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AND PONDKEEPER

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Editorial

AT this time of year a common complaint from the novice aquarist is that his aquarium water plants are failing to grow. In the coldwater aquarium in a cool situation the fall in temperature alone may be responsible, but with coldwater and tropical aquaria the usual cause of trouble is inadequate illumination. The reduced hours of daylight and the gloomy winter light in our cities and towns make it necessary for extra lighting to be provided if the plants are to keep green and growing. Aquarium top lights should be kept illuminated for longer periods than those allowed during summer months, and in some instances it may be necessary to increase the intensity of the lighting by fitting lamps of higher wattage.

It is more difficult to find sources of live foods for the fishes during winter months, but there is no excuse for withholding these from the dietary altogether. *Tubifex* worms are fortunately with us all the year round, and the owners of white-worm cultures will also continue to find good yields. Garden earthworms are easily obtainable and represent a valuable source of fish food. It is surprising what live foods can be found by the aquarist who will search around. Rainwater butts will usually provide bloodworms when the sediments covering their bottoms is collected, and even when ice covers the ponds of the countryside some foods, including that great favourite, *Daphnia*, can be netted. And if petrol rationing puts a stop to your live-food foraging in the country, do not overlook the fishmonger as a supplier of useful foods. Shrimps and fish roe are delicacies favoured by many aquarium fishes.

The Editor and staff of The Aquarist wish all our readers a Merry Christmas and a peaceful and Happy New Year.

Starting a Tropical Aquarium—12

by AQUARIUS

IN last month's article of this series the feeding of the young of egglayers was dealt with up to the stage when they were able to take fully grown *Daphnia*. Most aquarists find that once the fry are large enough to take *Daphnia* most of the feeding problems are over, provided, of course, that enough *Daphnia* can be obtained. From now on many other types of food can be used and it should be the endeavour of the fishkeeper to get the fishes used to varied diets in case one particular kind becomes unobtainable. Once the fry are getting along well it will be possible to get them feeding on packet foods and such mixtures as Bemax and dried shrimp. The change over must not be done immediately, but a little can be introduced between the ordinary feeds of live foods.

Feeding Young Fishes

Garden worms can be used for feeding young fish, but they must be chopped or shredded up quite finely, and the coarse skin must not be used. It will be found a good idea to sieve this food through a net before feeding so that the coarse can be given to older or larger fishes. Feeding with *Tubifex* and white worms can also be started, but do not expect some of the smaller tropicals to be able to swallow a whole fully grown white worm. It is better to place a few on a piece of board and cut them up with a razor blade, until the fry are larger. White worms are a very safe food, especially when they have been reared on brown or wholemeal bread.

Tubifex can be dangerous to fish if they are fed to them soon after they have been collected. Most of these worms live in foul mud and if they are fed to young fish before they have been cleansed through, trouble to the fry may occur. It is not easy to keep *Tubifex* alive for more than a day or two and even for such periods they should be under running water. Of course, the same thing applies to *Daphnia*—they are not easy to keep alive unless they have plenty of room, and aeration is often necessary to enable the aquarist to be able to keep them alive for long. They take a lot of oxygen from the water and when this is deficient the *Daphnia* die. A few dead *Daphnia* in a container will soon smell terribly, and few things will pollute water more quickly.

Although most of the instructions given have dealt with the feeding of the fry, it must not be thought that this is the only important factor in the rearing of healthy fishes. The very necessary provision of space must not be ignored; few fishes can be expected to become really first-class specimens unless they get sufficient space in which to develop. How must the aquarist see that this is so?

Although it will be found that, generally speaking, tropicals can stand a little crowding without showing ill effects it must not be thought that space is not very important. Where any fish are required to carry on the strain or for exhibiting it is essential that a small number of them should be sorted out at a fairly early stage so that they may be placed by themselves to get much more swimming room. When sorting out the fish it is not always the better plan to take only the very largest; sometimes the medium-developed fish are the best to choose.

Exhibition Tropicals

With practically all the egglayers it will be found that they all conform to a fixed pattern and all that is necessary is to see that there are no misshapen fish or runts among those which have been picked out. They should be placed in a well-planted tank where they have ample space in which

The beginner who has progressed as far as breeding his tropical fishes is advised in this article how to exhibit the results of his labours.

to develop, and then provided that they get enough of the right kinds of food their progress should be rapid. Later on, when they are nearly adult, they can have a final check over to make sure that they are all of a good quality.

When preparing some fish for exhibition it is necessary to have at least six from which your show fish is to be picked. Never concentrate on one or two fish, as anything may happen and the fish may become ill or damaged in some way and then you have no show specimen to exhibit. With the egglaying species it is of little use showing a fish until it is adult in size, as the fish are allotted 20 points for size, and if they fail in this they may not be able to make it up anywhere else. Naturally the exhibition fish must be in the pink of condition, as this will ensure that it has the correct colouring and that it shows off its paces properly.

Remember that 20 points are allotted for colour and 20 for condition and deportment. If the fish is in good condition, the colour and deportment are also likely to be correct. Fish in bad condition rarely show the colour for the species and they cannot deport themselves well enough. There are 20 points allowed for body and the same for fins, but it will be found that with most egglayers these do not vary much; the great majority of tropical egglayers will turn out very much alike—it is the condition which can make most of the difference between a winner and loser.

Having made up your mind which fish you have to show it is a good plan to get the fish accustomed to a smaller tank and to being peered at. Some types of fishes are naturally good at displaying and need little if any training, but others are of a shy disposition and require a certain amount of handling and use to the show tank before they are likely to show off to the best advantage. It is useless showing a very good fish if it is going to be forever at the bottom of the show tank; a lively fish will generally beat a sluggish one.

It is a good plan to give a special tit-bit to a fish as soon as it is placed into a show tank; for example, some *Daphnia* or white worms. It then comes to expect this treat and will search around the tank, so that it moves about well. When you intend to show get the show schedule in good time and study it. See that your fish are entered in the correct classes. Sometimes a class for a.o.v. (any other variety), can mislead a novice. This means that fishes in this class have not been provided for in any other class. Sometimes fishes are disqualified because the owners have placed them in the a.o.v. class when there was an actual class provided for them in the schedule.

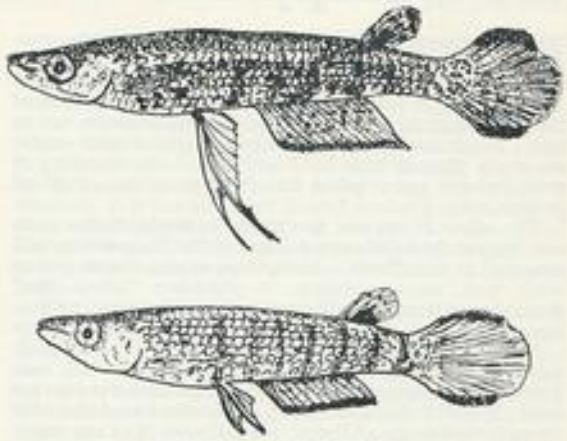
Do not ever exhibit gravid female livebearers, as some judges will disqualify them. Besides it is not a very good advertisement for fish-keeping to have visitors watching baby mollies being born and probably killed in the show tank. Where pairs of fishes are asked for, this means a true pair, not just two fishes; they must be of opposite sexes. Matching in such pairs can be very important, as it is not often that a pair will win if one fish is much larger than it should be in relation to the other.

Take your fishes to the show in good time for them to

(Continued on opposite page)

TROPICAL FISHKEEPERS' REFRESHER COURSE: *by Pisces*

Aplocheilus lineatus



Male above, female below

ORDER: Cyprinodontes, from Greek *kyprinos*—a kind of carp, and *odontos*—tooth.
FAMILY: Cyprinodontidae.
SPECIES: *Aplocheilus*, from Greek *aploos*—single, simple, and Greek *cheilus*—margin or lip. *Lineatus*—from Latin *lineatus*—streaked, or marked with lines.

APLOCHEILUS lineatus are far more beautiful than their name. But if you intend to keep them, do not put them in a community tank. They have large mouths, with sharp teeth, and make no bones about disposing of fishes one-half inch or more in length. The guppy breeder, faced with many fish for which he has insufficient room, and other breeders who do not know how safely to dispose of their runts, could do worse than have a tank or two of this species. They are by no means "toy" fishes, sometimes reaching four inches in length.

It is somewhat difficult to describe accurately the colours of these fishes, for they vary according to the way the light strikes them. Red, gold, green, blue, black, in spangles, patches and stripes, and an overall metallic sparkle is as broad a description as I can give.

When mature the female can be distinguished from the male by the presence of a black spot at the centre base of the dorsal fin, and by shorter ventral and anal fins. She also has more and stronger-marked vertical bars and very few red dots on her body.

A thickly planted aquarium with a heavy layer of floating plants such as *Riccia* is essential if breeding the fishes is to be attempted. A temperature of from 74° to 78° F. will encourage spawning. Routine feeding with surplus fry is assumed—otherwise liberal helpings of the usual *Daphnia*, May-fly and gnat larvae will be necessary.

The male chases the female into the thickest part of the surface layer, where she lays single eggs. Naturally this prolongs the spawning period, which may go on, with time off for meals and resting, for several days. A hundred or more eggs may be laid, and these adhere to the surface plants. It is said that any dislodged eggs which reach the floor of the tank will not develop. It would be interesting to know the explanation for this.

Incubation is exceptionally long—about 15 days. This means that the fresh alevins are bursting from their eggshells until the eighteenth day after spawning began. It means also that there are differences in the size of the alevins, which are not due to weakness or strength but merely to age.

The long incubation period gives plenty of time to prepare adequate supplies of infusorians for feeding the youngsters. The egg-sacs are absorbed in from two to three days, the swim-bladder fills, and the alevins are free-swimming and hungry. Plenty of food encourages rapid growth.

The thickest part of the cultures will be at the tops of the containers. A fountain-pen filler inserted just below their surfaces will draw in tremendous numbers of infusorians and comparatively little water. This minimises the risk of introducing harmful substances. Keep the temperature of the cultures the same as that of the aquarium water—too great a difference may kill all the infusorians or the sudden influx of much cooler water could chill the alevins.

Starting a Tropical Aquarium

(continued from opposite page)

settle down in the show tank before judging commences. Make sure that the water is of the correct temperature before the fishes are placed in the tank. This seems unnecessary to state, but I have seen many aquarists depending too much on the stewards and not taking the trouble themselves to make sure that the water is correct. The stewards have probably been very busy and the water may have been in the tank some time, in which case it may be too warm or too cold. Just because one or two tanks in the row appear to be all right it is not good enough to conclude that they are all alike. I have known ten degrees difference to occur in adjoining tanks.

When the fish have returned from a show they should never be placed with other fishes until they have had a few days by themselves. Many aquarists have had an outbreak of white-spot disease in their tanks after fishes have been returned to them from a show and when they have not spent some little time in quarantine. These fishes from the show should be fed well and given the best of conditions, as if they have won once they can do so again, but only if they are kept in the very best condition.

At the shows you may be able to pick up a fresh specimen or two. Even if you are unable to buy the actual winner it is half the battle to be able to procure a fish from the same strain, especially if you know that the owner has been breeding this particular strain for a long time. A strain which has produced winners is almost sure to produce some more from the progeny. While at the show have a good look at the fishes which may have beaten yours. If you can get a word with one of the judges it helps a lot. If you are in no doubt as to the type of fish which is winning it is a great help to you afterwards. It is, after all, rather useless trying to produce winners unless you are quite conversant with the types required.

Microscopy for the Aquarist—25

by C. E. C. COLE

LAST month I mentioned the ease with which the ecto-parasite *Ichthyophthirius* (white spot) could be studied with the aid of a microscope.

The study of fish parasites generally is, to me, one of the most fascinating uses to which our instruments can be put. Much has still to be discovered about them—there are many gaps in their life-history—and the discovery of some hitherto unpublished fact about them has a thrill all its own.

The effect of various treatments to eradicate the pests can frequently be observed, often with the parasites still attached to their hosts. Such observations enable one to work with more certainty, to eliminate "hit-or-miss" methods. Perhaps the illustration that follows will emphasise this point.

When experimenting with various chemicals to rid goldfishes of *Gyrodactylus* (the body and fin "fluke") I used Dettol. Too strong, it killed the fishes and flukes; too weak, it had little or no effect. I finally found the ideal strength—12 drops of Dettol in a gallon of fresh tap water. Under the microscope I could check, and did, time after time, what happened. Invariably the gyrodactylids released hold of their host with their rear-end immediately the chemical touched them. They stood in an S-shape on their heads for about three minutes, before finally leaving go to fall feebly to the bottom of the container. The fish was clean once more, and recovered its normal balance in fresh water after two or three hours.

The same strength of Dettol had no apparent effect upon *Dactylogyrus* (the egg-laying "gill-fluke"). In this case potassium permanganate proved effective, but the treatment was prolonged, hours instead of minutes. Again the examination of infested fishes under the microscope enabled me to check how long the dactylogyrids took to die.

The establishment of this fact was of vital importance, because these worms do not leave their hosts until death, so a single adult worm left alive can start a new generation of worms in whatever aquarium it finds itself, provided that the temperature is suitable.

And now for two practical matters that have arisen. The first concerns use of the substage condenser. Several letters have been received which indicate that some of you are using condensers with the low-power objectives I first recommended you to purchase. The results are extremely unsatisfactory, and small wonder.

Condensers are made to concentrate all available light into an area hardly more than a millimetre in diameter. Is it reasonable, then, to expect them to illuminate fields of view half-an-inch and more?

Sometimes one reads that to enlarge the area illuminated, the upper lens of the condenser should be unscrewed. This is satisfactory for medium-low powers, but I still cannot recommend it. If you are good at losing things, or careless as to where you place them, the small unscrewed lens can easily disappear, or be knocked to the floor unnoticed and later trodden on. Moreover, in our large and dirty industrial towns there is frequently a constant rain of gritty dust, some of which will undoubtedly settle upon the upper surface of the condenser lens.

Unless very careful, one can forget to clean this off before replacing the unscrewed lens. Any grit ground between the two lenses will not do either of them any good, and even if none actually scratches the lens surfaces the presence of dust in the optical train can cause trouble and detract from the operational efficiency of our instruments.

A condenser is unnecessary, and indeed, an encumbrance for any object glass with a lower power than one-quarter of an inch.

Tip of mask of dragonfly larva (2 in. objective, × 5 ocular)

Body and fin flukes (Gyrodactylus) from a fish. Preserved specimens (drawn under a ¼ in. objective and × 8 ocular)

Head of larval water beetle Dytiscus from below (2 in. objective, × 8 ocular)

The expression "low-power" objective or object glass sometimes misleads newcomers to microscopy, and is an example of an apparent contradiction of terms. The engraved value on the objective, i.e., 1 in., 2 in., ¼ in., etc., seems to imply that as 2 in. exceeds ¼ in., the 2 in. objective should be more powerful than the ¼ in. The reverse is actually the case. The smaller the fraction of an inch engraved upon the objective, the more powerful it is.

There should, of course, be no further difficulty once this fundamental is understood, but it would never arise if the initial magnification of the objectives was also engraved upon the object glasses. This is done by James Swift & Son Ltd., and is extremely useful in working out overall magnification without reference to manufacturers' catalogues.

Arising out of this, of course, it must be emphasised that any alteration in the length of the body tube above 160 mm. will automatically increase the overall magnification—that shown is immediately wrong. To avoid working out sums it is better to keep the body tube at its length of 160 mm. and increase the power of the eyepiece, or rotate a more powerful objective into position and adjust the focussing.

Next month I will talk about glare—its causes and the remedies available.

In the Water Garden in DECEMBER

by ASTILBES

IT is still possible to build a new pond at this time of the year, for it is probable that the weather will not be too severe until the new year. It is always easier to dig out a pond during the colder weather and the actual concreting can be done as long as it is not freezing at the time. The alteration of a pond or the addition of certain features can also be undertaken now.

Many pondkeepers find that after a few years their pond has become rather overcrowded with water plants and their restriction has become a problem. In such cases it is often possible to create separate parts to take most of the plants so that the main pond can be kept free from most plants. The water lilies of course must remain in the pond but most of the other larger-growing types can have a type of bog garden constructed adjoining the pond where they may grow unchecked.

It may be possible to make an extra water garden along two sides of the pond so that although quite separate from the actual pond the plants will merge well at the sides and look natural. When you have decided where the bog garden is to be, make sure that it is pegged out and that your levels are correct. Wooden pegs can be driven into the ground and levelled up with the aid of a long straight board and a spirit level. Sufficient soil must be removed to allow for a good depth of concrete. It must not be thought that because the bog garden is not actually connected with the pond no care need be taken to see that it is able to hold water well. Nothing is more annoying when a bog garden is finished to find that there is a continual leak from it, necessitating the constant topping up with fresh water.

Repairing Cracks

When your excavations are being made see that you do not go so near the concrete of the pond as to weaken it. At the same time it is possible to strengthen any pond which has developed a leak at a particular point by making the bog garden at this spot. Lower the water in the pond first and then dig out plenty of earth from where the leak has been noted. It will then be possible to force some fresh concrete into the crack, but make sure that no stones are present in the mix. See that it is a fairly strong mix but use sharp sand only and no aggregate.

When the actual crack has been filled it will be quite simple to see that there is a good depth of concrete placed over this spot when the actual bog garden trench is constructed. The depth of this bog garden should be sufficient to allow for at least a foot of soil with a covering of six inches of water. This depth will be quite enough for most of the water plants which you will require. The width can be anything you like, but from one foot to two feet will probably suit best. The bog garden adjoining the pond should never be too wide to allow easy access to all parts of it. A long pond could have a bog garden constructed the whole length of one side, and the width could be somewhat in proportion to the size of the pond. It should not be made so large that it dwarfs the actual pond in any way.

There appears to be considerable doubt in the minds of many readers as to how to make a pond or bog garden which will hold water safely. Many people have the idea that ordinary concrete will not hold water unless either special cement is used or the finished pond is treated with a water-proofing solution of some kind. This is not so. By using ordinary cement and sand in the right proportions it is possible to make concrete ponds which will hold water for years. There are two types of mix which can be used. One is to make a general mixture of one part of cement, two parts of sand and three parts of aggregate. The other method is to make a fairly coarse mixture for a first coat and then float this over with a mixture of three parts of sand to one part of cement.

For smallish ponds the first mix is good enough, but where a fairly large pond is to be made it will be found that the latter is the best. However, there is one point which must be remembered when using the two-coat method; it is not advisable to wait too long before adding the second coat or floating. If the first sets too firmly then the second will not adhere as well as if it had been placed on as soon as possible after the first coat had been laid.

When mentioning aggregate the substance referred to is small washed ballast having small stones of up to an inch in diameter. The addition of aggregate to a mix ensures that the finished product will be very strong and that expense is saved—the aggregate will be cheaper than either the cement or sand. The quality and type of sand is most important. There are many types of sand, not all of which are suitable. The very soft sand used in mortar work is not suitable. The sharp type known as Leighton is quite good, especially if some washed river sand or river grit is added. This kind is ideal for strength in concrete work, and where the depth or thickness of concrete is not great it is possible to make a mixture of one part of cement to three parts of washed river grit which will be not only waterproof but very strong and lasting.

Concrete Mixing

If great care is taken when mixing the concrete then a great deal of worry and trouble will be saved later on. The cement should always be fresh. When old it will contain hard lumps, which shows that a certain amount of setting has already taken place. The cement should be quite soft and flowing. The sand and aggregate must be quite clean and free from either lumps of earth or lumps of soft sand. Any such pieces left in the mixture may cause a hole to form later on which would give a leak. The cement and sand must be so mixed that all the sand is well covered with cement. The water should be clean and poured on with a water-can rose. The mixing must be done with all speed once water is added. It should be made just sloppy, but for the first coat, if two are being used, it should not be too wet. Firm it well down on a hardened base and if the area to be covered is large it is advisable to add some reinforcing at this point. This can be rods of iron, or coarse netting like that used sometimes for sheep folds will do.

Concrete starts to set or "go off," as it is called, in about 20 minutes after having water added, and so it will be realised that the sooner the mixture is put into position the better the job will be. As a matter of fact if one section of concrete is laid and left for a few hours before the next is added it is probable that the second layer will never join up correctly with the first and a leak could develop at this join. If only the one coat is to be used it is possible to tamp well over the surface with a trowel so that the large goes to the bottom and the finer comes to the surface. If this method can be adopted the result will be stronger than if two separate coats are given, as there is then no fear that the second coat will not make a good join.

The actual thickness of concrete should never be less than four inches. This is necessary to withstand the strain of a bad freeze-up. Where a fairly large bog garden is being constructed it will be safer to insert some pieces of

(*Continued at foot of next page*)

A Small-sized Cichlid—*Pelmatochromis kribensis*

by RODNEY YORKE

THIS is not really a dwarf cichlid as we know the term but its size is so accommodating (usually under three inches) that it is often looked upon as such. It certainly has much to commend it as a cichlid, because it does not uproot plants and is rarely aggressive to other occupants of its tank. By nature very shy and retiring it puts on magnificent coloration for its small size, and proves to be very hardy when assailed by the majority of piscine ills.

This African fish gets its name from the River Kribi in the Cameroons and seems to have been given no common name as yet, although it has become a universal favourite. Many hobbyists have reported that the male shows all the colour, but in my own view this is quite wrong. It is the female who shows up brightest and it is she who does most of the courting, leaving the male in no doubt of her intentions. Two females in spawning mood with one male are very interesting, because each seems to outglow the other, and the effect is amazing.

The well-known cichlid flower-pot breeding method works well, and a well-shaded tank in a quiet spot is necessary. *Pelmatochromis kribensis* is very timid and the more you put the blinds up round him the better he will enjoy his privacy. A temperature of 74-86° F. suits them quite well and breeding can be expected at a size of two inches. Not a great many eggs are laid, by cichlid standards, and they are not the easiest of this family to rear.

The eggs hatch in two or three days and this is where the difficulties start. Rather like the better-known glowlight tetra, the young fish dive down into the mulm and hide away and probably continue to do so for another seven days. All this period they need Infusoria in quantity but often don't get it, hence the high mortality rate. As soon as they are seen to be free-swimming they must have brine shrimp and sifted *Daphnia* to follow, after which it is easy going. This fish is always hungry but is a dainty feeder as cichlids go, almost all live foods being accepted. German sources suggest leaving the parents in with the fry, but it is probably wiser to remove the male, leaving the more devoted female with her babies for about a week.

If you rear 40 youngsters from roughly 80 eggs you will have no cause to complain. The young grow quickly if fed well on good, live food and if they are not crowded. They seem to "gasp" rather more than most fishes, but this is just their way—they are not short of oxygen as one might imagine. There seem to be a number of closely related species of this fish about, all very much the same, so that it is hard to describe exact markings or colourings. In particular the spots on the dorsal and tail vary considerably, and young fish are not easy to sex with any certainty, no matter what the dealer tells you. Adult fish are easier to sex as the female is much plumper, has brighter colours and less-pointed finnage, and is the one that pushes her attentions on the male.

Pelmatochromis kribensis has now been available for about four years and has equalled in popularity the now well-known *Apistogramma ramirezi*.

Hornwort

CERATOPHYLLUM demersum is commonly known as hornwort and is one of the finest types to use for spawning egglaying fishes. The plant has long stems which are thickly clothed with whorls of bristle-like leaves and it branches freely. It is strange in that it does not appear to make any proper roots but anchors its stems in the mulm at the bottom of the pond, and under good conditions soon spreads by repeated branchings. The characteristic growth without roots makes this plant particularly valuable for use at spawning times, as once the eggs have been laid on it the whole can be transferred to the hatching tank where the plant flourises although it only need float near the surface.

Hornwort can grow at a very great depth and will generally grow best at the bottom of a fairly deep tank; one 2 ft. deep suits this plant well. In the winter the plant appears to contract and shortens into hard horn-like pieces which drop to the bottom and so remain until the spring. Once the weather gets warmer the plant starts to shoot and grow. For the aquarium it is not too good as a permanent feature as it has a tendency of growing quickly up to the surface and will often leave the bottom altogether and float just below the top of the water.

It is quite easy to propagate as any shoot can be laid on the mulm, with a stone over it to keep it anchored, when it will soon grow. It must be handled with care as it is very brittle. The finely clothed stems are ideal for receiving fish eggs and the tight whorls are a safe hiding place for newly hatched fry.

Other species are: *C. echinatum*, from North America; *C. muricatum*, from Asia and Africa; *C. submersum*, Europe and Asia; *C. submersum* var. *apiculatum*, Europe and sometimes found in Britain. Although *C. demersum* is a useful cold-water plant it can also be used as a tropical one and is invaluable in tanks which contain livebearers, making a good safe hiding place for the newly born young.

In the Water Garden in December

(*continued from the preceding page*)

iron rod, bent at right angles, at each corner, as these form the weak spots as a rule. When the concrete has set it can be well washed round and should then be ready for use. If the work is carried out at this time of year there is no immediate need to fill with soil and water. This task can be left until the spring. However, if it is desired to test the work for leaks, etc., the filling can be done now.

The soil for the bog garden can be chopped-up turves, if available. If these cannot be obtained the John Innes Potting soil can be used, the no. 1 mixture will do. If a fair amount is required it is possible to make the mixture up oneself. The contents are: loam, 7 parts; peat 3 parts; sand 2 parts; to each bushel add ½ oz. of ground chalk or limestone, 1½ oz. of superphosphate, ½ oz. of sulphate of potash and 1½ oz. of hoof and horn grist.

See that the soil is well firmed down in the bog garden, about a foot of it, before any water is added. This should be run in with care so that as little disturbance as possible is caused. When actual planting is being done in the spring some of the water can first be removed.

AQUARIST'S Notebook——

by

RAYMOND YATES

NON-AQUARIST visitors fall roughly into two types. The first is charmed by your set-up and asks numerous questions. The second comes in and never gives the slightest indication of having even seen your tanks from the moment of arrival to final departure. There are other visitors, however, who grate on one's nerves. I suppose they are found all over Britain.

One is the type who knocks on the glass repeatedly and with a loud guffaw exclaims "Ha ha, that shook him!" It shakes me too. Another is interested in a condescending way but qualifies his approval with "but you should see mine." The trouble is you never do see his fishes and you suspect that his imagination is running away with him. How truly has it been said of another hobby that the only time an angler tells the truth is when he calls another fisherman a liar. Then there is the bore who wants to know how often do you change the water. I always feel that these people feel they ought to say something and that this is the only phrase which occurs to them to give the impression of deep interest. The cadger is well known; his opening gambit is usually on the lines of "Why, I've been looking all over for one of those for months" etc., etc., and he often proves to be the one who is prepared to put you to a lot of trouble and to keep on as long as you are prepared to stand for it.

Another nuisance always knows how and insists on telling you how, although he has never had any experience of the point in question. Nothing annoys me more than people who want to tell you how to breed fishes they have never kept and sometimes not even seen. The chain smoker is another unpopular visitor, although if aeration is turned off, relatively little harm is done. The noisy, loud-mouthed, back-slapping types are another horror. Often they insist on calling you by your christian name and generally want to talk all about themselves and their pet sport or hobby and treat yours as a matter for great amusement. "Whatever do you see in these little sardines?"—and so on, *ad infinitum*.

Visitors' children are the very last word. You can't tell them what they ought to be told and you have to watch them lynx-like all the time. If they are out of your sight you suffer agonies of fear as to what is happening. A good method is to scare the parents in advance with tales of faulty wiring, but it doesn't always work. When you know they are coming turn off all the lights, remove all loose fittings and plead a wiring fault which you cannot trace. As a rule you lose anyway so don't be too hopeful of getting away with bluff. One final horror is the "dismal Jimmy" individual who looks at your tanks, gives faint praise and then begins to look miserable and proceeds to thoroughly enjoy himself pointing out defects real or imaginary . . . . "Have you seen that one? . . bad way . . . won't be here for long." You must have met them. Well, what do you do? Personally, once known, I never have any further trouble because they never get beyond the doorstep. It is easy to invent some yarn about illness or decorating. They don't believe you, but who cares?

* * *

The Canadian National Exhibition held at Toronto was a great success and resulted in the club obtaining 63 new members and two fresh subscribers. The judge was the well-known American hobbyist Mr. Herbert R. Axelrod, who flew from New York with his wife specially for this purpose. Two points which emerged which are worth mentioning are the suggestions that livebearers should always have floating plants in their show tanks and that the type of plant used in furnished aquaria should bear some relation to those native to the waters in which the fishes shown are found. Both these points are often overlooked in England.

On the question of membership I quote from an unknown author. "A club may spend great amounts of time and effort to increase its membership, yet the new member will form his judgement of the club through his contact with one individual. If the person is crude, inefficient or a 'know-it-all' it will require a lot of courtesy and efficiency to overcome the bad impression. Every member of an organisation who, in any capacity, comes in contact with a prospective new member, is a salesman. The impression he makes is an advertisement, good or bad."

* * *

I am always glad to see cartoons reflecting some facet of the hobby. These are more in evidence in U.S.A. and Canada but a few appear in Britain. Perusal of European aquatic magazines show the cartoon as almost non-existent. The cartoonist must, of course, belong to the hobby, which perhaps explains the relative dearth of this form of humour. The following are good examples of recent efforts, mainly transatlantic in origin. Rolling-pin in hand, the wife confronts her husband who murmurs "Of course I love you as much as the fish dear, it's just that they are a lot cheaper to feed." Then we have the hobbyist who looks at his visitor and says "Spell it?—It's all I can do to pronounce it!" Domestic upset is depicted by the wife (holding half-full tank in her arms) saying "I don't want to hurry you but I wish you would make up your mind where you want the darn thing." Then again we have the lady of the house all ready to leave for the annual holiday saying "What do you mean . . . cancel our vacation just because your angel fish have spawned?"

A well-known scene is that of the aquarist cleaning out his tank, water all over the floor, fishes in a bucket and the last inch of water being siphoned out of the tank as the wife calls out "Supper's ready." Pet-shop aspects are introduced with the lady at the counter asking if the fish are genuine goldfish: the dealer replies "No, lady, not at that price, they are only rolled plate" (*Aquatic Life*); and the customer in the shop who says "What, two shillings each for those? Why, I never paid more than a shilling each for these at the X.Y.Z. Pet Store right up to the day they went bankrupt" (*All Pets*). From the same magazine we see the owner who puts his tank on top of his T.V. set and returns home to find his fish looking at him through the T.V. screen itself, swimming around quite unconcernedly. The best cartoonist I have come across is Mr. E. Green, of Toronto, who is responsible for most of those mentioned.

* * *

Portsmouth club took the risk and put on yet another show this year. This ran to over 400 tanks and 25 furnished aquaria and included a three-inch piranha, which few shows have. A comfortable profit was made although the attendance fell. Success was the result of careful planning and cutting down on unessentials. A feature of the show was an ornamental pond which made an attractive centre-piece. This was used as an effective display for the Society's

numerous cups and trophies. One lady, after critically studying the pond, was heard to remark "It's really very nice indeed but . . . I don't think it's worth all those prizes, do you?" You never can be too careful when planning your lay-out. The society continues to issue a club magazine every quarter and this is a very fine effort indeed, running to 24 pages plus eight advertising pages.

* * *

It is surprising how one comes across references to the hobby in trade papers and magazines. Some time ago I read up some very interesting notes in the *I.C.I. Magazine*. Recently the internal magazine of the de Havilland Aircraft Companies printed a most amusing article entitled "A Flat for Fishes" or "Shoved out by Shubunkins." It all goes to show that the hobby is getting more widely accepted and widespread. A very good sign.

* * *

An enthusiast in Nottingham puts forward an unusual suggestion after trouble in the propagation of white worm. He thinks that these worms deteriorate through inbreeding constantly from the same stock. Over a prolonged period there may be something in this, although new stock is easy to obtain. Has anyone any comments? An idea put forward for sweetening the soil of a white-worm culture requires a solution of bicarbonate of soda in water, in the proportion of two tablespoonfuls of bicarbonate to a gallon of water. This is sprinkled on the culture soil as required.

* * *

Far too many hobbyists keep a single *Corydoras* in a community tank. Thereby they lose all the fun. They look upon catfish as scavengers with a job to do and nothing more. This is all wrong. A single *Corydoras* will do its job, but mostly after dark, and will show itself but little whilst the tank is illuminated. If two of the same variety are kept together, however, they go about together in the most amusing way. When one goes the other follows and they have the trick of resting side by side in a most inseparable manner. Three or four together will often keep up the regimentation act but as a rule three is about the limit. There is also a limit to what *Corydoras* will clear as scavengers. They will remove much of the "left overs," within reason, but they will not clear excess *Tubifex* which has settled in quantity in the gravel.

Many aquarists make the mistake of feeding several foods at once. This is all wrong. Feed little and often. If you give your fishes some bulky dried food and follow up five minutes later with *Tubifex* the fishes will be in no condition to look at the worms, and these will merely set up a tank-floor colony to the detriment of all. Fishes with a bent backbone are unsightly and useless and should not be kept, but now and again one comes across this in a *Corydoras*. In these fish it is no defect as they rarely swim. Rather does it enhance their quaint gnome-like appearance. As a rule it is only found in adult fish.

* * *

Tanks are better if they rest on some firm foundation such as the top of a piece of furniture so that the whole of the bottom of the tank is supported. Time was when most aquariums had a slate bottom, but nowadays glass or wired glass is the rule. If the bottom falls out of a full tank the resultant mess is chaotic, more particularly if situated in a living-room. Tanks which stand on furniture should have a thick rubber mat to stand on to protect the woodwork. Water will quickly remove modern veneers and it is as well to see that no droppings can damage anything of this nature. The bottom of an iron tank can, and will, rust just as badly as the top portion, even when standing on a rubber mat, but it is not noticed until such time as the tank is moved. I do not favour oilcloth or the like as this allows the water to find its way through in time; rubber prevents this.

Many tanks which have stood for years with an inch or more of gravel covering the bottom have hidden cracks in the bottom glass, arising from the heater at some time or other. I do not favour heaters being allowed to lie on the gravel; it is just as easy to fix them up in a cradle of rockery which will prevent bottom cracking and also any possible movement sideways against the side glass. Tanks which are cracked are bad risks. Never half empty a tank and then leave it. This is asking for trouble, which usually comes four or five days later when the tank begins to leak without warning, as likely as not in the middle of the night. Remember a full tank gives least trouble. Old, rusty aquaria can be done up for use as vivaria and most schools will gladly take them to accommodate hamsters, mice and other animals.

* * *

It is surprising how little most people know about electricity. The majority of aquarists nevertheless do all their own wiring and in many instances this can be quite a big job where many tanks in different rooms are concerned. Even so we have yet to hear of a fatal accident to a hobbyist following electric shock, which is just as well; there is no doubt the press would make much of it to the detriment of the hobby. On the other hand, one reads of fatal accidents resulting from the use of electric blankets but these are still in demand. An aquarist in Oldham received some nasty burns recently whilst dealing with the electrical fittings of his tanks but the fault seems to have been the human element in this case. The local press gave it considerable publicity, however. Familiarity breeds contempt, it is true, but where electricity is concerned one cannot be too careful. All electric wiring used in the hobby should be connected with household power plugs and not lighting points. Rubber-covered cable is more expensive than the silk-covered variety but is far safer and shows little if any wear. It is a wise course to have a pilot light to indicate when your heater is on and never to put your hands or metal algae scrapers, etc., in tank water when the heater is shown to be on. Failing this, disconnect the plug from the socket, so as to be on the safe side.

Periodically check all connections and look for signs of wear, fraying or corrosion. Before removing a heater from the water make sure it has cooled down and never switch on a heater which is not immersed. Internal thermostats are not seen so much nowadays but those in use should be watched, because water can find its way into them. I have seen internal thermostats more than half full of water, the owner being blissfully ignorant. Arrange your wiring so that it is easily accessible in the event of trouble. I know of some instances where it proved impossible to get at the seat of the trouble without emptying and moving very large tanks. Know which fuses in your fuse-box govern your aquarium set-up. In midwinter after dark you don't want to waste any more time than necessary.

* * *

It is very annoying when one has trouble with a tank which cannot be dealt with unless the whole tank is emptied and taken down. Where the trouble is a leak this cannot really be helped and is just one of those things which, fortunately, don't happen very often. I had a lot of trouble with one tank with built-in thermostat, etc., and this was impossible to get at when the tank was standing against a wall because it was situated at the back of the tank. In the end I solved the trouble by installing the tank on a dinner waggon. I found this an excellent idea which enables a really ornamental aquarium to be moved about *en bloc* without trouble or fuss.

Interpreting Results of Aquarium Experiments

by Dr. F. N. GHADIALLY

AFTER an experiment has been done and a result obtained, the next job is to interpret it. Here the logical faculties of the mind are called into operation. Nature often has an irritating way of answering our questions in riddles rather than in a straightforward manner, and in light of existing knowledge it might be impossible to know what interpretation to put on a perfectly clear-cut result.

Two different scientists may read two entirely different meanings in the result of a single experiment. Controversy then begins, other scientists repeat the experiment and plan other similar experiments, and as more and more results pile up the picture becomes clearer and clearer. This is where a working hypothesis is so useful. On the basis of a set of results a tentative theory as to how these results are brought about is drawn up, and then fresh experiments to test the truth of this hypothesis are planned. As fresh results appear the hypothesis may become stronger and stronger, it may need some modifications or one may have to abandon it completely as false and form a new one. There is no disgrace in changing or modifying one's original ideas in light of new evidence. A scientist's reputation really suffers only when he obtains wrong results from his experiments which cannot be confirmed later on by the repetition of these experiments by others. A single error of this kind may completely ruin a scientist's career.

The first and minimum requirement of a scientist is complete and absolute honesty in his outlook. However much a result may go against his pet ideas or theories, he must accept them as he sees them. He must observe impartially and without bias. He must say to himself: "I cannot create facts—that is nature's job; I can only find them and record them however pleasant or unpleasant the consequences." When all is going well and experiments produce the results we anticipate it is easy to be honest, but when experiments begin to show up the error in one's old pet ideas, which have probably taken a lifetime of hard work to formulate, it is not so easy.

Negative results are another source of worry and frustration, but they too are important. Let me give you an example: Thomas Edison propounded a theory that it would be possible by making an electric current to flow through a conductor to render it incandescent and thus produce a useful source of light. Other workers of his time agreed that one could produce light momentarily by such means, but said that the light was due entirely to the combustion (burning up) of the conductor as the current passed through it so that it would be impossible to produce a permanent source of light by such means. Edison maintained that the light produced was not due to simple combustion but by incandescence, as the presence of oxygen was not essential. He therefore set out to make the incandescent lamp, a common household object to-day, but a thing of great scientific interest not so very long ago. He excluded oxygen by evacuating his lamp, so that the element would not burn out; but he could not find any metallic conductor that would stand up to the terrific heat and not melt. For a long time he worked with his team of research workers trying out various metals and their alloys then available, but to no purpose. In short, all his experiments were producing negative results.

One day one of his colleagues cried in despair that it was no use going on, that they had tried hundreds of experiments and had got no further towards making the lamp than when they first started. The reply which Edison made shows the importance of negative results: "Oh no," he said, "we do not yet know how to make the lamp but we have discovered hundreds of ways of how one cannot make a lamp. This too, is an advance as it narrows down our search." A few months later he struck upon the simple but ingenious method of making a carbon filament and gave the world its first incandescent lamp.

Those who attempt to breed fishes that are difficult to breed, or so far "impossible to breed," are faced with similar problems. They have to try one variation after another in the composition of the water, in the diet of the fish and resulting fry. Hundreds of failures and mounting despair as each bright idea proves to be not so bright, weighs down their mind and spirit. They can take courage from the example of others like Edison, for honest failures and sensible experiments are never a waste of time; they are only the stepping stones to ultimate success. The only thing that is a waste of time and fogs the issue, are bad, shabbily performed experiments. They mislead other workers, who have now the additional job of finding and correcting the errors before they can carry on with the research.

Some Common Errors of Simple Logic

Let us now consider a few common illogical fallacious doctrines which are pitfalls in which we are likely to stumble if we do not consciously watch out for them.

One of the most difficult problems is the establishment of a cause-and-effect relationship between two phenomena. To prove that one thing is the result of another is very difficult. Yet continuously we find during discussions in aquatic societies and the writings in aquatic journals that some people are not even vaguely aware of how difficult it is to prove a cause-and-effect relationship or how dangerous it is to draw such hasty deductions. Most such contentions are quite absurd and untrue, and easy to show that they are untrue, but with others it is not so easy. Let me give a few examples.

Two aquarists may be discussing the "best" way to culture white worms; one has been successful the other not so successful. They compare their methods; all appears to be exactly the same (it never is) except the fact that one uses bread as food for the worms, the other uses porridge. Out comes the remark "Ah well, that is it then, I always knew that the real secret of success with white worms is to use porridge." In short, what he is suggesting is that he has spotted the causal factor responsible for the other chap's failure to grow white worms. This chap goes home, throws away the bread and replaces it with porridge, only to find that he still cannot grow white worms!

As a matter of fact I have seen, and most of you have seen, first-class thriving cultures reared on either bread or porridge, and in light of present knowledge we could suggest that one appears to be as good as the other and that this sort of hasty deduction is just plain silly. The same applies to numerous other points of controversy, such as whether to dip bread in water or milk, whether to place a sheet of glass over the culture or not, and so on. Although as a rule it is worthwhile seeking out the differences between a successful method and one that is not so successful, one must be cautious and not be led away by trivial unimportant details and glibly accept them as the major cause, or worse

still, the sole cause of the failure or success as the case may be.

The same sort of illogical arguments are seen when the question of breeding fishes is discussed. Some member of a society succeeds in breeding a fish which other members have so far failed to breed. Notes are exchanged and often some quite trivial unimportant factor in the whole proceeding is pinned down as the main cause of the success. The fallacy, however, is soon brought home when other people get successful methods in the absence of this "important" factor. The classical example here is the pathetic importance that is being attached today to soft acid water as being the answer to all fish-breeding problems. While there may be some truth in this where some species are concerned the whole situation is now grossly exaggerated.

Statements such as this: angels or glowlights must have soft acid water for success (pH 6.5—6.8, and water less than 4 degrees of German hardness), are just not true. Angels have been bred very successfully both in acid and in alkaline waters on numerous occasions. I know of successful results obtained at pH 8 and 15 degrees of German hardness. The same goes for glowlight tetras which have been reported to have been bred successfully in large numbers in alkaline water of 8 degrees of German hardness. Note also here the failure of numerous aquarists to breed neons in large numbers in spite of making the water soft and acid. This fallacy, which I hope to discuss in detail in a future article, has crept in and is now deeply rooted, because of too hasty an acceptance of a cause-and-effect relationship.

Because a fish successfully breeds in soft acid water it does not automatically follow that soft acid water is absolutely necessary or that it is the cause of the success. It might be or it might not be; we do not know. It is suggestive, but no more. You might with equal logic state that the colour of the aquarium frame is responsible for the success when you observe a successful spawning in a frame painted green. Surely a lot more successful spawnings have been observed in green-framed tanks than in any other colour! Here are two correlated phenomena but nobody in his proper senses would suggest a cause-and-effect relationship, yet we do this sort of thing all the time.

How logical do you think is this statement? More people die in bed than anywhere else, therefore it is dangerous to go to bed. The obvious error of logic here is that the two phenomena are casually but not causally related, and hence the deduction drawn that it is dangerous to go to bed is, to put it mildly, somewhat inaccurate. Let us then state clearly once and for all, the well-known but often forgotten doctrine in science: *two phenomena occurring simultaneously or concurrently need not bear a cause-and-effect relationship to one another.*

It may be some consolation to know that we are not the only people who have made such mistakes. The history of science shows that many great men made very similar errors of judgment, so let us be careful and think hard before we say that A causes B or A is responsible for B. To drive home this important point, let me show you an example from human medicine. You have all heard of the "alcoholic's liver." Doctors and laymen alike believed that alcohol had a direct poisonous effect on the liver and that chronic indulgence led to the destruction of liver cells and scarring of the tissue, producing a disease technically known as cirrhosis of the liver. Only in recent years has experimental work revealed that alcohol is not directly responsible and that it has no direct poisonous effect on the liver. We can produce this disease in rats by feeding them a diet deficient in a substance (an amino acid) called methionine. That alcoholics suffer from this disease is not because they drink alcohol and alcohol is poisonous to the liver cell but because they are notoriously careless about their meals. They eat very little and never seem to have time or money to eat a proper balanced meal. Their disease is therefore no more than a nutritional deficiency. For instance, if they were to drink sufficient milk (milk is rich in methionine) they could drink the alcohol without producing any liver damage.

So you see, even an old-established belief like alcohol causes cirrhosis of the liver is not strictly true. There is no direct cause-and-effect relationship between alcohol on the one hand and cirrhosis of the liver on the other.

Significance of the Common Factor

Looking for a common factor is, in most instances, a sensible pursuit, but here again there is need for caution. Let me illustrate this with an example. Suppose we are trying to breed some variety of fish. We have only one male and three females. We try that male with each female in turn and find that there is no spawning or perhaps that each time we get only infertile eggs. Can we, therefore, conclude that the common factor, the male, is responsible for these failures? In short, can we deduce that the females are all right but the male is no good? This is quite a reasonable attitude to take for we will be right most of the time but not every time. There is undoubtedly the likelihood (*a*) that the three females are probably all egg bound and no good and the male is normal, (*b*) that the fault does not lie with any of the fish at all but perhaps the water is unsuitable or the layout or technique is at fault.

In short, while the common factor is usually the one that is responsible this is not invariably so, and when faced with a situation similar to the one above we must keep an open mind for any other possible alternatives.

To give a somewhat humorous example. A medical student who had never heard of alcoholic drinks became drunk on Scotch and soda, so to find out whether the Scotch or the soda was responsible for the effects observed he tried gin and soda, rum and soda, brandy and soda on successive nights, and came to the conclusion that the common factor (soda) was the intoxicating factor!

Recording and Publishing Results

We all know only too well that human memory is neither perfect nor reliable. It seems almost silly to point out that immediate and accurate recording of observations is of prime importance. This has been pointed out repeatedly by various writers yet so few people bother to record their observations. The keeping of accurate records is not easy; it comes only with practice. It is difficult to decide in the early stages what is relevant and worth recording and what is irrelevant and hence not worth recording. The answer to that is simple: if in doubt, play safe and put it all down—it cannot do any harm. It is most frustrating to find that a whole experiment has to be repeated because you failed to record something that you now find, when it is too late, should have been recorded.

It is very difficult to see in the beginning what is important and what is not. So think hard about all possible things you should record and record them. Whenever possible put down actual measurements or weights or numbers instead of vague statements as to size or numbers. On the other hand, when you are giving a rough estimate or an impression, please say so and also how you arrived at it.

Take a common example: the number of eggs in a spawning. How on earth can one tell just by looking at a tank how many eggs have been laid in a spawning? Yet we find it quite common for people to write "about 200 eggs were seen" or that "about 500 fry were seen." Short of destroying a spawning and actually finding and counting all the eggs one by one, there is no real way of finding out how many eggs have been laid. Counting hundreds of

(Continued at foot of opposite page)

Semi-Self-supporting Aquarium Division

by STEWART G. KNOCK

I BELIEVE that many fish-keeping enthusiasts eventually come to the point when every suitable position in the house is occupied by an aquarium and yet still more room is required. This is the time when any furtive loitering about the house, coupled with examination of electric points and strength of floorboards, raises suspicious feminine eyebrows!

As I came to that stage some months ago, I decided to make a compartment in a large breeding tank, and I have found it most useful. It has proved to be a ready receiver for fish awaiting disposal, a repository for the growing-on of virgin fry of livebearers, a place where special feeding can be given to fish before spawning and where small livebearers can produce their young, and no doubt it has many other uses.

The only materials required to make this division are two sheets of glass, a little cement, and a few pieces of galvanised wire. It will be observed from the figures that the sheet of glass forming the base is wider than the tank, and is therefore on a slope (Fig. 1). Provided that the lower edge is supported, it will be appreciated that the higher edge cannot sink. To support the lower edge it is necessary to add two blobs of cement, into which are embedded pieces of galvanised wire (Fig. 2). One of these wires is bent over the top of the aquarium frame at the front, and the other over the side frame to prevent the tray from swinging out (Fig. 3).

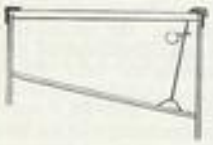
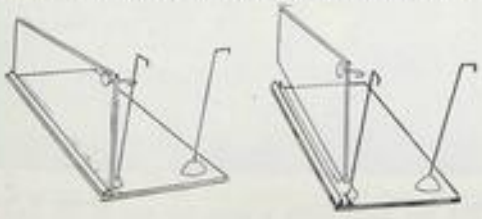


Fig. 1

Fig. 2

The side panel of glass drops into a groove formed with cement on the edge of the base panel (Fig. 4). This groove is best made by loosely covering the bottom of the side panel with paper, standing the panel in position on the base, and working up to the paper with cement (Fig. 5). Before the cement is quite hard, the side panel can be removed, with care, and the paper discarded. To give greater rigidity to the side panel, a wire can be cemented to the inside top and hooked around the near vertical wire.

Of course, the top of the side panel must be about ¼ in.



Figs. 4

Fig. 3

below the aquarium frame, as it has to be lifted over the ¼ in. groove on the base. Should there be any slight gap between the glass sheets and the tank sides where fry might escape, narrow pieces of glass will close them (Fig. 6).

Fig. 5

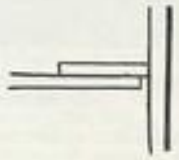


Fig. 6

Interpreting Results of Aquarium Experiments

(*continued from opposite page*)

tiny fry by looking at a spawning is also quite impossible. If you want to find out you must catch a few at a time and count them as you transfer them to another tank. This may not be good for the fry but that is the only real way in which one can find out how many fry there were in that spawning.

Of course I am not suggesting that this sort of thing should be done all the time to every spawning, you would rear very few fish that way; but that is the only real way of finding out these facts. This is a worthwhile fact-finding project that serious aquarists could undertake. For even today we are far from certain about the number of eggs deposited or the number of fry that are produced by various fishes.

And finally the most important item of all, publishing your work. This is something that very few aquarists seem to bother about. If all the scientists in the world did experiments in secret and never wrote about them we would not get very far. For unless the results of an experiment or some unusual observation are published, there is no way in which others interested in the same subject can know about it. Much of our knowledge is derived by reading about other people's experiments and experiences. We take freely from this vast pool of printed knowledge. To give an occasional small personal donation to it should be considered a privilege and not a burden.

Judging under the New Standards

Some reflections on the new show standards for coldwater fishes from the judge's viewpoint.

by A. BOARDER

Show specimen of veiltail goldfish, a product of careful selection, by the breeder, of parents and young

SINCE the introduction of the Federation of British Aquatic Societies' new Standards for judging goldfish varieties I have had an opportunity of seeing how they work out in practice. When they first came out I criticised certain aspects, and experience has proved to me that my conjectures were correct.

The method of using the five twenties for allowable points was certain to cause trouble when it came to judging most of the fancy goldfish, but this is nothing to the chaos met with when trying to judge a mixed class. One class which I had to judge at a large open show this year was for a.o.v. fishes. There were coldwater classes provided only for common goldfish, shubunkins and British coldwater fishes. I found, in the class I had to judge, specimens of sunfish, veiltails, fantails (both scaled and calico), moors, comets, orandas and one or two in-betweens.

The sunfish was fairly well grown and so could scarcely lose any points for size; its fins and body were of the same shape as most other sunfish, it was in good condition and, of course, displayed in the tank in the usual sunfish manner. Under the present system of judging it was difficult to take off many points from such a fish. Next I judged a fine oranda, and under the same system of pointings. No points are allowed for the hood of an oranda, and no special extra points for the tail or caudal fin.

Now the difference between the two fishes appeared to me like this. The sunfish is as it occurs in nature; from thousands of fish of this species the great majority could be grown and fed well to become show specimens ; there is little to prevent this. One could say that about 97 per cent. of sunfish would make show fishes if given normal fair treatment. Now let us consider the oranda. This fish, I venture to assert, was only one of hundreds; in other words, you would find an almost perfect specimen of such a fish not more than one in a hundred.

There have been many years of endeavour and selection in producing such a fish. The bodies of these fish vary greatly in shape, the fins also, especially the dorsal, caudal and anal. The hood does not develop in a large number of orandas and the colour may not be too good. How then can one assess the comparative values of two such fishes? One is as nature made it, and reproduces almost like so many peas in a pod, whereas the other is the result of man-made experiments. The same reasoning applies to the veiltails and fantails. It makes one wonder if the Standards were made by judges who had never had the task of trying to produce a near-perfect specimen from a strain of fancy goldfish.

Since 20 points are allotted for size and 20 for condition and deportment, it can be realised that a small, very good fish has little chance against a coarse, large fish. I noticed in another show I judged that many very large fishes were shown in the coldwater classes, no doubt their owners hoped to win with them mainly on their size and condition alone.

When judging Bristol shubunkins at another show I found a few very large but coarse-bodied fish shown against smaller but much better quality fish. When only 20 points are allowed for colour, how can the nicely formed but smaller fish hope to compete with a larger fish which has a bonus of points for size, condition and deportment?

I found another nasty snag, in another class: that for moors. The Standards now say that the moor must conform to the veiltail in shape; the fantail moors are not recognised. I found an indifferent veiltail moor and two excellent fantail moors among the fish. Up to the latest edition of the Standards the fantail moor had been recognised. Why was it dropped? I doubt if anyone can give me a valid reason for the dropping of this handsome fish.

Photos : Laurence E. Perkins

Young angel fish, like many other fishes in their natural forms, show as little variation between themselves as do "peas in a pod"

The fantail moor is always a more active and pleasing fish in a tank. The veiltail moor invariably lies on the bottom of the tank with its tail and anal fins so draped over the bottom that it is almost impossible to see if the fish has a divided tail, let alone paired anal fins.

Why was the fantail moor dropped and the nymph included? If ever there was some cock-eyed reasoning it concerns this fish. I know that the excuse for including the nymph was that many breeders actually breed for this strain, but nymphs can be produced also from veiltail and fantail strains as utter runts. From my own well-known winning strain of fantails I get several single-tailed fish each season. This year I have placed a couple of dozen in the local village pond. These fish have fine deep bodies and large well-held tails and conform to the standards required for nymphs, yet they are utter runts, produced by accident during attempts to produce a different kind of fish altogether.

I judged the fish in question on their merits as moors, but to comply with the Federation no stars were affixed to the winning cards. Now then Federation officials, let us have a speedy revaluation and the inclusion of the fantail moor in the Standards!

I wonder if this system of stars on show cards really pays for the loss of time of the judges concerned. They mean so little really. On most cards today the points gained by the fish are shown. Surely this is all that is needed? A fish with 100 points gets a gold star, another with 80 points gets a silver one: but also a fish with 90 points gets a gold and one with 89 gets a silver. Yet there is only one point between the latter fish and 20 between the first two. All this star fixing takes time and costs money. I find that the average time taken to judge a show and see to the prize cards is six to seven hours, with about three hours travelling time. The payment for a judge is 15 shillings, but I wonder how many aquarists would work for seven hours or more for this sum?

I came across the old and ever-recurring problem of judging the best fish in the show. I am usually in the minority to the tropical judges and have to give way. I had a splendid specimen of fantail for my best coldwater fish but a cichlid was placed above it. A good fish, no doubt, and a big one, but it is the nature of the fish to be big, and as long as it was in condition few points could have been taken from it: but to compare it with a fantail which could not have been found more than one in five hundred was ridiculous.

I would like some tropical judges to have a few seasons at producing a number of winning fancy goldfish, of whatever types. They might then alter their opinions as to the relative value of a fish constructed as nature made it and one which shows the endeavour, perseverance and skill required to produce a near-winning fancy goldfish.

Cacti in the Fish House

AQUARISTS who heat their fish house by paraffin-oil lamps need have no fear that this will disagree with cacti. On the contrary, the fumes, if any, will tend to keep pests away from the plants. Always keep a sharp look out all through the winter for mealy bug. This is a small grey bug, very sluggish in movements, which sucks the juices from the plants. It lays many eggs and so, if not kept in check, can soon become a nuisance. These bugs cover themselves and eggs with a form of powder or meal which is impervious to water. Therefore it can be realised that the ordinary insecticides are of little value; they run off the bugs like water from a duck's back. A very good method of controlling the pest is to use a pointed match stick which has been dipped in surgical spirit and to touch the bug with this. This spirit is a sure killer and as it is colourless is not likely to harm or discolour the whitest plant.

FRIENDS & FOES No. 51 (contd.)

Water Mites

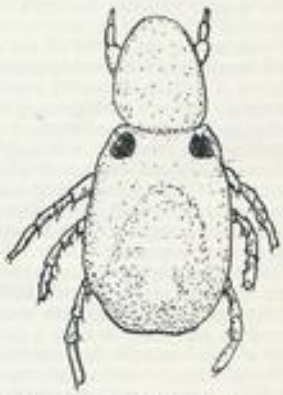
HYDRACARINA

THE larvae of Hydracarina, with six legs and a large false head, as it is called, in the front, appears so different from its parents that it may be thought to be a different creature altogether. Many species have a short existence as a free-swimming larva before settling upon their hosts. Nor are their hosts confined to submerged aquatic creatures. Larvae have been found in numbers upon dragonflies, or closer to the water on *Gerris* or pond measurers. Below the surface they may choose *Nepa* or some other water bug.

Some species utilise the freshwater sponge, and others lay their eggs in the tissues or in mass in the siphon of the mussel. In the latter cases the larval stages are spent inside the mussel, and, indeed, the nymphal period too, the creature probably being blown out when adult through the siphon.

Species are known which are not parasitic, remaining within the egg until the nymphal stage is reached. All nymphs and adults are carnivorous, and may eat one another if insufficient food is forthcoming.

It is sometimes possible to distinguish the males of a species from the females by differences in the structure of the third and fourth pairs of legs. Space does not permit too great a detail upon this and other points.



A larval water mite (Hydrarachna). Found as a parasite on numerous aquatic hosts (magnified about 50 times)

Many fishes eat the mites, but before feeding them use caution. I have not heard of any damage to fish fry, or yet that fishes act as hosts. Just see, however, that the mites are really eaten and not left alive in the aquarium. Discretion is the better part of valour.

C. E. C. Cole

Marine Aquarium-keeping

This article consists of extracts from the author's book "Marine Aquaria", to be published by Cassell & Company Ltd. on 17th January, 1957 (price 18s).

by L. A. J. JACKMAN

THE fertility of the sea can be compared quite closely with that of the average acre of farmland, and the major portion of this fertility is derived from the countless millions of microscopic plants and animals that live their brief life beneath the sunlit surface of our seas.

If only we could submerge and evolve eyes that could magnify like the lens of a microscope, the variety of life before us would defy description. Within a few seconds of our first glimpse we would see enacted before our eyes a thousand deaths and a thousand births, for in these pastures of the sea the struggle for survival is as continuous as the tides that carry this drifting population, the plankton.

Plankton, in the economy of the sea, is the vital thread that floats on all the tides. Yet without the sunlight and the ceaseless rhythm of the seasons, the sea might become as barren as a gaunt cliff face.

In the spring as the sun mounts higher in the sky the light becomes more intense and the tiny one-celled plants begin to thrive. However, they need more than sunlight, and nature has provided for them a great store of minerals that has been slowly built up during the winter days and nights. These minerals are the "salts" of the sea and are the equivalent of the natural fertilisers found in the rotting vegetation on land.

Chemical Composition of Sea Water

A short walk along the tide-line when the surf is rolling shorewards soon brings the tang of salt to the lips, and the white ruination of sea-soaked leather shoes is an indication of the quantity of this salt in even a small amount of sea water.

If you take a bucketful of sea water and evaporate it, a white crystalline substance remains. On an average, the quantity of salts is about 35 parts to 1,000 parts of water, by weight. Near a river estuary it will be considerably less, and in the Red Sea, for instance, considerably more. Even in the Red Sea, however, it is only around 40 parts to 1,000.

The salt in our bucket is about 75 per cent. sodium chloride. If the bucket held two gallons of water, then there would be enough salt to last the average fish-and-chip shop a whole evening. To be more accurate, there would be about half a pound.

The remainder of the salts would comprise sulphates, bromides, and carbonates of sodium, potassium, calcium, and magnesium, plus minute traces of other elements.

Because sea water is such a delicate balance of minerals many a keen aquarist has encountered difficulties. Many of the salts react with certain metals such as brass, galvanised iron, copper, and even lead to an extent sufficient to produce a solution poisonous to fish and other living creatures in your aquarium. Thus it is essential for the marine aquarium keeper to take great care in his choice of materials and equipment.

Whilst on the topic of sea-water chemistry, it may be as well to include a formula for those who wish to make their own. The following formula has been communicated to me by Mr. F. A. J. Armstrong of the Plymouth Laboratory and is one which he and Dr. Wilson have used quite successfully for the rearing of *Echinus* larvae.

NaCl	.. .. 23.477 g.	$NaHCO_3$	.. .. 0.192
$MgCl_2$	.. .. 4.981	KBr	.. .. 0.096
Na_2SO_4	.. .. 3.917	H_3BO_3	.. .. 0.026
$CaCl_2$	.. .. 1.102	$SrCl_2$	.. .. 0.024
KCl	.. .. 0.664	NaF	.. .. 0.003

Water to 1,000 grams. Aerate before use.

This yields sea water of salinity 34.5, pH between 7.9 and 8.3. The accuracy with which some of the weights are given is probably needlessly great for normal work.

Water of crystallisation in some of the salts must be allowed for, and the $MgCl_2$ and $CaCl_2$ are impossible to weigh since they are hygroscopic and contain unknown amounts of water. Solutions can be made up, standardised, and you can then take the volume necessary to give the correct weight. Trace elements are difficult, but by using Analytical Reagent chemicals one can keep them fairly low. Mr. Armstrong mentions the fact that he keeps a set of reagents aside for artificial sea water in order to ensure that batches made at different times are constant in this respect.

This then is the formula as used at Plymouth for rearing *Echinus* larvae. It can be seen that the making of such artificial sea water is not an easy task and that great accuracy has to be aimed at. No doubt any local chemist will make up the desired quantities if you present him with this formula.

Around the shallow water of our coasts there is a great seasonal variation in temperatures. In winter it may go as low as freezing point, whilst during a hot summer the figure of 66° F. may well be attained.

This great temperature variation causes movements of fish and other creatures in and out between deeper water and shallow water. For instance, the movement of mackerel is perhaps as well known as any. Now these fish first appear inshore soon after the sea reaches 53° F. and they remain until the temperature returns to about that level.

Although this wide temperature variation occurs, it must not be imagined that the creatures of the shore will tolerate sudden changes in your aquarium. Always remember that most of the actively swimming ones will be well offshore before the cold weather sets in. In your aquarium they are trapped, so keep that temperature steady.

Construction of Marine Aquarium Tanks

As has already been discussed, sea water has highly corrosive properties, and thus our choice of material for tank construction is rather limited unless very careful proofing of the exposed parts is carried out. If we assume that correct proofing can be given we are still faced with the problem of tank size, for any aquarist making his own tanks will have to consider the matter of weight and cost when building them.

As an example let us take what will probably be the largest size attempted by any amateur, and presume its measurements to be 4 feet long by 2 feet wide and 2 feet in depth. If it is to be built of angle-iron, the sheets of plate glass will be both expensive and heavy, and by the time the tank is filled you will be getting near three-quarters of a ton total weight. You will also have glass all around, and since this does not lend itself to the best presentation of marine

1. What am I going to keep? Make a list of the specimens you intend to keep in the particular tank under consideration, and then ask yourself question 2.

2. What particular consideration must I give to their special requirements? For instance, your list may consist of shore crabs, hermit crabs, mussel, anemones, and prawns.

From this list you can see that the anemones can be quite at home on rock ledges, and a small cave can be provided for the shore crabs. A few ledges or overhanging rocks will provide a stamping ground for the hermits, and perhaps a sloping rock could be provided for the mussel.

If fish had been included in the list you might have added a small rock pinnacle for wrasse, or a seashell home for a two-spot goby, and so on.

You may feel that all this thinking beforehand is a waste of time, and that the aquarium is seldom made that will contain one set community for any length of time. But it is surprising how attached the aquarist becomes to certain creatures, and few of us are prepared to return well-known animals to the shore. The time will surely come when you also want new creatures, and that is the moment to build or buy the next tank. So set up this one with some definite plan in mind.

The third and last question is one that must inevitably be answered by compromise.

3. How can I place the rocks so that maximum visibility is attained? A cave, for instance, can be a compromise between the darkness of a submarine cleft and the half-light of a shore-line cave. The roof part can slope sharply backwards to allow light to penetrate or a piece of glass can be set in the top.

Having decided on the general layout of the rocks, the next decision is with regard to type of stone to use. A natural effect can be attained only by using natural rocks and assembling them in their own particular stratified way. Unless you bear this fact in mind your rock-work will resemble a pile of untidy and uninteresting stones that constantly offend the eye.

If possible keep to one kind of rock, and do not try to mix red sandstone in with limestone as a back-ground for your tank. Rocks can be mixed fairly effectively on the bed of the aquarium, but the restricted vista of the tank back is far too small to allow successful use of different rocks.

Having secured sufficient rocks for your purpose (and it is always a good plan to have far more than you *think* you will require), wash them thoroughly in fresh tap water to remove all salt. Next scrub them with a wire brush to remove all seaweed growth, dirt and adhering shellfish. The weed will only die whilst the aquarium is seasoning, the dirt prevents the cement getting a good grip, and shellfish are not required yet, anyway.

Leave the now clean rocks in a basin of water to soak thoroughly before cementing into place.

Since loose rocks invite trouble and also provide hiding-places, rockwork should be fixed permanently in place with cement. In this way all cracks can be effectively sealed and many future troubles prevented.

Providing the aquarium can be left for about two or three weeks to "season," ordinary cement is quite satisfactory. It causes a few disturbing features to develop, however, in the first few days after filling. Usually you will find a few stalagmite-like growths spreading upwards from the point of contact between the cement and the back of your aquarium. From the base of each of these a small quantity of porridge-like material will sometimes run down to the aquarium floor.

This material is working out of the cement, and is far more noticeable when the aquarium is first filled with sea water. If you prefer to fill it with fresh water first, the trouble sometimes does not develop. However, it is of little consequence and after a fortnight it can be scraped off with the finger and no more should appear.

We have kept prawns in a freshly cemented tank without any apparent discomfort to them, but this is not really advisable.

The cement should be mixed at the rate of one part of cement to one part of sand, and the sand should be as fine as possible. Moulding sand, such as used in foundries for casting lead, is ideal, and failing a supply of this, ordinary sharp sand can be well sifted.

Mix thoroughly before adding water. Finally add sufficient water to make the cement into a whipped-cream consistency, and you will find this is ideal for working. If the mix is too dry it will not stick to the rocks, and if too wet it tends to run off and will not secure them in place.

Expert bricklayers will prefer to use the correct tools, but we have found that an ordinary table knife (*some* aquarists are quite unscrupulous) is ideal. Providing it is washed immediately after use, no harm is done either to the knife or your reputation.

Be sure to fill in all irregularities behind the rocks as you cement them in place, and this is best done by placing a large portion of cement on the rock face to be secured to the tank. Press this rock against the tank and remove the surplus cement that squeezes out.

When all rocks have been securely cemented into place the cement "ties" between the rocks can be camouflaged by pressing some large sand grains into them, and the odd empty sea shell such as a limpet or winkle can be stuck there for effect. If some of the exposed cemented surfaces are large, a quick and efficient method of covering them with sand is to throw small handfuls at them. Providing sufficient force is used the result will be quite pleasing—but always do this job out in the garden or you will have to spend the next half-hour brushing up sand grains that have ricocheted all over the floor.

Pure cement protruding from rockwork is always unsightly, but after a few months under sea water it will soon develop a growth of weed and blend with the natural rocks.

(Further extracts from "Marine Aquaria" will be included in next month's issue)

Breeding "Secrets"

Breeding Aquarium Fishes, by Julius Nachstedt and Hans Tusche. 127 pages. Illustrated in line and black-and-white pictures. Aquarium Stock Co., Inc., U.S.A. Obtainable in Britain from Arthur F. Bird, 66, Chandos Place, London, W.C.2. 21s.

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OUR EXPERTS' ANSWERS TO TROPICAL AQUARIUM QUERIES

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.

I have been given a 3 ft. aquarium complete with hood fixed up for electric lighting and one or two accessories such as thermometer, feeding rings, etc. I have never kept tropical fishes before, and wonder how many heaters I should buy, and what strength of electric lamps I should insert in the three sockets in the hood? And must I keep the light on all day?

Two heaters are perhaps better than one heater, for if they are placed in a horizontal position close to the bottom of the aquarium, one at each end, they will give a more even distribution of heat in the water. Besides, if they are wired in parallel and one should fail, the other one will carry on and prevent a sudden drop in the temperature. For a tank such as you mention, we think that two 60 watt heaters controlled by a thermostat should prove just about right to maintain a temperature in the seventies all the year round. The right amount of light to give an aquarium is largely a matter for personal experiment, for so much depends on how close the tank is to a window, the position of the window, whether it is heavily curtained or overhung by trees and so forth, and whether the plants placed in the aquarium are lovers of a bright light or prefer to grow in partial shade. Electric lighting may be used to supplement natural daylight or take its place. If the tank receives little or no daylight, then the aquarium should be provided with three lamps each rated at about 40 to 60 watts, and these should be kept alight for at least seven hours every day. If some daylight, preferably sunlight, reaches the aquarium, then the hours of electric lighting may be cut down as necessary. The average aquarium plant will not flourish if the light is bad, so by experimenting with the hours of light given, and the strength of the bulbs (wattage), it is not difficult to provide the plants with the proper amount needed to keep them in perfect growing condition.

Is the dwarf gourami a difficult fish to breed?

The dwarf gourami is not a difficult fish to breed if you go the right way about it. The fish is by nature a timid species, and likes a tank thickly planted with feathery foliage to give it a feeling of security from enemies. It also likes a high temperature, say, about 80° F. If a male and a female are placed in a thickly planted tank, maintained at a high temperature, and fed on live food and scraped meat it should not be long before the female fattens up and the male shows brighter coloration. He will then build a slightly raised bubble and vegetable-matter nest at the surface of the water. In between times, he will display before the female, who in turn will show an increased interest in her partner. When the nest is to the male's liking, he will meet the female underneath it, where they will embrace, and the eggs extruded will rise into the mass of bubbles. The male will watch over the eggs until they hatch out. After the fry are free-swimming, it is advisable to remove the parent fish. The fry must be fed on the usual Infusoria, and later with micro worms and other suitable small life. Cold air blowing across the top of the water is fatal to baby gouramies, so make sure that the top of the aquarium is kept well covered.

Can you please give me some information on pipe fish?

Pipe fishes are found in tropical and temperate waters. They are mostly found in salt water, but a few species are found where sea water and freshwater mingle, say, at the mouths of rivers or in inlets on a coast into which streams empty. The fish are closely related to sea horses and rather resemble them in their manner of swimming, or rather moving about in the water, for they are not accomplished swimmers, but hover in submerged plant life, channel-grasses, seaweeds and the like. They usually swim in a head-up position. They use the dorsal fin for swimming, and vibrate this very quickly. The snout is drawn out like a tube, slightly upturned at the end—hence the common name of pipe fish. The male fish carries the eggs around with him in a pouch located on the underside of the body, between the vent and the tail fin.

I wonder whether you can give me some idea as to what is ailing my zebra fish? It has always been active and seemingly in excellent health these last two years, but a few days ago it started to swim rather erratically, and now seems to be wasting away. My other fishes are in good condition.

Your zebra fish has about reached the end of its life. Zebra fish do not usually live much over two years. Your fish will probably grow thinner day by day and its movements will slow down considerably. Now and then it will indulge in sudden bursts of speed, especially when food has been introduced into the aquarium, but its strength will not last for long, and it is unlikely to be long before it dies of old age.

I have just started to keep tropical fishes, and I have noticed that some of my guppies have dark blotchy markings on the fins and body. Some have almost black markings on the underparts. Have the fish contracted some disease?

We do not think that your guppies have any disease. The black markings you referred to in your letter are most likely concentrations of dark pigment, and if some of the fish are females, and the dark areas are in the region of the vent, it is probably a sign that the fish are about due to produce a family.

I have been captivated by the charms of the white-cloud-mountain-minnow, and I have been told that it is hardy enough to live at ordinary living-room temperature. I have a small aquarium—empty at the moment—in my living room, and as this room is kept warm all the year round I wonder whether I should risk placing some of these minnows in it without going to the trouble and expense of fitting up an electric heater?

The white-cloud-mountain minnow is quite comfortable at warm living-room temperature. But do not place fish taken from a heated tank into cooler water right away. Heat the aquarium by adding hot water from a kettle to the same temperature as the dealer's tank, and keep the aquarium wrapped round with a piece of woollen cloth or flannel to retard the fall in temperature as long as possible. Once acclimatised to a temperature in the sixties, mountain minnows will withstand a temperature so low as 55° F. without suffering any harm.

I am going to have a shot at breeding an egglayer, and fancy the rosy barb. Is this fish easy to breed?

The rosy barb is one of the easiest fishes to breed. Give it a brightly lighted aquarium thickly planted with fine-foliaged plant life, and a temperature of about 75° F. The male will assume sparkling, coppery-red sides and underparts and chase the female in and out of the plant life. During the chase, eggs are scattered in all directions. After spawning is over, transfer the parent fish to another tank.

Among my many and varied possessions, I have several pieces of coral which I collected while living abroad. Would these be suitable for placing in my tropical aquarium?

We do not advise the use of coral in the aquarium. The sharp points and rasp-like surfaces often scratch the sides of the fishes and lead to outbreaks of fungus disease. Then

again, to make sure that coral will not pollute the water, it must be placed in boiling water and allowed to soak for a time, after which it must be given several washings in clean water.

I have just bought a fish which the dealer called a black-banded sunfish. He said this fish is peaceful enough to place in my community tank. Can you give me some information about it?

The black-banded sunfish is found in the warmer parts of North America. It favours rather shallow, acid waters. It will often refuse to accept prepared food in the aquarium, and craves small live foods such as *Tubifex*, *Daphnia* and white worms. Sometimes it can be trained to take small pieces of raw red meat. It is a nervous species, and really does best in a tank to itself. It likes clear, sparkling water, and a temperature in the region of about 75° F., though by gradual acclimatisation, the species can be made used to living in a much lower temperature, say, round about 65° F. It seldom interferes with other species, but, like most so-called "tropicals," it relishes chasing and eating baby guppies and other small livebearer fry.

I am new to the hobby of tropical fishkeeping, and would like to have your opinion on the following matter. The fishes I introduced into my newly set-up aquarium all died within a few days, yet I started off with well-washed sand and boiled water. Even the few snails I bought at the same time as the fishes crawled up the sides and above the surface of the water. What do you think went wrong?

The fact that the snails crawled above water level indicates that all was not right with the water. We suspect pollution. Perhaps you gave the fishes too much food at one time. Lots of food lying uneaten on the bottom will soon turn the water bad, send the snails above water level for a "breath of fresh air," and kill the fishes.

COLDWATER FISH-KEEPING QUERIES answered by A. BOARDER

I have some adult shubunkins in my pond which are quite healthy but have not bred this year. Why is this?

The whys and wherefores of fish breeding could be debated for years. Every time I think I can put my finger on a specific reason why fishes did not spawn I find that something happens to disprove my speculation. There are a few pointers which I think are most important to note. One is, of course, that both sexes of the fishes must be present and also they must be in very good condition. It is practically impossible to breed with fishes unless they are in good condition. Added to this there appears to be a certain condition of the water which encourages the fishes to commence the spawning act. I feel sure that where all goldfish types are concerned it is important that there is a very good oxygen content to the water. It is sparkling clear and fresh; the fish seem to be invigorated and they then start to spawn. Sometimes we can notice a certain condition of the weather which seems to start them off, but on another occasion the same conditions do not bring the desired results. When fish are spawning well there is a strong "fishy" smell emanating from the water and if a fish or two has been caught in a net the net retains this fishy smell for some time. After having been caught or transferred from one place to another the fish will often start to spawn, but not always. If some of the water is removed from a pond and fresh, colder water is introduced the fish will then commence to breed. It seems that when the water is rather murky, or too green with an abundance of algae, the fishes will not spawn. It has been said that they spawn when there is a rising barometer but I have had fishes spawn when the barometer is quite steady. I have often had the fishes spawn in the pond when a warm spell has commenced but now and then they spawn when it is raining.

The age of fish does not seem to make a lot of difference, as I have had fish as young as 11 months old breed and others of over 17 years. I have had the fish spawn four or more times in a year and I have also had only one in a year. The condition of the water plays a very important part, I believe, as I have had aquarists tell me that their fishes have spawned in a pond when mine have not done so. I do think that the water can be too warm for the fishes and have on occasions had to remove a quantity of water from the pond and replace it with cooler water before the fishes would spawn. I have had spawnings at temperatures as low as 50° F. and as high as 75° F., and at most temperatures in between, so it is apparent that the warmth of the water is not the only point. I think that the fish are more likely to spawn when the water is in the sixties than when it is in the higher seventies.

I know some aquarists who say they can spawn their goldfish types any time they like. This is, of course, when they keep the sexes separate, and then when they are ready for a spawning all they have to do is to introduce the female fish to a tank where a male has been for a few days and spawning can be expected in a day or two. This means that the fish are already in breeding condition—the female full of eggs which are ripe and the male ready to spawn. When fishes are bred in a pond there is little chance of separating the sexes, but where this could be done I feel sure that more success could be obtained in getting a spawning at any particular time. During the past two years it has been a feature of spawnings that many have not taken place until July, whereas the normal time for fish to breed in ponds in the southern part of England has been late April or May.

After very many breeding experiments with fishes in open ponds I still cannot say for sure what actually starts them off. However, I have mentioned here a few important factors.

When showing fishes in a furnished tank there are allowed 8 points for size of fish. Does this mean size of fish for the tank or does it apply to the sizes of the actual fish in relation to the possibility of size for the species?

I think that judges are inclined to interpret this in different ways. When judging coldwater furnished tanks I always interpret the pointings to mean the size of fish for the tank, otherwise a golden orfe should be about 18 in. long to be considered adult and worthy of maximum points for size! On the other hand I have known tropical tanks judged the other way, that is, maximum points have only been given if the fishes are of a certain size. This is a point which should be cleared up, as I know there is a variation of opinion among judges on this matter.

I am considering making a tank 4 feet long, 1 foot wide and I want it as deep as possible. Would you please tell me the maximum permissible depth for the health of the occupants?

There is no maximum depth for a tank. I consider that an ideal depth is 12 in. but I would not quarrel with 15 in. for a tank as long as yours. The depth does not mean as much to the health of the fishes as the surface area. The top of the water in contact with the air is the important feature. Deep water often means that the lower section is fairly foul and the fishes will not remain there for any length of time. They may go down for food but as soon as they have picked up a mouthful they return to near the top and remain there until they are ready for more food. It is far easier to keep fishes healthy in a tank only six inches deep than in one 15 in. deep. Where there is a heater or aerator to increase the circulation of the water it may help

a lot. Some plants look better when they are growing in a 15 in. tank than in a shallower one.

I have a tank 30 in. by 15 in. by 15 in. which has a piece of glass at the back which is wired and frosted. This is an eyesore. How can I improve it? A correspondent in *The Aquarist* suggested painting on the glass but does not say whether inside or out.

I expect that it would not make much difference whether the glass was painted inside or not but it would be far easier to do it from the inside so that the finished effect is more easily viewed. In your tank it would not be seen if outside. Once dry the paint should not harm the fishes. It is also possible for you to get a sheet of green or other coloured glass to fit inside the tank, or you could plant in sufficient density so that the back is obscured. If the glass is left alone it would soon become covered with algae and look quite all right. I never clean the backs or ends of my tanks —only the front is kept clear. Another idea that might appeal to you is to place a piece of looking glass at the back; this would add to the depth and attractiveness of the tank.

I have a number of veiltails, fantails, shubunkins and goldfish. They are now developing a whitish film all over them. The tanks are filtered and aerated but the water sometimes has a slight smell.

The trouble appears to be velvet disease (*Oodinium*), and is caused by a minute parasite. I often think that this is encouraged by unhygienic conditions, and the smell of the water seems to confirm this in your case. I suspect that you have been giving too much dried foods, as nothing upsets the balance of the water more quickly. This in turn upsets the fishes so that their protective mucous covering is deranged, and gives the parasite a chance to attack them. By adding some salt to the water you may be able to rid the fishes of the trouble. A teaspoonful should be used to every four gallons of water in the tank; change the water after about five days. Alternatively, the fish can be taken from the tank and treated in a solution of tablespoonful of salt to a gallon of water, reducing the salt content by adding fresh water after a few days. In any case it is essential to remove one of the main causes of the trouble, and that is to refrain from feeding the fishes except for a little live food, for about a fortnight, and once they improve go easy with the quantities of food added. There is a preparation advertised in *The Aquarist*, which is said to cure velvet disease; I have not had an opportunity of testing it on an infected fish, but it may well be worth a trial.

Is there a cure for fish-rot? I have had a few cases and have not been able to cure them.

I do not know quite what you are referring to. I assume it is fungus disease or else fin-rot. Fin-rot is a disease which attacks the fins, usually at the ends first, and gradually eats them away. Fungus can appear on any part of the body or fins and looks like a tuft of cotton wool which gradually spreads over a large area of the fish, finally killing it when the gills are reached. Either disease can be cured if the fish is treated in time. Do not wait until the fish is almost dead before trying out the cure.

If I go away for a fortnight will it be all right to put a large number of *Daphnia* in my tank of fancy goldfish for them to feed on whilst I am away?

Go easy with the *Daphnia!* If you put a large number in the tank they will take oxygen from the fishes and if the tank is stocked close to the limit of fish capacity the fishes can soon be in trouble. Even if this does not happen the fish can eat so many that they become sated with them, after which they will take the fleas in their mouths and spit them out again dead or dying. This can cause some pollution. The safest way to leave the fishes is to feed as usual before you go away, no more no less. When you return you will be surprised how well the fishes look.

I have two ponds the larger of which leaks. I want to transfer all the fishes and plants to the smaller pond whilst repairs are undertaken. I do not want to get any blanket weed in the small pond and am wondering how to prevent this. When is the best time to attend to the pond and how soon after repairs can I return my fishes and plants to the large pond with safety?

The best time to repair the pond is when most of the leaves have fallen. If you have no trees or bushes near then you need not wait any longer. The sooner it is done the better. When you transfer the plants to the small pond pull off all the blanket weed you can see. Do the same when it is returned to the large pond and you should get rid of most of it. The extent of the repairs will decide how long the fishes should be kept from the pond. If only a little fresh cement is needed then there is not likely to be much free lime present to do any harm. A good wash out as soon as the cement is firm should be sufficient. It is a good plan to clean out the pond each autumn. It is surprising how much mulm and filth can accumulate in a pond in the course of a year. If this is left it can pollute the water, being especially dangerous when the water freezes over, so trapping in the foul gases. This is not all the story, as many fishes in a pond fail to breed the following season when the pond has been allowed to become too foul. It is a fact that most of our fishes prefer to spawn only in water very clear and well charged with oxygen. If the water is impure the fishes may not spawn; many aquarists lose sight of this fact.

Do gill-spots establish the sex of a shubunkin?

The male shubunkin, like all the other goldfish types, can have some raised white spots on the gill plates. The front of the pectoral fins can also carry these spots and I have seen the front part of the fins raised and swollen. I have heard it said that sometimes the female will show these spots but I have never seen one myself. I am prepared to say that 99 times out of 100 the white spots indicate the male sex. Unfortunately, all male fish do not show the spots; in my own strain of fantails I rarely see these signs, yet the fish breed. In the early part of the year the female fish should look much plumper than the males, especially when viewed from above.

I am planning to make a concrete pond and I wish to know the correct mixture of sand and cement.

There are two methods of applying the concrete when making the pond. One way is to use some fairly coarse ballast and what is known as aggregate and make the coat fairly weak in cement, and then to add a further coat of three parts of sand to one part of cement (parts by volume). The other way, especially if the pond is not too large, is to apply the concrete in one go and then by continually tamping with a trowel or the back of a spade the fine mixture is brought up to the top. By the latter method you do not run the risk of a bad join when the second coat is applied.

I wish to remake my garden pond and am concerned about the safety of my fish whilst doing this. Could I put the fish in an enamel bath for the winter, and if so shall I put gravel in the bottom and water plants, and shall I dig it into the garden or leave it in my garage?

Your fish should be quite safe in the enamel bath for the winter. I think the garage would be the better site for it as the water would be less likely to freeze up there than if it were in the open. I do not advise using any gravel; leave the bottom clear and then it will be far easier to clean out the bath if necessary. Plants are not likely to grow during the winter, but a few oxygenating plants could be used, planted in small containers. The fish will be almost dormant for most of the winter and are not likely to need frequent feeding. Do not give them any dried food during the winter: if any food is given it should be a small piece of garden worm, or white worms if available.

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.

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

Suggestions for Suppliers

FOR the breeding of the more difficult egglayers your contributors invariably favour the use of all-glass tanks. I have had fair success in breeding numerous species and agree entirely. I have on occasions carried out the usual sterilisation of plants, water and aquarium (angle-iron frame type) and despite the utmost diligence, within a few days the water has been teeming with Infusoria. But—where does one purchase an all-glass tank? The only ones I have seen are the old accumulator cells, which are invariably of the wrong dimensions, the depth being the greatest. Surely an enterprising manufacturer could find a ready sale for all-glass or Perspex tanks?

The preparation, filtering and sterilising of peat water to obtain aquarium water of correct acidity, is a somewhat tedious and lengthy business. I think there would be a ready sale for "peat-water extract" of known acidity, possibly with instructions as to the amounts needed per gallon to decrease the pH value to a known extent.

Suppliers have done us well in recent years in producing Infusoria cultures for feeding fry of the egglayers, doing away with the smelly methods we were obliged to use previously. I have found preparations of fry foods to give excellent results. But here again suppliers have not gone far enough. Infusoria cannot be accepted as a hard and fast first food, particularly with the smaller fry. For a first food we are informed that green water or *Euglena* is the answer. Again, could not our suppliers offer cultures for sale? I have successfully spawned and hatched neon and glowlight tetra eggs, but this problem over the first food I have not overcome. Infusoria has not given the usual results.

Perhaps the publication of my letter may act as some inducement to suppliers, as I feel sure that these problems are not confined only to my own experiences.

N. F. Moore,
Denholme, Nr. Bradford.

Brine-Shrimp Culture

WITHOUT loam or yeast I have been busy raising many brine shrimps to the adult stage. I use a bare tank and rock salt plus borax powder and Epsom salt—these items in a full 20 gallons of water provide me with adults as well as many freshly hatched brine shrimps for feeding to my 18 tanks of tropical and coldwater fishes. In a two-gallon tank I also keep adult brine shrimps to reproduce many more, with only fine dried fish food—no green water or other source of food. To do this I use *strong* aeration, for with many eggs being introduced every third day into the hatching tank I must constantly maintain the water in a swirl. The temperature must be in the low seventies and when all else fails then it is time to add fresh (tap) water, just as the spring floods do to the Great Salt Lake, and remove some of the salt water from the hatching tank. The adult brine shrimps have a greater life span with Epsom salt, and without the borax I do not offer any hope of success.

Don R. Abel,
The International Federation of Aquarium Societies,
Ohio, U.S.A.

Show Information

AS a result of my recent visit to the British Aquarists' Festival at Belle Vue, Manchester, may I make a plea to exhibitors at such shows to display the scientific and common names of the fishes they are exhibiting?

I have only recently taken up fishkeeping as a hobby and I felt that my enjoyment of this show, and I am sure that of many other novices there, would have been greater had the names of the fishes on view been given. The illustrated souvenir catalogue which was on sale was of little assistance as it classified the fishes only as cichlids, labyrinths, etc.

May I stress that this is not intended as a criticism of what was a very fine show and one of which the members of the Federation of Northern Aquarium Societies may justly be proud.

B. J. Leatherbarrow,
Leyland, Lancs.

Heater Safety

ALTHOUGH the majority of heaters, thermostats and tanks are, of course, reliable, I have often wondered what the result of a rapidly leaking tank would be, especially if the leak developed during the night. Would the thermostat set the uncovered heater in action inside the empty tank? Without water the heater must continue to heat and crack its glass, and even cause a fire from its smouldering wires. All this is a long-odds chance, of course, but possible, and to dispel these unpleasant thoughts I have suspended a jam jar in the tank corner below the water surface and have immersed the heater in the jar. The jar is suspended with nichrome wire, which will not corrode. Now if the tank should leak during my absence there will always be at least the jar full of water for the apparatus and the heater will go on and off in safety. The jar can be hidden from view with water plants.

D. Boatwright,
Dagenham, Essex.

Low-Temperature Mollies

I HAVE succeeded in acclimatising a breed of black mollies to reproduce in cold water at a temperature of 50-60° F. The offspring appear more robust, hardy and swift. They have noticeable scales and larger and longer dorsal fins. In four of the young the tail resembles that of an oceanic or deep water type of fish.

E. ROGERS,
Bulwell Hall, Nottingham.

An Appeal

MAY I please make an appeal through your magazine to any of its readers who would be generous enough to supply our school's tropical aquarium with any plants.

I am afraid we have to rely on support of this nature as we have very little funds at our disposal.

J. DEARNALEY,
Audershaw Grammar School,
Stamford Road,
Audenshaw,
Nr. Manchester.

Aquarium Cover

I WONDER if I could pass on a tip to fellow aquarists regarding the fitting of the top cover glass to a tank? To prevent rusting, cut thin slices from an ordinary bottle cork for the glass to rest on. The cork can be secured to the tank frame with a dab of paint or glue.

G. ROBINSON,
Gosforth, Newcastle-on-Tyne.

Young Pen-friend Wanted

MY grandson in Canada, who is very interested in tropical fishes, has written to ask me if I can find someone keen on the same hobby who would be a pen-friend. A young aquarist, 12 years of age or a little older, would be suitable. His address is Andrew Tollit, Apt. 1, Rosemount, 48, Sydenham Street, Kingston, Ontario, Canada.

(MRS.) E. ANDREWS,
London, S.W.16.

Oil on Troubled Waters

FIVE deaths occurred in my community tank within a week and on inspection I found a film of oil on the surface of the water. When this had been cleared the deaths ceased.

One week later, four more fish died and once again I discovered a similar film of oil. I had never had this trouble before and was puzzled as to where the oil had come from. The source was eventually located: a packet of fire lighters that I had been storing in a cupboard beneath the aquarium. Once the lighters had been removed the oil and also the deaths ceased.

One interesting observation was made. The deaths occurred mainly in surface feeders, the other fishes escaping any ill effects. This led me to believe that death was due to the consumption of oil whilst feeding. The symptoms were complete wasting away of the fish and general listlessness.

R. W. LATHAM,
Wirral, Cheshire.

PICK YOUR ANSWER

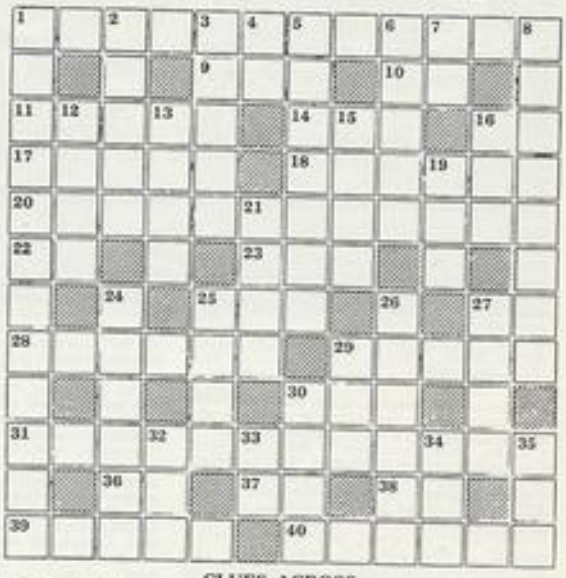
1. Peter Artedi, sometimes known as "The Father of Ichthyologists," was: (*a*) Dutch; (*b*) German; (*c*) Norwegian; (*d*) Swedish.
2. *Barbus dunckeri* is native to: (*a*) Assam; (*b*) Borneo; (*c*) Ceylon; (*d*) Malay.
3. *Corydoras paleatus* is popularly known as the: (*a*) banded catfish; (*b*) bronze catfish; (*c*) peppered catfish; (*d*) spotted catfish.
4. Which is the largest of the following species? (*a*) *Aphanius dispar*. (*b*) *Aphanius fasciatus*. (*c*) *Aphanius iberus*. (*d*) *Aphanius sophiae*.
5. *Mastacembelus* is represented by about: (*a*) 30 species; (*b*) 60 species; (*c*) 90 species; (*d*) 120 species.
6. The flowers of *Veronica beccabunga* (brooklime) are: (*a*) blue; (*b*) red; (*c*) white; (*d*) yellow.

G. F. H.

(Solutions on page 207)

The AQUARIST Crossword

Compiled by J. LAUGHLAND



CLUES ACROSS

1 Breeders' Aim, or count roe, drip. (anag.) (12)
9 Moved swiftly (3)
10 Silent service (1, 1)
11 Dispensed (5)
14 Golden fish common in ornamental ponds (3)
16 End of the bream (1, 1)
17 Wind around the egg-sac for China (5)
18 Fled on in confusion from caress (6)
20 Royal Marine in the aquarium? (5, 7)
22 Ho! Bach! (2)
23 Could be made with steak or eel (3)
25 One of the shorter lilies, obviously (3)
27 Denomination of dace (1, 1)
28 Fabled monster, but the fly of this name is a flashing feature of streams (6)
29 Little credit in the sports body for a tropical fish (5)
30 Moorish idol gives the response that ends single status (1, 2)
31 Man's at a snail for water plant (6, 6)
36 Part of Dark Continent (1, 1)
37 Civil equivalent of 10 across (1, 1)
38 Do judges assess goldfish by this unit? (2)
39 Aquatic bloodsucker (5)
40 Plan (6)

CLUES DOWN

1 Sanguinary weapon caudal fin (3, 9)
2 This fish is always the companion of a shark (5)
3 Biological classification (5)
4 Half a dace for a hair cut (1, 1)
5 Bearing only a single leaf (7)
6 Head of trout and tail show tendency (5)
7 Not out (2)
8 Kind of sand-worm (8)
12 Sea-fish of dory family, also called kingfish (4)
13 British river known to Adam? (4)
15 Do the French for allowance (4)
16 Alevin lose the French drink but find the British (3)
19 Immerse (3)
21 So fish and get nips back (4)
24 A line's tangled in salt water (6)
25 Weaving machine (4)
26 Northern drink begins with a little science and ends with great distinction (6)
27 About 750 average herrings (4)
29 Form of Edith, largely 4 down (3)
30 Fisherman's Arms and Anglers' Rests? (4)
32 Bag, especially associated with ova (3)
33 Morn (1, 1)
34 Devoured (3)
35 Sounds like sea for fishers of men (3)

Market News

AQUA-SITTER is the name of a new automatic fish feeder on sale in the U.S.A. It is operated by an electric motor, a slowly revolving scoop taking up a measured quantity of food from a small hopper every 24 hours. Provision for faster or slower feeding is made.

News from AQUARISTS' SOCIETIES

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

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

THE **Edinburgh Aquarist Society** were represented recently at a Hobbies Exhibition held by the Rotary Club at Edinburgh. Coldwater and tropical were represented in the exhibit. In a competition for furnished and best pairs the placings were as follow: Furnished aquaria: 1, Mr. Kerr; 2, Mr. Kennedy; 3, Master Stark. Pairs: 1, Mr. Henderson; 2, Mr. Cunningham.

* * *

AT the annual meeting of the **Bethnal Green Aquatic Society** the following members were elected: Mr. H. Penton, chairman; Mr. J. Coombs, show secretary; Mrs. F. Scott, treasurer; Mr. W. Wiegold, hon. secretary. A hearty vote of thanks was given to Mr. A. Linford and Mrs. P. Penton for their services in the offices of hon. secretary and hon. treasurer respectively.

* * *

RECENT activities of the **Mansfield and District Aquarist Society** included a talk given by Mr. A. Atkins on breeding the nigger barb.

* * *

THE **Independent Aquarist Society** represented the hobby at the Festival of Arts Exhibition held at Islington Town Hall in November. The society staged an attractive show of eight tanks, and club members were in attendance each evening to assist the public. The club meetings are now held every Monday at the Men's Evening Institute, Isledon School, Hornsey Road, and Mr. Allies with Mrs. Meadows are among the regular lecturers. New members will be welcome and full particulars may be obtained from Mr. L. Dare 17, Lady Somerset Road, N.W.5. The new chairman is Mr. F. C. Tomkins.

* * *

A TALK on Commercial Fish Breeding was given by Mr. A. Brunton at the November meeting of the **Sunderland and District Aquarists.** The bi-monthly table show was also held and the winners were as follows: Tropical—1, Miss B. Hodgson; 2, Miss Gilbey; 3, Mr. Vipond. Coldwater—1, Mr. A. Brunton; 2, Mr. T. Pearson; 3, Mr. A. Brunton.

* * *

A DISPLAY of tropical and coldwater fish was staged by **Derwent Aquarist Club** at the Chrysanthemum Show, Derby and was greatly admired and appreciated by the visitors.

* * *

Brockley Breeders Circle are already going ahead with their plans for 1957. The group aims to exhibit stands for the benefit of the hobby wherever possible, and is already making portable stands built to exhibit several sizes of tank, fitting side-by-side or back-to-back to suit any position that may be required.

Another helpful feature are the "Information Leaflets." These are reproductions of results of experiments, talks given by members and visitors, etc., and are given to the members. The group invites correspondence with other societies who have experience with this type of facility in order to avoid any pitfalls. Recently the circle were given a talk by Mr. John Searle on the subject of furnished tanks in shows.

* * *

WITH the idea of using their members' own talent, a new series of "Lecturettes" has been instituted by the **Forest Hill and District A.S.** The first was given by Mr. J. Vosper, on Marine Aquaria. The ease with which one can keep rock-pool inhabitants was stressed and a small tank was on view containing examples of shore-crab, beadlet anemone, periwinkle, limpet and prawn. Future short talks number among their titles—"The judge and the fish" (by Mr. H. Cook, a trained A.S.L.A.S. judge), "Fish-keeping for a living," "Does your set-up please your wife."

An important innovation in 1956 has been the institution of "The Dick Allen Trophy"—to be presented annually to the member making the finest contribution to the fish-keeping hobby during the year. Any subject—gadget, breeding experience, etc., may be put forward as an entry—and a well-known aquarist outside the society will be asked to adjudicate. The cup now known as the Dick Allen Trophy was given by Mr. Allen for the Society's use in any way they thought fit and this competition was the result. One suggestion was a "Member of the year" competition, which was second in the vote and as a result has also been taken up for action in 1957.

The Annual General Meeting (election of officers) took place recently, at which W. G. Rushbrooke was elected chairman, and other offices taken as follows: H. J. Vosper (secretary), J. Earnshaw Armstrong (treasurer), E. Shaul (show secretary). Committee, Messrs. Tratt, Niblett, Ryan.

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IN a recent show for cichlids and other varieties held by the **North Hants Aquarists' Society** at Farnborough the following gained awards: *Cichlids:* 1 and 2, Mr. Chambers, 3, Mr. Parsons. *Novice Class:* 1, Mrs. F. N. Millard. *A.O.V.:* 1, Mr. Parsons, 2, Mr. C. A. Allan, 3, Mr. Chambers. *Novice Class:* Mrs. Millard.

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WHEN the **Southport Aquarist Society** held their fortnightly meeting a talk on the Breeding of Tropical Fish was given by Mr. Jack Taylor. He described in great detail the methods of successfully breeding livebearers, egglayers and bubble nesters, also the plants that were and were not necessary for the breeding. The society would like to hear of any aquarist who has a topic of interest which he could pass on to the society. The services of anyone willing to give a talk would also be appreciated. The hon. secretary's address is 51, Dover Road, Birkdale.

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WE regret to announce the death of Mr. Charles Collins, who was a founder member of **Hornsey and District Aquatic Society.** He was a fine aquarist and a great friend of many connected with the hobby.

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AS from the 1st November **Romford Aquarists' Society** will be holding their meetings in the Church House, Wykeham Hall, Romford every first third Thursday in the month.

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AT **Southall Aquarist Society** A.G.M. it was decided to widen the membership sphere to allow fishkeepers from other towns other than Southall to become members. The new title will be the **Southall and District Fishkeepers Society.** The headquarters are at South Lodge Bungalow, The Green, Southall, meetings being held on alternate Thursdays at 8 p.m. Mrs. F. Evans, 19, Tenring Road, Southall, is the secretary.

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 here (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 **2s. together with the Aquarist's Badge Token cut from page vi,** to Aquarist's Badge, *The Aquarist,* The Butts, Half Acre, Brentford, Middlesex, and please specify which type of fitting you require.

Blackpool & Fylde A.S. Show

DETAILS of the awards at the annual show of the **Blackpool & Fylde Aquatic Society** are as follow:

Club Furnished Aquaria: 1, Blackpool, 2, Lancaster and Morecambe.

Individual Coldwater: 1, G. N. Hadley, 2, V. Fletcher, 3, H. Smith.

Individual Tropical: 1, G. N. Hadley, 2, G. Gower, 3, V. Stevenson.

Ornamental Aquaria: 1, V. Stevenson, 2, J. Pettifer, 3, G. N. Hadley.

Individual Classes: Common Goldfish: 1, Mrs. M. Jones, 2, R. W. Brook, 3, J. Sweeting. *Shubunkins:* 1, S. Walsh, 2, N. E. Jones, 3, J. Sweeting. *Fancy Goldfish:* 1, S. Walsh, 2, V. Fletcher, 3, G. N. Hadley. *Swordtails:* 1, W. Leigh, 2, Miss A. Morgan, 3, W. E. Oakley. *Platys:* 1, G. Gower, 2, J. A. Peck, 3, C. A. Blake. *Mollies:* 1, F. Taylor, 2, A. Briggs, 3, F. Taylor. *Guppies:* 1, D. Hammond, 2, N. E. Jones, 3, F. Taylor. *A.O.V.:* 1, D. Hammond, 2, C. H. Whitsey, 3, F. Taylor. *Characins:* 1, J. Hodgetts, 2, G. Gower, 3, L. Lewis. *Labyrinths: Dwarf Gouramis:* 1, D. Talbot, 2, A. Morgan, 3, A. Morgan. *Leeri Gouramis:* 1, A. Taylor, 2 and 3, R. W. Crook. *A.O.V.:* 1, 2 and 3, J. Haworth. *Siamese Fighters:* 1, J. Simpson, 2, C. A. Blake, 3, L. A. Childs. *Minnows and Barbs:* 1, E. J. Cook, 2, D. Chapman, 3, J. Simpson. *Dwarf Cichlids:* 1, B. Norris, 2, F. Taylor, 3, D. Loder. *A.O.V.:* 1, G. N. Hadley, 2 and 3, R. R. Walsh. *Catfish:* 1, D. Chapman, 2, J. Haworth, 3, J. Peck. *A.O.V.:* 1, J. Hodgetts, 2, Mrs. M. Peck, 3, D. Hammond. *Breeders: Class (Coldwater):* 1, C. N. Wilkinson, 2, S. Walsh, 3, C. N. Wilkinson. *Livebearers:* 1 and 2, F. Taylor, 3, R. R. Walsh. *Egglayers:* 1, C. A. Blake, 2, A. Morgan, 3, J. Simpson.

Inter-School Trophy: 1, Claremont Junior Boys, 2, Claremont Senior Girls. *Individual School Aquaria:* 1, G. Fletcher, 2, C. Bradley, 3, C. Bennett.

Best Fish in Show: B. Norris.

Successful Film Show at Hendon

A large attendance of aquarists from all over London saw the film show sponsored by Hendon Aquarists' Society. The films were shown and entertainingly commented on by the well-known continental aquarists Messrs. Carel and Wante. Part of the audience during an interval is shown below

Photos : Ray Skipper

THE **Horbury and District Aquarists' Society** held a successful first annual show which was staged in conjunction with the local cage birds and rabbit keepers' societies. L. Prest, T. Greeson, and R. Tatham finished in that order in the furnished aquarium placings and Roger Moulson won the junior class. The children's goldfish competition was won by Irene Hunter.

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THE forthcoming programme of the **Forest Hill and District Aquarist Society** includes a Film and Film-strip show on the 16th November by Messrs. Tratt and Vosper and a lecture on Plants by F. C. Katritzky. The latter item will be on the 30th November.

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DUKERIES **Aquarist Society** spent an enjoyable evening when visiting Mansfield Aquarist Society for a table show. The cichlid class was won by Mrs. B. Deakin, the livebearing class being won by Mr. A. M. Deakin. At the next meeting Dr. F. N. Ghadially is giving a film show and lecture on fish feeding.

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AT a recent meeting of the **Sunderland and District Aquarists' Club** members of the Middlesbrough and District A.S. attended as guests. The evening's programme consisted of a talk on water, given by Mr. A. Hutchinson, and a table show. Winners of the table show were: *Coldwater fishes*—1 and 2, Mr. A. Brunton; 3, Mr. J. Foster. *Tropical fishes*—1, Mr. R. Cantes; 2, Miss M. Gilbey; 3, Mr. B. Hodges. A presentation was made to Mr. J. Nell, vice-chairman of the society, who is leaving the district.

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LICHFIELD **Aquarist Society** has now been incorporated into the Tamworth society. The title of the society now is Tamworth and Lichfield Aquarist Society and the secretary is Mr. L. Barber, 22, Bitterscote Lane, Tamworth Staffs.

Changes of Secretary

CHANGES of secretaries and addresses have been reported from the following societies: **Forest Hill and District Aquaria Society** (Mr. H. J. Vosper, 23, St. Asaph Road, Brockley, S.E.24. Tel: New Cross 6732). **Deal and District Aquarists' Society** (Mr. J. Cowell, 44, Douglas Road, Mill Hill, Deal). **Bethnal Green Aquatic Society** (W. Wiegold, 46, Cranbrook Street, Bethnal Green, E.2).

Crossword Solution

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

PICK YOUR ANSWER (Solution)

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