

The AQUARIST AND PONDKEEPER

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Editorial

EARLIER in this year some correspondence was published in *The Aquarist* about the desirability of introductions of alien and other plants and fishes to unstocked waters, or to waters previously uninhabited by the introduced species, in Britain. Although it was discussed in a new context, the same topic aroused discussion at last month's symposium on The Effects of Pollution on Living Material held in London by the Institute of Biology.

A speaker at the symposium suggested that it might be possible deliberately to introduce sub-tropical game fishes and water plants into regions of British rivers and streams where temperature of the water was persistently raised above the normal by the outflow of hot water from cooling plants at power stations. The speaker, Dr. H. B. N. Hynes, a zoologist of the University of Liverpool, had considered in his paper delivered to the meeting the biological effects of heat, as one type of pollutant, on natural waters. As with other types of pollution which he discussed, it was shown that often the number of species supported in affected waters was reduced and that abnormally raised numbers of individuals of a few species capable of withstanding the conditions might be found in their place. This led to the report by a member of the audience of the discovery of large numbers of a sub-tropical worm in a river receiving the warm-water discharge of a riparian factory.

Some of Dr. Hynes' listeners raised objections to the idea that foreign species could advantageously be added to our waters; dangers of successful colonisation and spread of luxuriant growths of plants were mentioned. However, it was pointed out that such introductions would not be made haphazardly and that all factors should be carefully considered before such a plan might be adopted. Examples were given of several alien species of animals that had successfully established themselves in Britain without harm to existing fauna and flora. The suggestion was made that the Central Electricity Generating Board might be approached to participate in the experimental introductions of desirable kind to the waters close to their inland power stations.

Cornwall's "Buckland"

by L. R. BRIGHTWELL

TO every marine aquarist a visit to the coast has two charms: the local life and its association with one of the great pioneers. The North is dedicated to Thomas Edwards, Alder and Hancock, etc. Devon is sacred to the memory of Gosse and Cornwall can boast with justifiable pride of Jonathan Couch.

At a time when naturalists were all regarded as cranks, Couch opened the public's eyes to the wonders on its doorstep.

Jonathan was born at Polperro in 1789 and seems never to have strayed far beyond. One of twelve brothers, he was the only one to gain notoriety, though one other sailed with and shared the fate of Sir John Franklin. Jonathan came of a well-to-do land-owning family. He trained as a doctor at the combined Medical Schools of Guys and St. Thomas's Hospital. The austerity of the period may be gauged from the fact that after the death of his first wife, a particularly blameless character, he spent many sleepless nights wondering if all her sins had been forgiven by the Heavenly Hosts. But as a tolerably hard-working G.P. he was universally liked, and knew his clients through and through. As often as not he would deal with some suppliant, whining for a "bottle of trade" (medicine), by producing a shilling and saying brusquely, "Here, go and buy yourself a beef steak. That will do you more good than any of the stuff I can give you!" For in consideration of the pharmacopea those days, a statement only too literally true.

Though he won small glory in the field of medicine, however, he soon made himself felt as a naturalist, and was shrewdly on the best of terms with every fisherman and beach-combing layabout. He always overpaid for everything they brought him, knowingly observing "If you don't pay well for rubbish, you are more than likely to miss something really worth having." He was sometimes on the carpet with his distaff side, the constant coming and going of waterlogged shellbacks in muddy sea boots and vast accumulations of not-too-well preserved animal remains having a detrimental effect on his weird one-room surgery, library and study.

He started a natural-history diary when he was 16, and in his late forties distinctions began to shower upon him. In 1840 The Royal Institute of Cornwall presented him with £10, then a handsome sum, for the best history of Cornish shells ever produced, and in the same year a bronze medal for a paper on the Pilchard fishery in the reigns of Elizabeth and James I. It was Couch who first established that the famous pilchard is really the grown-up Mediterranean sardine.

In the course of 10 years he published a Maritime Calendar of Polperro's fauna and flora, and a valuable treatise on local whales, rare fishes and other matters. His work on the salmon soon gained him the friendship of Frank Buckland, and like that pioneer he bitterly deplored the inevitable destruction of undersized fishes by trawling. This continues a hundred-fold to-day. If only we, like the French, could realise the value of fish soup, some of the wastage might be turned to account.

Couch's *Natural History of the Fishes of the British Isles* is still a classic worth consulting. Begun in 1862, it was published 3 years later and brought him £50. Its great value lies in the colour plates, all made from his own meticulously executed water-colour paintings. Thousands of exquisite anatomical drawings, mostly of an osteological nature, were found after his death. He was a regular



contributor to Buckland's famous *Land and Water*. His writings are full of interesting sidelights on the fisheries of his time.

In his day hake fetched only 5 shillings per hundredweight, lobsters were 10 shillings a dozen, spider crabs might bring a few pence per score and dog fish were considered unfit for human food. Polperro's strong suite was "Congerdouce," made by splitting and bone-ing conger, stitching up the cleaned bodies and nailing them to boards, placed by hundreds to "cure" in the wind and sun. Polperro advertised this industry in hot weather to an extent that nauseated visitors, but it did a roaring trade with Spain. Grated up in soup it was considered well worth the 30 shillings per hundredweight demanded.

Couch became a great friend of Yarrell and helped him with his *History of British Fishes* and *Natural History of Britain*. Jonathan Couch's eldest son was father of the famous "Q," author of the *Astonishing History of Troy Town* and other well-known works. The naturalist lucky enough to holiday in Polperro will find Jonathan Couch's birth place at the foot of the Old Calvinist steps. Couch House in Polperro is a museum of antiquities.

When in 1870 Jonathan died he was buried at Mable Burrow in the parish of Lansallos. In the excellent

(Please turn to page 140)

Some Hints on Close-up Photography

by LAURENCE E. PERKINS

(Illustrated by the author)

THE enthusiastic aquarist-photographer who has succeeded in taking reasonable photographs of his fishes may, at some time, wish to obtain detailed studies of the lesser forms of life in his aquarium, i.e., aquatic insects, small plants, molluscs, etc., and will seek some method of bringing them within range of his lens.

Owing to their usually very small dimensions, an extremely close approach will be necessary (from, say, 9 to 12 in.), which will result in a greatly reduced depth of field so that a good deal of restriction must be imposed upon the freedom of movement of the creature concerned. Rather than resorting to the introduction of sheets of glass to the aquarium for the purpose of trapping the subject in a confined space, it will be found that a quickly made miniature aquarium will suit the purpose more adequately.

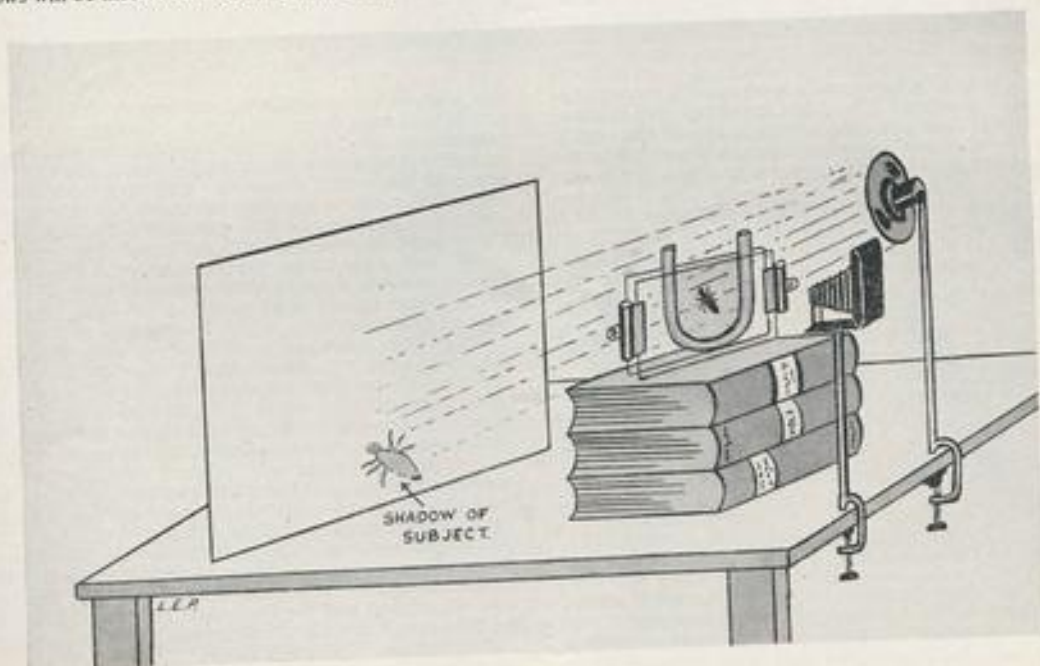
All that will be required for its construction are: two sheets of glass measuring roughly 12 in. by 9 in., two spring paper clips and about 12 to 15 in. of $\frac{1}{4}$ in. rubber tubing. The rubber tubing is sandwiched in a U shape between the two sheets of glass, which are held together by a spring clip at each end. Water is then poured into the chamber, which is of such a narrow width that the creature contained therein will be in focus at all times. The completed aquarium can then be stood upon a pile of books or some raised platform and a light background-board placed about a foot behind it at a lower level. It will then be found that if a top front-lighting source is employed, all unwanted shadows will be thrown on the background at a point lower

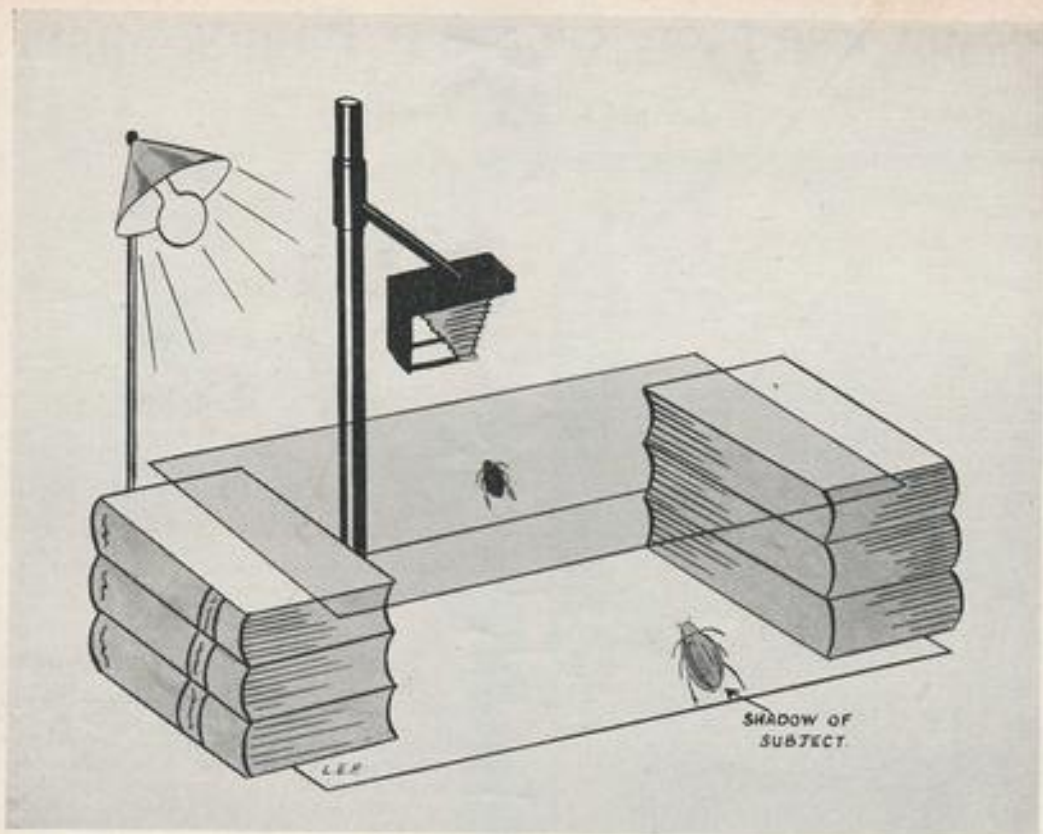


Caddis-fly larvae photographed in the "rubber-tube aquarium." Note the absence of shadows in this picture

than the area covered by the lens, shadow-free pictures result.

Sometimes photographs of dead specimens, mollusc shells and the like may be required, and it will be found very difficult to obviate obtruding shadows if the subject is merely placed upon a background. The problem can be





overcome simply, however, as is shown in the accompanying sketch. A sheet of glass is laid across two piles of books which in turn are stood upon a white card. If the subject is now placed upon the glass, the camera situated immediately above it and the light source sited above and to one

side, the subject's shadow will be thrown well out of the picture area upon the remotely placed background.

It is only natural, I suppose, that in these days of advanced scientific development in all fields, photography of small forms of life should always be associated with artificial illumination and with electronic flashlight in particular. It is true that without the speed-flash much of to-day's work would be impossible, but it is as well not to forget that the sun (when it is visible!) provides an unequalled quality of light which can often be employed to better advantage than any artificial substitute.

The reproduction of *Anolla* or fairy fern shown on page 115 of last month's issue of *The Aquarist* is the result of making use of oblique sunlight during the early evening. The beauty of this tiny floating plant is in the crispness of its texture and the lichen-like build-up of its "leaves." The individual plants were selected carefully from the aquarium and floated in one inch of water in a flower-pot saucer. As the exposure was calculated on the amount of light reflected by the plant, the pottery detail, clearly visible to the eye through the water, was under exposed in the negative with the result that a quite black background has been achieved and the final effect almost resembles the sort of brocade much favoured in Victorian furnishings.



Larva of the dragonfly photographed alive in the "rubber-tube aquarium"



Under surface of a silver water beetle photographed after death on a sheet of glass

How to Establish a Strain of Goldfish

by A. BOARDER

BREEDING of fancy goldfish for exhibition purposes can be a most fascinating hobby. It is not at all easy and so gives an added incentive to the specialist breeder. It does not appear to be generally understood that a pair of exhibition fancy goldfish are not likely to produce many fish which are good enough for showing. It is thought by many people that all or at least most of the fry from such a pair would be of show quality and they are amazed when it is pointed out to them that such is not the case. When breeding any of the fancy goldfish varieties it would be thought exceptionally good to be able to produce five out of a 100 fish from a spawning which were nearly perfect.

Can this lack of perfection be easily explained? It must be realised that all the fancy varieties were originally bred from descendants of the common goldfish and all the eccentricities are the result of breeding from parent fish which showed a distortion or sport from the normal. Any of the varieties with a double tail are therefore quite unnatural, and the strains have been established only by careful selection over very many generations. There appears to be an ever-dominant tendency for the fish to revert to the natural, and if a pair of good veiltails were allowed to breed in a pond for some years it is probable that after a time very many of the fish bred would be of little value. Even when ordinary common goldfish are allowed to breed in a pond for a number of years the quality of the youngsters will be lowered considerably. One of the first signs of this is that the number of fry which failed to change colour would increase each year.

To breed any variety of fancy goldfish some form of strict control must be exercised. If the fish are bred in a pond then the eggs must be removed for hatching and the rearing of the fry done under circumstances where the fry can be frequently examined and sorted. Only by such rigid control is it possible to establish and improve any strain.

How then should any aquarist interested in establishing a strain go about the task? To start right is half the battle, as provided that fish are procured from good stock the newcomer will at least have the foundations of a good strain. It is not that any particular pair of fish are going to produce exact replicas of themselves, but their progeny may resemble some of their antecedents back many generations. When any strain has been bred from for many years and strict sorting has been carried out it is possible for any of the fry to produce at least some fish which are as good as or even better than any of the parents. This point should be borne in mind when one is considering the purchase of stock for breeding purposes. There are the aquarists who imagine that as long as they buy a pair of fish which appear to have all the points required they are bound to be able to breed plenty of good ones from them and also to establish a good strain.

This may be far from the truth, since so much depends on how the parent fishes have been bred. If they are from good stock they must carry many of the genes of character and form passed on to them by their antecedents. Let me carry the point further by describing what might happen to the purchaser of a pair of fish when nothing is known about how they had been bred. If you pair a common goldfish to a fantail you will get a very mixed crop of youngsters. The Mendelian count should show 25 per cent. like the father, 25 per cent. like the mother and 50 per cent.



Photo 1

Laurence E. Perkins

This fantail goldfish shows undercurling of the lower lobe of its caudal fin. Such a character may have been the result of damage to the young fish and would not detract from its value as a breeder since the fish came from an established strain

resembling both parents. This count is not of much value when breeding fancy goldfish as so many eggs may be unfertilised, many more may fail to hatch and the hazards are so unpredictable that only a guess can be made as to the exact numbers of each type which would be produced. However, it is possible and quite probable that among the fry would be a few fish which resembled the parents almost exactly. One could then have quite good-looking common goldfish and also fantails.

If a pair of fantails were purchased without the buyer having any knowledge of how the fish had been bred he may obtain a fantail that is the result of a first cross such as just described. Now although this fish might even win a prize it is absolutely unsuitable for the purpose of establishing a strain. If this fish was paired to a good fantail it might never itself produce a good fantail. The bad strain from the odd pairing would remain in the stock for very many years and could crop up at any time in future generations.

Sometimes a pair of fish are used for breeding purposes which are not in any way perfect and could never win a prize in good company. Provided that this pair had been bred from good strains it is possible for them to produce a good number of fish better than their parents, as such fish would carry the genes of inheritance from the well-established strain. This means that it is better to breed from second-class fish from a good strain than from fish which appear to be good but whose history is unknown.

It is almost impossible to buy a perfect pair of fancy goldfish, unless one is lucky enough to buy some fish from an aquarist who is giving up or to purchase some fry at an early age from a good breeder who has a surplus to his requirements.

If fish are bought from a good strain there is no need to be too particular about any slight mis-shape of a fin. Such an abnormality might have been caused after the fish was

hatched, in which case it would not be passed on to the progeny. Hundreds of fancy goldfish are hatched each year which may be quite a good shape originally. During the rearing period many things can happen to the fry which could alter the shape of a fin. This alteration would no doubt prevent the fish from ever winning a prize but the same fish could produce fish which were perfect specimens and showing no trace whatever of the imperfect fin of the parent.

If we take a hatching of fantails through from birth to maturity it will be seen that it is possible for the fins to become damaged in several ways. Some of these may be accidental and some caused unwittingly by the breeder himself. Many aquarists who breed imperfect fish would be surprised to learn that it may have been their own fault through some mismanagement somewhere during the period from the hatching to the adult stage. One certain way of getting badly shaped tails is to have the fry too crowded, kept too hungry and unsorted. When the fry are unsorted after about a month it is probable that some of them would have grown larger than the others. These large fry are able to take bigger pieces of food and so get the lion's share all the time. They therefore grow on much more quickly, so that by the time they are 2 months old some fry may be double the size of the others.

These large fry could then eat the smaller ones, but this does not always happen. The large fish will seize the smaller ones by the tail and shake them in an endeavour to eat them. The victims may be too large to be swallowed but the effect of the chewing may easily damage the tail of the smaller fish. It can be said that the damaged fin will soon grow again. This may be so, but very often at the point where the damage stopped and the new growth began there will always be a thickening of the tissue, and if the damage had been rather extensive the ribs of the tail may show a knot or thick line for ever after. Such a fish would not be a perfect specimen for exhibition but it could still reproduce perfect youngsters which would have no tendency whatever to show any deformity to the fins such as the parent had.

The trouble described can be to a large extent prevented by sorting out the fry at a fairly early age and by not keeping them crowded together for long. The provision of plenty of the right kind of food will also deter the fish from biting one another.

Attacks by other fish may not be all that the breeder has to contend with. When the fry are about a month old they are very liable to get a form of fungus on their fins. This causes the ends of the tail and some of the other fins to have a whitish woolly appearance. The fungus eats away the ends of the fins and although the disease can be cured by treatment with salt the results may be permanent. The fin partly eaten away can grow again and still show the thickening where the new growth commences.

Some fry will have slight imperfections in the tail fin such as one lobe bending under, or one slightly smaller than the other; again a fin may appear double or split. All of these imperfections can have been caused after the fish has hatched and therefore will not in any way prevent the fish from producing perfect progeny.

Great care must then be taken when rearing fry to see that they are always in healthy conditions. It is surprising how soon the water in a fry tank can become foul. One wrong feed can cause the trouble. Fine dried food is one of the worst things to cause the water to become foul. Over-feeding can bring about the same results. A tank can foul in a single night and the fry can show signs of fungus in a short time. Although it may not be difficult to cure the fry the after-results may badly affect the fish.

Once a good number of fry are obtained do not forget that it is possible to cause some damage to fins by wrong

treatment. Plenty of space seems to be almost as important as feeding. A few fish in a tank will always thrive much better than those in a crowded tank, and their chances of receiving any damage will be lessened.

The type of food can also make a difference to the quality as well as the rate of growth of the fry. If it is possible to rear the fry from their first feed on some form of live food until they are at least 6 weeks old they are likely to grow better, and not only that but they are less likely to contract any fungus trouble. Once the youngsters are about 2 months old they should be large enough to take the ordinary foods and a good assortment of these should keep them healthy.

Although it is safer to keep the very young fry in tanks which do not have any compost or water plants therein, I am sure that once the fry are over 6 weeks old they do better with some water plants. If these are present there is always something for them to browse over and very fine growths of algae are there to make a meal for the fry at any time. The water will also keep healthier. Lack of plants in any tank will encourage the growth of free-floating algae, and although a little of this can be of benefit, too much can suddenly foul the water in warm weather.

It is surprising how few aquarists realise the importance of securing their breeding fish from a source they know to be good and what a difference it would make to the eventual strain if no mistakes were made in the first place.

Remember that it is almost impossible to establish a good strain from poor-quality fish.

Cornwall's "Buckland"

(continued from page 136)

Museum at Truro is preserved the original manuscript and water-colour paintings of Couch's *British Fishes*. The present writer has been honoured with the task of establishing an exhibit of local coastal fauna—the only such collection in the entire Duchy!

A very short stay in this lovely corner of the west country will give the visitor some grasp of the atmosphere which must have played a big part in making Jonathan Couch, during his 81 years, one of the great figures amongst our maritime naturalists.

Cacti in the Fish House

ALL cacti and other succulents should have an autumn clearing of the surface of the soil. Each plant should receive attention. First scratch over the surface of the soil. Remove any weeds and take off the top half-inch of old soil. Now examine the plant for pests such as mealy bug, scale or red spider. These pests can be killed with surgical spirit. A small plastic sprayer bottle is ideal for this task. Pay particular attention to the base of the plant which was covered with soil, as this is where pests may be lurking. Now replace the removed top soil with some fresh. See that the name label is still readable. If not, either replace or re-write.

There are plenty of types of celluloid labels on the market and the kind known as T labels are very good as they enable one to read them without turning the head. These labels can be written on with lead pencil and this will last for several years, although it is possible to clean the old writing off if not required, with a rag and soft sand.

Aquarist at Home—by RAYMOND YATES

(Photographs by the author)

A WELL-KNOWN hobbyist in the north is Mr. Harry Vernon of Romiley, Cheshire. He has been interested in fish-keeping for roughly 25 years and has had great success as a breeder of about 30 varieties. He is now retired from business and devotes his entire time to his hobby, and finds this a great cure for loneliness, as there is always somebody knocking at the door for fishes or plants or just advice.

Romiley is a small township within easy reach of Stockport and Manchester, but the introduction of widespread diesel services has made Mr. Vernon's fish houses even more accessible. His home is within a few yards of the station which connects directly with Manchester, London, Derby, Sheffield, Stoke, Macclesfield and industrial Lancashire towns. Even the local station master is an enthusiast, so Mr. Vernon now has no worries about the arrival by train of consignments of fishes or *Tubifex*!

He began by transforming the wash-house into a fish room, and this proved so successful that he later had a further fish house constructed with a glass roof in which he grows his plants. Between the two is a boiler house which provides the essential heating, but also each tank is wired for electrical heating as well, and paraffin heaters are used when cold spells call for extra warmth. There are so many jars and bottles and tubs and sinks and tanks, it is hard to know just how big his establishment is, but there are approximately 50 tanks of all shapes and sizes and not one is ever empty. It is rather like this in his garden, one has to be careful where one steps or a foot might be put into a *Daphnia* pool or submerged sink.

Not all of his bottles are for fishes, however; I noticed some which contained "build-up medicine" for *Daphnia*. I asked him about feeding fads and fancies but, unlike some fanciers, he has no secret home-made food. He keeps stocks of commercial foods for callers and uses these himself, coupled with Grindal and white worm and *Daphnia*. He is also a staunch supporter of *Tubifex*, particularly shredded, and I agree with him that *Tubifex* is anything but the bogey some writers would have us believe. Mr. Vernon considers Grindal worm an excellent early food and uses it invariably.

Aeration is not used overmuch by Mr. Vernon, although he has a piston pump covering the 14 tanks which hold



In these pictures Mr. Harry Vernon is seen in his fish house with his varied collection

purchased (and for sale) fishes, which are obviously more crowded than the remainder which are used for breeding and bringing on. He has kept in the region of 120 different varieties of tropicals and nowadays has about 40 varieties on show.

His plants are most successful and he has upwards of 20 tropical varieties. His speciality is (I think) *Vallisneria*, and he showed me how much better this plant does in water which is not acid by pointing out two tanks, side by side, of quite different pH where the results were staggering. He does not believe in indiscriminate mixing of either fishes





One of Mr. Vernon's pools in his garden. A closer view of the lilies in this pool is given in the photograph below



or plants and puts down many failures on the part of newcomers to this habit. *Ambulia* grows very well with a good top light and acid water and is, he contends, a plant seen all too little in aquaria to-day.

All of his breeding tanks are well planted and green, and visitors can enjoy seeing all sorts of minute fry at various stages. Like all of us he has had his trials and disasters and remembers the day when seepage through the roof from a heavy rain storm dropped on the contacts of a thermostat, which resulted in the loss of a tank of cardinal tetras. On one occasion a visitor knocked a tray of micro worms measuring 12 in. by 12 in. into a tank of livebearers!

His latest idea is to keep spiders in his white-worm culture trays to deal with fly pests—I did not see these and he told me this with such a twinkle in his eye that I was reminded of some of the weird but plausible stories one hears at club nights.

It is now some 7 years or so since he first began a partnership with Mr. Arthur Whithnall which he called Vernon and Whithnall's Aquarium. Although he now operates alone Mr. Whithnall is still most interested and is often in the fish houses cleaning or topping up or just entertaining visitors. Mr. Vernon has exhibited at many northern shows with success and has been a member of several aquarists' societies in the area. Last year he went to Spain for a holiday and was shown over the Barcelona Aquarium, so it will be seen that although getting on in years he is still young at heart and most enthusiastic about the hobby.

An Aquarium Control Box

AFTER contemplating going in for tropical-fish keeping for some time, I was recently fortunate enough to acquire a nicely set-up aquarium of about 12 gallons capacity, complete with heater, thermostat, light and aerator. Complete also with a fearsome tangle of decrepit wire, petrified insulating tape and doubtful torpedo switches! Having a considerable and healthy respect for the potentialities of electricity, especially when it is in close proximity with water, I decided to do something about it in an effort to improve things.

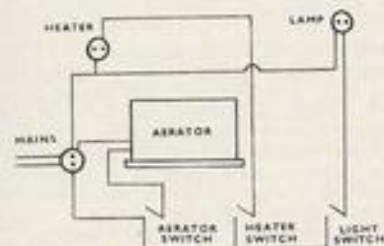


Fig. 1.
Control-box
circuit

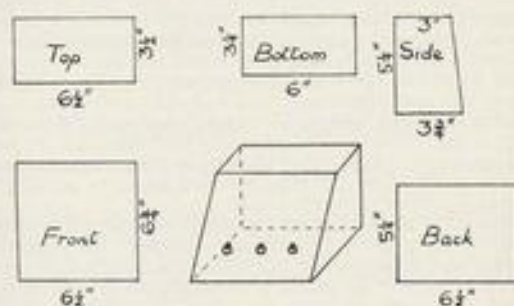


Fig. 2. Component parts of the control box

Being a novice, I was rather at a loss to know where to begin but I decided to construct a small control box with separate switches for heater, light and aerator, and 2 amp plugs and sockets for the main incoming feed and the light and heater. It has proved a more successful project than I expected and it has occurred to me that other aquarists may be interested.

The box was made large enough to enclose a small vibrator-type air pump which was lightly packed in with spun glass to reduce the noise. Three small toggle switches, three small 2 amp sockets, complete with plugs, some wire and 1/4 in. three-ply wood, with hardboard for the front panel, were the materials.

As the pump motor was enclosed in the box, it was connected directly to the incoming power socket and the aerator switch, but an alternative method would be to draw out its flex through a small hole in the box wall and fix a plug to it. This would necessitate a further socket but would give the box greater adaptability. The wiring I used corresponded to the diagram in Fig. 1.

The box itself is made simply without the finer devices of good joinery being used, and a strong impact glue has so far proved an adequate substitute for dovetails. It is illustrated in Fig. 2.

E. G. Robinson

THE AQUARIST

Girardinus metallicus

ORDER: Microcyprini, from Greek *mikros*—small, and *kyprinos*—a kind of carp.

FAMILY: Poeciliidae, from Greek *poikilos*—many coloured.

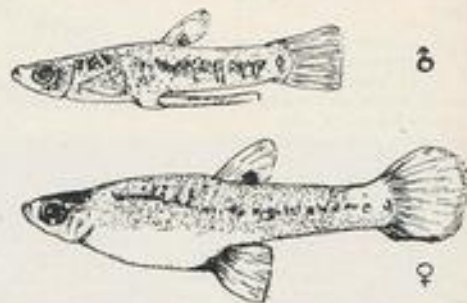
SPECIES: *Girardinus*, after the ichthyologist Charles Girard, and Latin *metallicus*—metallic.

GIRARDINUS METALLICUS is one of those fishes with recurring waves of popularity. Recently it appears to have largely disappeared from the thousands of aquaria up and down the country. Soon after the end of World War 2, however, specimens were very much sought after and commanded a respectable price. This might well have reflected the general conditions of that period when anything with fins was eagerly purchased by fish-starved aquarists and breeders anxious to cash in on the situation.

Nevertheless, I consider *Girardinus* well worth keeping. They are easy to feed, tolerant of a wide range of temperature, not fussy over space and can be relied upon to produce batches of young at regular intervals. Finally, although not brilliant in coloration, their metallic lustre, particularly that of the emerald-green eyes, is sufficient in a poor light to give them the appearance of animated glow worms.

The original *G. metallicus* hailed from Cuba. The female grows to a maximum of 2 inches, and the male about half that size. Both sexes have a dark spot at the base of the dorsal fin. A number of silver bars traverse the sides of the fish. A great amount of light is reflected from small green dots round the eyes and upon the gill covers.

The male possesses a gonopodium, which extends two-thirds of the length of its body and is double-pointed and slightly hooked. Like the guppy, the males are ardent



Girardinus metallicus: male above, female below

suitors, and the females apparently supremely indifferent to their advances. Notwithstanding, however, it is rare indeed to find a female which does not give birth to a brood or two of youngsters. These are, of course, fully capable of looking after themselves once the female delivers them, and immediately start hunting for food. They are in little danger from the parents, particularly if these are well fed on live foods such as gnat larvae, *Daphnia* and the like.

Given sufficient nourishing small live foods, the young fish grow rapidly, being practically as big as their parents in from 3 to 4 months. In the absence of live foods dry food is accepted, but growth is slowed up and some of the lustre on the bodies seems to be lost.

Temperature will also affect the rate of growth. The lowest which seems tolerable to the fish is 66° F. The highest safe temperature is 85° F. If they are persistently kept at over 80° F. growth will be very rapid, and life will be very short, for the whole metabolism of the fish will be speeded up.

There is a black or nearly black species, according to W. T. Innes, which hails from the Hongolosongo River in Cuba. So far as I am aware, this interesting variation has not yet been seen in this country. Maybe one day we shall see them. I hope so, for black fishes have an appeal of all their own to a great many fish enthusiasts.

Make it Watertight—by HILDA M. EVANS

IF you are considering making a garden pool, make a good job of it in the first place.

The pool in my garden is almost 10 years old, and not very large because my garden is small. I made it after reading varied instructions as to the best way to complete the job. Starting to dig, I made a hole of over 2 feet in depth so that my fishes should dwell in safety, even through the severest winter. I was in a hurry, and my concrete water container was soon finished. By the end of the summer it was planted and inhabited by goldfish and several minnows.

It was a source of delight to all the family. Then, in the autumn, when it should have been full to overflowing, it was obvious that the concrete was not watertight.

Searching for cracks and small holes was not easy, but dabs of cement were placed on likely spots. So far so good. By the end of the spring, after severe testing by a thickness of ice, it was leaking badly in many places, so it was patched inside and outside once more.

This state of affairs continued for several years. The

first mild day in spring found me putting the fishes into a pail, and emptying the pool. But my work was in vain.

Cats became a pest. They discovered ways and means of doing a spot of fishing, until, eventually, all the fishes disappeared or died through being disturbed when they were about to spawn. Then, one morning, on going into the garden, I found only a quart of water in the pool. Desperately, the plants were uprooted, the entire surface of concrete was scrubbed, and it was not long before I found the cause of all the trouble over the years. The layer of concrete was too thin; it was a mere crust, which cracked when the water became a thick slab of ice.

The remedy was simple. A layer of concrete 2 inch thick was put all over the previous layer, and allowed to dry and become quite firm. The pond was filled with water, and crystals of potassium permanganate were added. This was left for a week. Then the pool was emptied once more, the plants were replaced in their pockets and

(Continued overpage)

Microscopy for the Aquarist—45 by C. E. C. COLE

WE have worked our way through the various stages of preparation of specimens for mounting as microscope slides. Now we must consider the actual mounting media and methods of mounting, remembering all we have learned so far.

No matter how careful and thorough we have been in preparing our specimens for mounting, a great deal of our effort can be wasted if we are careless in this final process.

For the reasons outlined in last month's article we should know the refractive index (R.I.) of each of our various mounting media. The ones most generally used are: Canada balsam (R.I. 1.524), Euparal (R.I. 1.484), glycerine (R.I. 1.470), lacto-phenol (R.I. 1.440).

We choose the mountant most suitable for the object we have in mind, which can vary from specimen to specimen. I suggest, for experimental purposes, that several unstained specimens of the same creature, treated in exactly the same way up to the final stage of mounting, should be mounted in different media and compared. This will clearly indicate the effects of the various refractive indices of the media in enhancing or decreasing visibility and transparency.

If economy of slides is desired, several specimens can be mounted on the same slip of glass, but under different cover glasses, of course.

A small camel-hair brush is useful for removing specimens from the clearing fluid to the cover slip upon which they are to be mounted.

What is the order of procedure—the technique to be used? 1. Place a drop of mountant in the centre of the glass slide; a glass dropper is useful for this, or a small brush can be dipped into the bottle of mountant and the material transferred from the tip of the brush.

2. Place the specimen on top of the mountant.

3. Clean and polish a cover slip. Hold it in an old linen handkerchief, supported by the first finger, and gently rotate the cloth with the thumb of the same hand.

4. Place the cleaned and polished cover slip so that at one point it rests on the glass slide and slopes over but clear of the mountant, supported under the far edge by a needle. Now lower it so that it contacts the mountant. If this is done too quickly it will trap air and force it into the mountant. Allow the cover slip to settle by its own weight.



Side view of microscope slide bearing mountant with the object, showing the method of arranging the cover slip before lowering it gently over the mountant

If this is done correctly, the mountant will spread out towards the edges of the slip. Ideally, it should just reach to the edge of the cover slip and stop. More often than not, particularly in early efforts, it will either not reach or go beyond, and begin to return over the top surface of the glass. This latter is not particularly important—except so far as appearance goes—provided that it does not obscure any part of the mounted specimen. When dry, excess of mountant can be removed by careful operation of a penknife or razor blade.

If insufficient mountant is present a little more can be

added round the ragged parts, and this will be drawn under the cover slip by capillary attraction.

Should air bubbles have formed under the glass, these can often be removed by the application of very slight heat. It must be very carefully applied to avoid boiling the mountant and ruining the whole slide.

Most mountants take a surprising time to dry. I have pressed slides which have been weeks old and found that the mountant will ooze out from under the cover slip. It can safely be assumed that some of the mountants I have mentioned will retain their viscosity almost indefinitely, but they can evaporate. It follows that we must seal the edges of the cover slip with a hard drying material.

There are many of these on the market. Two I have used for years and found eminently satisfactory are Brown Cement and Murrayite (proprietary articles obtainable from microscope stockists). Other more easily obtained sealing materials are gold size and shellac varnish.

It is difficult to make a neat seal by hand operation without the aid of a "ringing" turntable. I will give details of a home-made and efficient turntable in my next article.

Make it Watertight

(continued from page 143)

clear water flowed through the hose pipe.

That was 3 years ago. The pool is a picture now. It never leaks, and the cats can find no opportunity for fishing.

Polythene is being used to make a pool by many people nowadays. It can only be temporary at best, and still a site has to be dug out for this. In the long run, a well-made concrete pool is more satisfactory. There will be no risk of a leakage, with the resulting disappointments of stranded fishes and wilting water plants. Patience and a little hard work will bring their own reward.

Auckland Aquarists

AUCKLAND, New Zealand, has recently held its annual carnival in the Western Springs Stadium. Local aquarists took part and contributed so big a display of both coldwater and tropical fishes this year that a large marquee was required for accommodation. This marquee proved to be one of the major attractions in the Stadium, drawing crowds of visitors who showed keen and critical attention, for interest in aquaria is growing fast in New Zealand.

Although there are societies in other centres, the Auckland Aquarist Society has well over 100 members, some living many miles distant in the country. Two such members of this society, Mr. and Mrs. G. Adams, have over 1,000 fishes, including a large proportion of comets, lionheads, orandas, veiltails and moors, though they have not been very successful in keeping the last-named. Cold-water breeding fishes they keep in raised 8ft. by 4 ft. concrete ponds in the garden, and these are furnished with local water plants and also water lilies.

Mr. and Mrs. Adams say they have little sickness among stock, and swim-bladder trouble is mentioned as the most serious; as a remedy for this Epsom salt is used with the addition of a little baking powder. They report that the first spawnings are usually due in late August or early September, the Antipodean spring.

Lisbon's Vasco da Gama Aquarium

by MARY R. BULL

(Photomicrographs by the author)

ON the outskirts of Lisbon, near the Tagus, is a well-kept Aquarium featuring a variety of fishes. There is one room lined with glass tanks set in the walls containing tropical fishes from Portuguese colonies and Brazil. Among the most interesting is the sinister black electric eel. *Electrophorus electricus* is found in certain parts of Brazil and the Guianas. The specimen in the aquarium was some 3 feet long, but it can attain fully 6 feet. The electric organs can generate a 500 volt discharge that will paralyse a horse.

Nearby is a single specimen of the piranha. This fish belongs to an extensive family of freshwater fishes found in tropical America and Africa below the Sahara. Some of these fish are exclusively carnivorous while others are strictly vegetable feeders. The American piranha is a small spotted fish with a snub nose which feeds on live flesh. Hunting in large numbers they can tear a man or animal to pieces in a few minutes with their razor-edged teeth.

One tank contains nine telescope-eyed goldfish and a solitary chaetodon occupied another tank. This tank had only one large stone in the centre of the sandy floor, but the sides were lined with mirror glass. All other tanks have aquatic plants and a plain background. One had a magnifying glass set in the centre so one could better see the minute fishes which swam back and forth.

In the centre of this large room is an open tank. One side has a pair of large sealions which a keeper feeds to

(Please turn to page 148)



One of the exhibits at the Aquarium Vasco da Gama



A pool in the Estufa Fria at Lisbon



An ornamental fountain in the botanical gardens at Lisbon.
In the background is the Palace of Ajuda

OUR EXPERTS' ANSWERS TO TROPICAL AQUARIUM QUERIES

I have just taken up the hobby of tropical fishkeeping. The other day I noticed that my guppies and platys were finding it difficult to rise from the floor of the aquarium. They seemed as though they were too heavy to move in the water. They are eating the food that sinks to the bottom, but only half-heartedly. Can you tell me what is wrong with them?

The symptoms you described in your letter point to derangement of the swim-bladder. This trouble may be brought on by feeding too much dried food, which often gives rise to chronic constipation and digestive troubles which upset a fish's balance in the water. But more usually, a fish which loses its equilibrium in the water is suffering from the effects of a chill. A chill may be brought on by a sudden drop in the temperature of the water, or by placing the fish in water at a temperature much lower than that it has been used to in the recent past. Or a fish can quite easily contract a chill during transit from a dealer's establishment to one's own home. Treatment for swim-bladder trouble consists in maintaining a steady temperature a few degrees above normal, lowering the depth of the water in the aquarium and feeding the fish on live food and scraped lean meat. The addition of about a level teaspoonful of evaporated sea salt to every gallon of water contained in the aquarium will often help the fish to recover. If affected fish do not show any improvement after about a week of treatment, it is kinder to destroy them.

I have a female platy in a tank inhabited by swordtails and guppies. The platy appears to be pregnant. It is possible for a male swordtail to fertilise a female platy?

Cross-mating between swordtails and platys is quite common. In fact, the cross mating of these fishes in the past has resulted in many of the interesting and highly decorative strains of swordtails and platys we have to-day. The offspring of matings between platys and swordtails invariably grow into prettily marked and large fishes.

Is it possible to cure white-spot disease with heat alone? I have been told that one must use certain drugs or chemicals to get rid of the disease.

Heat alone will usually cure a mild outbreak of white spot. Increase the temperature 5 or more degrees above normal, and siphon the bottom of the aquarium at least once every day for about a week to get rid of all sediment and unclean food lying on the compost. Feed the fish on live food to "keep up the patients' strength." If, on the other hand, the disease does not respond to heat alone, the addition of a few drops of a 5 per cent. solution of methylene blue to the water—enough to colour the water a distinct blue—will usually result in the disease being cured within a few days.

I placed two young shubunkins in my tropical-community tank. Before I introduced the shubunkins, the water was always clear. Now the water is always cloudy, though the fishes seem healthy enough and are eating well. Can you tell me what has gone wrong?

Young shubunkins are great disturbers of the compost. They are always searching it for morsels of food. As they take mouthfuls of compost up in their mouths they create a cloudy condition of the water by disturbing the fine sediment and sending it drifting about the aquarium. The best thing you can do to get over your difficulty would be to install a filter, or plant the back and ends of the aquarium more thickly. Of course, if you have a spare aquarium, you could transfer the shubunkins to this and so give your tropical tank the chance to revert to its original clear condition.

Sometime ago I introduced a pair of black mollies into my 24 in. by 12 in. by 12 in. community aquarium. Soon after I placed these fish in the aquarium, the female gave birth to a

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.

large batch of young. As the tank contained a thick growth of plant life at the surface, the majority of the fry escaped being eaten by the other fishes. But now I notice that most of the fishes seem to be hugging the top of the water, and several of the baby mollies have been found dead on the floor of the aquarium, or in the plant life. Can you please tell me what has gone wrong?

You probably have too many fishes living in your tank. Mollies need plenty of oxygen, and as you have lots of young fish in your aquarium, it is natural that the oxygen in the water has become sadly depleted. To breed mollies successfully, a 24 in. by 12 in. by 12 in. aquarium should be set aside for a single pair.

I am a comparative beginner in tropical fishkeeping, and wonder whether it would be advisable to place some young angel fish in my 36 in. by 12 in. by 12 in. tank, which already houses several neon tetras, harlequin fish, barbs and flame fish?

Yes, young angel fish make very good occupants for a community tank. But when they reach a length of above 3 inches they often develop into bullies, and drive smaller fishes away from food. Angel fish are also very partial to livebearer fry, and any young livebearers born in the community tank will soon be hunted down by the angel fish and eaten.

Please can you give me some information on the likes and dislikes of *Trichogaster leeri*? Is it easy to breed?

T. leeri flourishes best in clear water with a slightly acid reaction. A temperature ranging between 70° and 78°F.



Photo:

Laurence E. Perkins

Dwarf gourami (*Trichogaster leeri*)

suits it very well. It likes rather shallow water, say, about 9 inches deep, matted with surface plants such as floating fern, *Salvinia*, or dwarf bladderwort (*Utricularia prostrata*). It has a good appetite but a small mouth; so all food given should be on the small side. That is to say, it cannot swallow earthworms unless they are very tiny, or chopped small. It will eat any small food, however, dried or alive. It is fond of sprinklings of fine oatmeal. The fish is not difficult to breed. It builds the usual bubble nest at the surface of the water, and will breed several times throughout the summer months, and even into the winter if the temperature is raised and the aquarium is flooded for several hours every day with a really bright electric light.

Can you tell me whether there are any firms specialising in the construction of fish houses?

We do not know of any firm specialising in the construction of fish houses. Most fishkeepers who desire to house their fishes in a building out-doors usually convert a greenhouse or conservatory to suit their own special requirements, or even modify a disused cycle- or tool-shed. Of course, one can always construct a small house of wood or bricks and mortar to house a collection of fishes. Lining the glazed roof with thick polythene sheeting, and the walls with asbestos sheeting, will help to conserve the heat in the winter and guard against overheating in the summertime. Heating may be by oil stoves or small solid-fuel boilers. Individual heating of the tanks by electricity is not very economical unless only a few tanks are being kept.

Are zebra fish easy to breed?

Zebra fish are very easy to breed. The floor of the aquarium should be layered with glass marbles or well-washed rounded pebbles. Some aquarists prefer a mat of feathery-foliaged plant life anchored to the bottom. But whatever method is used, the eggs are non-adhesive and need something to fall into to save them from being eaten by the parent fish. The fish spawn at a temperature of about 78°F., and after spawning is over they should be transferred to another aquarium. The fry hatch out in about 2 days, and quickly develop into plump little fish if they are given plenty of Infusoria for the first fortnight or so of their existence, and this is then followed up with micro worms, fine oatmeal and screened *Daphnia*.

Recently I bought about two dozen *Cryptocoryne cordata* plants for my aquarium. A week or so after introducing the plants into the aquarium the leaves of the plants started to split, develop holes and disintegrate. Now most of them have been reduced to mere stumps or sprigs of greenery. Please can you tell me why the plants should go into this decline?

The leaves of certain species of *Cryptocoryne* often disintegrate after being uprooted and planted afresh, for *Cryptocoryne* do not take so kindly to transplantation as some other water plants, such as *Vallisneria* or *Sagittaria*. But they will soon send up fresh leaves and re-establish themselves if conditions are to their liking. *Cryptocoryne* prefer a diffuse light, acid water and a temperature not

lower than 68°F. Young, or newly planted *Cryptocoryne* need sediment-free water, for sediment settling on the delicate leaves, which slowly emerge from the crowns of the plants, will rot them and, if the water is not cleared by siphoning or filtration, the plants will give up the struggle for existence and die.

I have just acquired some blue gouramies for my tropical-community tank. I have noticed, however, that the ground colour of the fish often deepens at night. Is there anything wrong with it?

There is nothing to worry about. The basic or ground colour of the fish often deepens or becomes more blue under electric light or sunlight, when courting and when stimulated by the introduction of live food. A temperature in the high seventies or middle eighties will often procure the same result. The colours of all the gouramies are very transient, and when in breeding condition are exceedingly changeable.

I have two orandas in a tank 18 in. by 12 in. by 10 in. which appear to be off colour. The temperature of the water is 64°F., and the fish have closed their fins, appear listless and mouth at the surface of the water. The body of one now seems to be smeared with a smoky substance. What is the trouble?

The fish may not have sufficient space in the tank, especially as you have the water warm. The warmer the water the less oxygen will it hold. If the water is so impure that the fish mouth at the top then they should get all right quickly if the water is changed. You may also have been over-feeding as the condition of the fish resembles that of fishes kept under unhygienic conditions brought about by the decaying of uneaten food.

Can you please tell me if fantails have to be kept under special conditions. Would a tank 24 in. by 12 in. by 15 in. be suitable to keep them in and how many would it hold? Are fantails hard to breed and do they need special foods? Are they expensive?

Fantails do not have to have special conditions. The scaled ones are quite hardy but the scaleless or shubunkin types are not quite so hardy. In the tank you mention you could keep two 4 in. fish, four 3 in. fish or six 2 in. fish, as long as sufficient water plants were growing in the tank and feeding was carried out with care. Fantails are not more difficult to breed than common goldfish, but to obtain exhibition specimens needs more care and knowledge. Good fantails are expensive but those suitable for you need not cost more than a few shillings each.

I have a stand for two tanks with tropicals at the top. I would like to install coldwater fishes in the lower tank and would like to put some electric lamps above it. I have been told that the coldwater fish would be frightened when the lights are put on and this might involve cruelty. What is your opinion?

I have two such tanks as yours, both housing coldwater fishes. Each tank is illuminated by two 25 watt lamps and the fish never show the slightest sign of distress when the lamps are switched on. You can dismiss the suggestion of cruelty as I can assure you that if I thought my fish would be even inconvenienced by such lighting I would not have continued to use the method for many years.

COLDWATER FISH-KEEPING QUERIES answered by A. BOARDER

Could you recommend a good vacuum for sucking up the sediment in my tank? I have bought three vacuums, one hand-operated and the others electric, but I cannot get much satisfaction from them.

From your description of the tank water I believe that you may be over-feeding your fishes. A filter will only do its job under reasonable conditions. If the water is over-charged with foul matter then the filter has to be very effective to be able to keep the water clear. If you reduce

the dry foods considerably for a time I am sure that you will find that the water becomes clearer. If we watch what happens in a well-planted tank containing goldfish it soon becomes apparent what happens when food is withheld for a time. The goldfish cease to suck up any food from the bottom of the tank and then start to feed from the water plants. These are usually partially covered with a form of algae and the fish suck this off. After 2 days without artificial food it will be noticed that the droppings of the

fish are quite copious and black. This indicates that the fish have been feeding exclusively on the algae on the plants and sides of the tank. At the same time it will be noticed that the water has cleared considerably, and whilst dry food is not given it will remain clear even without the use of an aerator or filter. When the plant leaves are cleaned by the fish they are able to perform the important function of assisting in keeping the water clear. Plants also use up much of the droppings of the fish and so help to keep everything sweet. Any well-managed tank should keep in good order almost indefinitely with a weekly servicing of about a half-an-hour's duration, and that even without a filter. Your filters should be suitable for your purpose and I know of no better ones than those mentioned.

I have recently had a grass snake visiting my pond. I am afraid for my fish and would like to know what I can do to protect them.

Grass snakes will remain fairly near a pond as they are very fond of frogs as food. Frogs prefer any area which is

FINNY BUSINESS

by
LD



"Very handy, he is—makes a good tooth-pick!"

on the damp side, therefore they frequent the surroundings of ponds even when not breeding. Grass snakes are good swimmers and would be able to catch and eat your goldfish. A grass snake with a head less than an inch across could eat a fully grown frog, and so you can imagine that your goldfish would not have much chance. It is difficult to make sure that a grass snake could not get into your pond and the only method I can suggest is to build a small outward curving wall with concrete all round the pond, this would prevent any grass snake from climbing over. The rendering would have to be smooth and the wall at least a foot high, with a good outward overhang.

I have a pond about 10 feet by 8 feet, which I made some time ago. I have 12 good-sized goldfish which seem quite healthy. However, they remain at the bottom of the pond all the time among the water-lily roots. They never come to the top of the water. I wondered if a heron had visited the pond and frightened them to the bottom. I have hundreds of "water boatmen" on the top of the water; would these be the cause of the fish going to the bottom of the pond?

Your fish are remaining at the bottom of the pond because the water is in a healthy condition. If it was lacking in oxygen or over-charged with foul gases the fish would soon be at the surface and you would have something to worry over. I do not think that a heron would frighten the fish so that they kept to the bottom. I am of the opinion that goldfish soon forget any disturbance and are not likely to remember anything like a visit from a heron for long. The creatures you describe as being on the surface are not water boatmen but pond skaters. The former are under-water swimmers whereas the latter never go below the covering skin of the water. The pond skaters will certainly not harm your fish or frighten them in any way, although I have never known a goldfish to eat one.

With reference to the making of a pond with polythene sheeting, could you please tell me the best method of planting the pond? Should plants be planted in separate containers or should they be put directly into compost on the bottom?

It will be much better to set all the plants in containers. They can then be lifted from the pond if necessary for cleaning purposes. It is also much easier to keep each plant under control. When all plants are placed in a common rooting compost the very strong ones can soon crowd out and starve the weaker but perhaps more ornamental ones. I hope your pond turns out to be successful. I am waiting to see how the polythene sheeting holds up to severe freezing of the water during the winter, and shall be interested to hear from any reader as to how it does so.

Lisbon's Aquarium

(continued from page 145)

amuse the visitors. On the other side of a glass partition are a couple of seals. People are warned not to pat these animals as they bite, but they are so tame and look so friendly it is difficult not to. This room only has a canvas roof like a tent, which is withdrawn in summer. The walls are dark.

In another part the walls are lined with large tanks containing fishes found off the coasts of Portugal. Grey and red mullet, horse and striped mackerel, streaked gurnards, sinister octopuses and many other species.

A keen pondkeeper will be interested in a visit to Lisbon's fascinating and unique Estufa Fria. This is a large greenhouse in the Edward VII park in the city's centre. It contains a great variety of tropical plants. The pools are full of aquatic plants and goldfish overshadowed by huge philodendron, ferns and hundreds of other creepers, bushes and plants of all kinds from Portugal's African and Eastern colonies as well as Brazil.

Sea Gardens

by HENRY TEGNER

THE Farne Islands, which lie off the north-east coast of Britain, are within a few miles of the Scottish border. The surrounding sea, at certain times of the year, is of a remarkable clarity, being almost tropical in its transparency, the colours of the various seaweeds, limpets, crabs, starfish, sea urchins and sea anemones are easily visible far down beneath the surface. This may seem a surprising thing, as the North Sea has normally a reputation for its grey dreary waters.

The birds, fishes, flowers and animals of Britain are generally believed to lack the vivid colouring one associates with that of the equatorial jungles and tropical seas. The cold seas, however, which surround our northern coasts can exhibit, in one particular sphere, at least, astonishing colours. For our native sea anemones offer a profusion of tints which has to be seen to be believed.

One of the finest submarine anemone gardens is to be seen in the little Dove Marine Aquarium in the Northumbrian hamlet of Cullercoats. Cullercoats, once a fishing village, lies near the mouth of the river Tyne which separates the northern counties of Durham and Northumberland; the Aquarium is less than 30 miles from the Farne Islands. In the great glass cases anemones, resembling the earth-bound dahlia and the chrysanthemum to a remarkable extent, flower before one's eyes, their waving petals keep up a perpetual undulation in the clear sea water. Through pale pink to gentle mauve and then vivid blue, the onlooker's eyes wander in admiration. Crimson and ivory-white strike a contrasting colour-note of their own, whilst a background of amber and green provides a sombre setting.

The anemone is a primitive form of life, not far removed from the flaccid jellyfish, though the anemone is almost entirely static whereas the jellyfish is sometimes a great traveller.

Both anemone and jellyfish have the same sort of feeding and excretory apparatus, for the "mouths" of anemones and jellyfish take in nourishment, to reject through this same orifice waste matter after its digestion.

The "mouths" of anemones and jellyfish are surrounded by tentacles which have a stinging power. Most bathers are aware of this power in the jellyfish but the degree of sting of an anemone is much less; it can scarcely be felt by the human hand, although placed on the cheek or tongue their tendrils may cause a slight burning sensation.

Anemones are exceedingly voracious creatures. To watch them being fed at the Dove Marine Aquarium is something of an experience. They are often given the flesh of fresh limpets, cut to the size of sixpenny-pieces; these bits are dropped, one at a time, into the top of the tank. The curator stands on a wooden platform above the aquarium and with the help of a long bamboo cane he guides the slowly sinking morsels within reach of the anemones' tentacles. As soon as the creatures sense a limpet in their neighbourhood, they grasp the food and immediately contract themselves into puckered conical knobs. Sometimes, two grasping anemones in juxtaposition will come in conflict but, once the portion is captured, or broken during battle, the two opponents settle back to digest, or look for more, should they have missed their bit. Anemones need

to be fed only once a week or even once a fortnight. Provided that one lives near enough to the sea to be able to collect limpets, winkles, cockles or mussels, these lovely flower animals are not difficult to keep alive.

They have one advantage over the flowers of earthly gardens in that anemones are extremely long lived, although the extent of their life, as with other creatures about which little is known, is probably greatly exaggerated.

British anemones seldom exceed 3 to 4 inches in diameter, but certain tropical specimens measure as many feet in diameter.

A species of anemone known as *Discosoma*, which measures 2 feet in diameter, is said to spread, like some fantastic scarlet carpet, over large areas of the Red Sea's bottom.

Not all anemones lead a static life. Some of them lead a nomadic existence by adhering to the shell of hermit crabs or sea snails. The sustenance of these is mainly gained by picking up the fragments of food left by their landlords. Sea anemones are commonest on rocky shores but they also occur in sand and mud; some small anemones frequently bud on the piles of jetties, as many a pier-angler knows.

There are no more lovely creatures in the sea than fully expanded anemones. These creatures are strange, mysterious and beautiful things. They may start a craze at any time which might well oust the tropical fish from the many aquariums of the drawing-room and parlour.

This flower creature has another charm and this lies in its variety of names. The marine biologist has given anemones an extensive nomenclature. Here are some examples: the glaucous pimplet, the beadlet, the trumpet, the deeples, the opellet, the painted pufflet, the latticed corklet, the crimson imperial, the dahlia, the daisy and finally the plumose anemone.

Aquarist's Calendar

4th October: **British Aquarists Study Society Conference**, 1958, in London. Details available from secretary, J. E. Edwards, 42, Berrylands Road, Surbiton, Surrey.

18th-25th October: **Edinburgh and East of Scotland A.S.** annual show at Infirmary Street, Edinburgh.

31st October and 1st November: **Bristol Aquarist Society** annual open show at Bishopston Parish Hall, Bristol.

8th-9th November: **British Aquarists' Festival** at Belle Vue, Manchester.

12th-15th November: **Scottish Aquarium Society** annual open show at the McLellan Galleries, Glasgow.

Fish Deaths at Show

AFTER the deaths of about 60 fishes at the Midland Aquarium and Pool Society's show at Birmingham last month samples of the water from the aquaria were tested by public analysts. Abnormally high concentrations of copper and zinc were found in the water and it is thought that the combination of the two metals in the amounts found could have caused the poisoning of the fishes. The metals were in the water supply used by the exhibitors at the show, and a sample of hot water and cold water mixed had 0.16 parts per million of copper and 2.0 parts per million of zinc. Deaths did not occur when fishes were exposed to the water in aquaria containing water plants and sand, which appeared to absorb some of the metals and so caused their concentration to fall below the danger level. The Society is reported to be taking precautions to ensure that trouble of this kind does not occur in the future.

AQUARIST'S Notebook



by

RAYMOND YATES

IN recent issues I have recounted for readers how I made a polythene pond and how successful this at first proved to be. Subsequently it was ruined by youths of the "Teddy-boy" type who broke into the property and wrecked the pond. After this quite unforeseen disaster I am afraid I quite lost heart and left the pond just as it was, empty and derelict for two or three weeks. However, one day I removed all the rockery surrounds and took up the damaged polythene and laid it out flat on the grass for a more complete inspection. It was very dirty indeed on the underside but after leaving it exposed for some days to the heavy rain of July, and turning it, it became quite clean again. I then found that the holes in the fabric were mostly about an inch in length, but two or three were up to 4 inches long. I felt that I ought to make an effort at repairing the damage.

I bought a small tube of an adhesive called Evo-stik, which was described as waterproof, to try out for repair of some of the smaller holes. I cut out some small squares of polythene from the edges of the sheet and cemented these on the holes, as patches, both sides. When dry I arranged the sheet so that the rain would run into the hollows where the repairs had been made. This it did and I was surprised and pleased to find that the patches were waterproof. In due course I patched up the whole sheet, using two more tubes of the adhesive, but the appearance was anything but pleasing. Hoping against hope I relaid the sheet in the pond and then put back the rockery in a rather rough-and-ready manner because I felt I was really wasting my time. I was able to stand on the repaired polythene to place the rockery by the simple expedient of laying down a patch of carpet on top of the polythene to avoid damaging it with my shoes.

I then filled the pond and covered the unsightly patchings with gravel and then went to bed and hoped for the best. In the morning I found the pond was only half full, and I feared the worst. However, the water level remained constant and after about 10 days I decided to refill to the top and see how things went, as I had been unable to find any obvious source of leakage at the waterline. Judge my surprise to find that the topped-up pond remained full, and no further leakage took place. A month has now elapsed since the repaired pond was put in commission, and I have had no further trouble with it. The adhesive did not appear to have any toxic effect on the fishes; this I tested out for a week with goldfish and golden orfe, but they were unaffected.

All my plants were lost in the original disaster so to carry me over until such time as I could obtain more suitable aquatic vegetation I flung in quantities of frog-bit and bog bean and forget-me-not, which quickly took over and made themselves at home. I also put in some cuttings of moneywort from the garden, and some garden mint. The last-named makes a very good show if you cut about a dozen stems about 9 inches long and put them in a very small plant pot and wedge them in with a couple of fair-sized stones, standing the plant pot on the bed of the pond.

A reader in Kent has asked me if I could suggest any paint which could be used to cover the polythene to make it look more natural. I did not feel that I could suggest any with confidence, nor, for that matter, is it necessary. A polythene pond is not supposed to be exactly like a more formal and more permanent concrete pond and cannot compare with such for durability. Its appeal is to those who want a pond in a hurry, or one made with little effort, and to those who like to change shape and size and scope

every year. The major hazard is the risk of puncturing the fabric (for example, by a rock surround falling into the pool) and the difficulty of locating the source of leakage.

It has been an interesting experiment which, all in all, I have quite enjoyed, but I would not recommend this type of pool to all hobbyists, in particular those with children, dogs or cats, or where the location can be seen from the roadway or elsewhere. Modern youth has no respect for private property, and I often wonder how many people with outside fish houses have had these broken into and have suffered losses and damage. Long ago I had such a house, never locked, and this was "visited" by two children, aged 8, who made a dreadful wreck of things.

The Boy Scout movement in Britain does not seem to be aquarium-minded, but the reverse is the case in Canada. It is reported that the Toronto club has set itself the task of providing eight volunteers to teach the local scouts about aquarium matters for their aquarist badge, and also to provide examiners to test the scouts for the badge. In addition, the club president has prepared a special teaching brochure. This club certainly knows the meaning of "Be Prepared"!

I have had spatterdocks for years and have always had considerable success with them. I find that they like plenty of light, and this is a prime need. I never bury the rhizome in the gravel, of course, nor do I layer it on the gravel. Usually I anchor the roots with lead and allow the rhizome to stand vertically. This does not affect the plant, which does very well indeed. The leaves adjust themselves to the height of the water, and grow below the surface and not at it. From time to time aerial leaves will be thrown up; these can be left or cut off. If they are removed it will not endanger the plant. Spatterdocks should not be kept out of water at all and care must be taken that no leaves get creased or they will rot at the crease. Lack of light produces tiny spindly leaves.

Noise from pumps can be deadened by putting them on a piece of deep foam-rubber sheeting. See also that the wires to the pump and the air-flow pipe do not touch anything in the vicinity; this can increase vibration and noise.

An error often made by newcomers to the hobby is to keep together fishes in a community tank which require widely differing temperatures of water. Some fishes like cool water and are miserable if the temperature is too high, others insist on hot conditions and go right off if the water drops to more equable conditions. Too many books give suitable temperatures for fishes as 70-85°F. This is nonsense. Some fishes much prefer the lower end of this scale, others the higher. If you want good results the twain should not meet—keep them in separate tanks. Far too many livebearers and *Aphyosemon* species are kept in water which is too warm. Few fishes need over 75°F, except for breeding; those who like it warmer (like the chocolate gourami) are much fewer and you can give these separate quarters.

Providing a Pond

by WILFRID HULL

IN the summer of 1953, my suburban garden contained a multiflorous flood of bloom, the chief attraction being a massed bed of asters. They were a source of pride to me and the envy of my neighbours. Then came disaster! Without warning, they began to collapse one after the other, like rows of skittles and within a fortnight, I lost the lot.

Shocked and disgusted, I said to my wife, "That patch of ground will never be tilled again. I'm going to make a fish pond there." She asked me what kind of fish I was going to put in it and I replied, "Kippers!"

I decided upon an informal pool for two reasons. First it would be more suitable for a small garden; secondly, very little wooden shuttering would be needed.

During the preliminary excavations, I candidly cursed the consistency and weight of Middlesex clay, but, later on, it proved to be a blessing. The hole kept its shape and the clay made a good foundation. I dug out a rough oval, working towards the middle, 18 in. deep at the sides sloping down to 30 in. in the centre. Here I cut out an oblong, 1 ft. deeper. This was to be the base proper and here, too, I made the lily trough. This oblong was half-filled with broken bricks, well rammed down.

All the earth and clay was dumped at the far end of the plot, where a rockery was made at a later stage.

Next came the concreting, and bang went my beer and tobacco allowance for some time to come! The expert had emphasised that the minimum thickness of exterior walls and base should be 4 in. I decided to be generous; mine were 6 in. As a guide, small pegs were pushed into the clay at intervals and projecting 6 in. They were removed as work progressed.

The concrete was 4 parts of sandy ballast to 1 of cement, well mixed, three times dry, three times wet, water being added very gradually.

The oblong was filled in first, thus making the maximum depth 2 ft. 6 in., at which the fish would be likely to survive during rigorous weather conditions. A bottomless box was made from 6 in. battens and its size all round was 6 in. less than the oblong. It was kept in position, temporarily, by a few bricks placed on the inside.

Concrete was placed all round the battens and I built upwards and outwards. Good progress was made and the fabric of the pool emerged at ground level, approximately 11 ft. by 7 ft. It was faced up with 2 parts of sand to 1 of cement, $\frac{1}{2}$ in. thick, then waterproofed. Cement was mixed with water to the consistency of thick whitewash and the whole area "painted" twice, each coat being allowed to dry in between.

The top section of the lily trough and divisions for plant pockets were made from ashes, cinders and clinker, mixed with cement (proportions 6 : 1), as they did not need to be watertight. The pool was filled with water in October and left to weather the winter.

Seven months later, in May, 1954, it was emptied, scrubbed out and planted with marginals and oxygenators, plus two water lilies (James Brydon and Gladstoniana). In June, four small goldfish were introduced. They all died within a very short time from fungus and tail rot, due, I supposed, to the toxic conditions coming from the cement. At the end of July, I tried two more fish; they survived the winter, but passed out in the spring of 1955. Looking back, it seems to me that I did not achieve any success for

18 months, and this coincided with the appearance of blanket weed.

Then, livestock thrived, but, cats arrived! I have heard it said that furry felines hate water, but I have good reason to think otherwise. One "Tommy" I know, is not only an angler, but a diver as well, and he has enjoyed succulent dishes of stolen goldfish. My pool was protected at one end by the rockery and on two sides by dwarf walls. I hit upon a plan for the unguarded end by raising the level of the concrete just 2 in. Whilst it was still wet, 6 in. lengths of bamboo cane were slipped in between, horizontally and the ends just visible. Stout gauge wire was cut into 18 in. pieces, bent into an L shape, and the shorter portions were pushed into the canes, which had been spaced about a foot apart. Nesting, 12 in. deep, was slipped over the wire and this arrangement proved to be effective. Tommy is now conspicuous by his absence!

In 1956 I decided to make another pond, at a higher level. It was constructed on similar lines to the first one, except for one additional improvement. After waterproofing, it was sealed with a preparation which penetrates into the concrete, closes the pores, renders the pool water-tight and instantly stops the caustic action of new cement, so injurious to fish and plant life.

To-day, I possess six pools and a bog garden, but, no asters! A centrifugal pump will be in operation shortly, to provide visitors and myself with a pleasing view of cascade, waterfall and babbling brook, not forgetting my pretty pets, the fancy fish.



Ponds made by the author in his garden

Worm Cultures of Pests

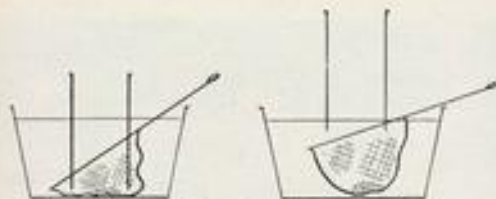
by L. W. RIVERS

THOSE small, white, active pests which I find thriving in dwarf white-worm cultures have caused me many a headache. Every means employed to dispose of them has always left a few for "seed" which always prove to be prolific breeders.

The only way I have found to separate them from the culture is by complete immersion in water. The pests then float to the surface. The problem then arises of removing the cleaned worms without them coming in contact with the pests floating on the water surface. If you pour the water off, some pests invariably remain. If you add more water in order to float them over the edge of the bowl you will still find survivors. However, I have evolved a simple method whereby the culture can be completely cleared provided that reasonable care is taken.

Materials required are a large bowl (5-6 in. deep), an empty tin with its bottom removed, and a net big enough to take this tin. Tip out the culture on to a piece of paper or into a spare bowl. The culture box can now be thoroughly sterilised with boiling water (and don't forget underneath the box and the lid!).

Fill the bowl with water (78° F.), place the net on the bottom of the bowl and stand the bottomless tin in it. The top of the tin must be clear of the water. Now comes the tricky bit—the transfer of the culture into the tin without any pests jumping into the surrounding water. This is not too difficult if the tin is of fair size, say 5-6 in. diameter, and if you spoon the culture in, holding the spoon over a plate.



The culture to be cleaned has been dropped into the net through the tin cylinder (left), and when this cylinder is lifted the net with culture free from pests can be removed (right)

A quantity of culture having been deposited in the tin a little agitation is advisable to release all the pests from the medium. A little time should be taken at this stage to ensure that all the pests have reached the water surface inside the tin.

Having satisfied yourself this has been done, lift the tin, taking great care not to lift it out of the water! Your cleaned culture can now be withdrawn in the net from beneath the tin and the pests are left trapped inside the tin.

Your cleaned culture can now be gently squeezed in the net to rid it of excess of water and then returned to the cleaned box. Repeat this procedure until the whole culture is cleaned.

I hope this suggestion will help many fishkeepers who may have abandoned these useful worms because of pests.

Compiled by J. LAUGHLAND

1		2		3	4	5		6	7	8	
				9				10			
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28	29	30				31	32	33		34	35
36				37					38		
39									40		
41			42								

CLUES ACROSS

- Could be of his lit carp some way (8, 4)
- Tail of gousami for my French friend (3)
- Tetex from — (5)
- Shockers in creel tile, etc. (8, 4)
- Half hake returns gasping (2)
- plus nearly the head of an anchovy (2)
- Order of toothed carps (12)
- Not the current supplied by 1 Across (1, 1)
- Detective seems confused (3)
- Change from tadpole to frog, for instance (12)
- By far the greatest source of fish (3)
- Part of the Dark Continent (1, 1)
- Freak goldfish, Nelson-like (9, 3)
- You are in archaic form (2)
- Island from which sardine is named (8)
- Fish eggs (3)
- Let India go from giant danio for this insect (3)
- Small saint but no angel (2)
- Thymallus thymallus* (8)

CLUES DOWN

- These instruments might term metres hot, somehow (12)
- Metallic earth (3)
- A little meee softly and we'd have a carp (3)
- Amy has it in for peace in the community tank (5)
- Little licensee (3)
- Nice iron for scheme for 4 down (8)
- Yellow pigment of sild (3)
- Spilt hops on ice for monastic rest-house in alps (7)
- Body in box under vehicle (7)
- Poetically although (3)
- Land (5)
- Fish with nine lives? (3)
- Vent of a reptile (6)
- Wino (3)
- Muddler (6)
- Maxim (6)
- Islet (4)
- River Leech holds (3)
- Drunken revel (4)
- Settled in short (2)
- Last Indies (1, 1)
- Devour (3)

PICK YOUR ANSWER

- "All's fish they get, that cometh to net" was written by: (a) James Thomson. (b) Thomas Tickell. (c) James Townley. (d) Thomas Tusser.
- Yu-tan-yu is the Chinese name for: (a) Egg Fish. (b) Fantail. (c) Oranda. (d) Pompon.
- The minnow (*Phoxinus phoxinus*) is found throughout the British Isles except in: (a) Northern Ireland. (b) Northern Scotland. (c) Southern England. (d) Southern Wales.
- Zebra cichlid is the popular name of: (a) *Cichlasoma bicellatum*. (b) *Cichlasoma festivum*. (c) *Cichlasoma nigrofasciatum*. (d) *Cichlasoma severum*.
- Moenkhausia oligolepis* (glass tetra) was named by: (a) Eigenmann. (b) Günther. (c) Kner. (d) Spix.
- Lamia zandvoortii* (blue poeciliid) is native to: (a) Cuba. (b) Haiti. (c) Jamaica. (d) Trinidad.

(Solutions on page 157)

G. F. H.

The Sacred Fish of Ambondrona (Madagascar)

by J. T. HARDYMAN

IT is not often that one sees a shoal of freshwater fish so large, and in such a confined space, that they could probably be picked out of the water by hand.

Such a shoal exists, however, in the Lake Alaotra area of Madagascar; and what is more, the fish and their pond are regarded as sacred. For years I had known—from a brief reference made by a Government official in an old copy of a French learned journal—that this pond existed. But despite enquiries, I had been unable to find its whereabouts. Then one day in 1955, while in conversation in a Malagasy house, an incidental remark made by someone suggested to me that the Ambondrona pond was perhaps being referred to. So before long I made it convenient to go and see what was to be seen.

From the village where I was, we first walked along the shoulder of a hill, then took a path across some rice-fields, till we found a stream. This we followed till we came to a small pond, which was fed by the stream running out of another pond. The whole was surrounded by vegetation, so that it could not be seen from a distance.

The stream has its source in this second pond, which is about 10 yards in diameter. The water comes up from an underground source, the exact site of which could be identified by the cleanliness of the sand within a circle about 2 yards in diameter; the rest of the sand is blackish. The explanation is that this area is waterlogged and the land floats on the surface; when a railway was built years ago and crossed part of this area (not far from the pond), it is said that a distinct "wavy" motion could be felt when a train passed by. The smaller pond (the first mentioned above) is about 4 yards in diameter; but in addition to the stream there is obviously also another underground source, the motion of the water being, however, much more violent, so that the pond appears to "simmer."

But to come to the fish. They are found in the larger pond, but not in the smaller. They lie so closely together as to form a black mass several yards long. Some of the fish are very much larger than the rest and, when I saw them, appeared usually on the outer edge, as though giving instructions to the shoal, which in consequence both moved *en masse* from one part of the pond to another and also altered in general shape.

The Government official who saw the fish 40 years ago was not able to identify them with certainty. They are different from a fish which is very common in the area (*Paratilapia bleekeri*). The closest resemblance appears to be *Paratilapia poleni*, according to an expert to whom they were described; but I think that, owing to their special situation, they have never been examined by a competent naturalist.

The evidence for the existence of this shoal at Ambondrona goes back at least 40 years; but probably they had already been there for many years before. There seems no obvious reason why they live in the one pond and not in the other; nor indeed why they should live there always in such a mass and not disperse down the stream. Thus their origin is something of a mystery—so far as natural history is concerned.

But according to the local Malagasy tradition which was told to me, it is no mystery at all. There were once two young lovers who, however, were forbidden by their parents



The shoal of sacred fish forms an elongated black shape in the water of their hidden pond

to marry. In despair, they committed suicide together at Ambondrona and they turned into two large fish. The present fish then, says the tradition, are their descendants!

With such an origin and with such peculiarities in their way of life, it is not surprising that the fish are regarded as "sacred" and the water in which they live as having special "power." This sanctity protects them from being caught—otherwise, of course, they would all have disappeared into the local cooking-pots years ago—for who would spend hours in a small canoe in the hot sun on the lake, when fish could be so easily caught in a pond? But it is thought that because of their mysterious power, even if someone did catch the fish, they could never be cooked.

Forty years ago the fish had a guardian: this was probably the man rejoicing in the long name of Lehibefihavanana, which might be roughly translated as "the man who gets on well with people." His was the earliest name I could trace in connection with the fish. To-day, it is a man living in a village a few miles away who is in charge.

He and others who "perform" there, are known as mpianjaka; that is, they are believed to be "possessed" at certain times by spirits. It is difficult to get precise details of the ceremonies, as people do not like to give the impression that they know too much about what goes on! But it would seem that there is some ceremonial bathing in the pond, and water is flung over the person; requests are made (perhaps to the spirits of those two young lovers) for such benefits as good health and wealth.

Changing conditions and especially the influence of the Christian churches in the area have caused the numbers of those who have recourse to the sacred fish of Ambondrona to decrease. And modern drainage schemes may yet dry up their ponds. But at present they still have their devotees who expect great things from them. And even if no one expected any such benefits, they would still, in their little-known hide-out, form a curiosity and a minor puzzle in natural history.

our readers

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



write

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

In the Swim

I HAVE kept tropicals, but for some time have had a 5 ft. tank which I was unable to stock except for a few goldfish on a sandy bottom with no vegetation. A visit to the local river, armed with gum-boots and a bucket, produced some results which might be of interest.

The tank is now presentable with a bottom of clean gravel brought back from the sea-side. The plants from the river include what I can only term water carrot and water parsnip, a few plants of exceptional beauty which give the appearance of a fir tree (as new growth appears the old drops off like pine needles), and four or five others are similar to weeds found in the sea; various shells and an arch of coal finish the effect. The coal arch makes an ideal lair, which is shared by a catfish (Clarence) and a crayfish.

The fish life of the tank is now as follows: 12 assorted goldfish, shubunkin and hybrids, Clarence, a stickleback, minnows, stone loach, a miller's thumb (bullhead), water boatmen, a freshwater whelk and two crayfish (the larger of which has his large right claw missing; it is now half grown, but at no time has it impeded his progress over the tank bed).

One crayfish is fairly large and shares the lair with Clarence. There's endless amusement as he comes out in search of food; he climbs plants until they bend with his weight, and plop! he's back on the bottom. He climbs right over the miller's thumb, which is surely the laziest fish in existence. The very small crayfish is most belligerent, he spends his time under a flat shell and nipping the fishes if they come too close, and even a 6 in. goldfish steers clear of this little so-and-so.

The point of all this is that everything in the tank is not only living together but thriving, not a fatality among the fishes (although a lot of the small life has disappeared—minute crustaceans, etc., and I'm afraid the tadpoles I put in fed Clarence!), the plants are growing and retaining their colour.

I now have a fairly good idea of what goes on at the bottom of the river and intend to visit it again this week-end, so who knows what may be in the tank next week?

R. A. LINTON,
Amesbury, Wilts.

Not a "Must"

NOT even *Vallisneria* is a must! I have several tanks, none of which contains a single piece of vallis—the stuff just wouldn't grow properly! *Cryptocoryne* takes longer to propagate sufficiently to fill a tank (few could afford to buy a

tankful!) but the final result is much more pleasing—and cheaper on the lighting.

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

A Terrapin Pond

I FEEL that I cannot agree with the advice given in the August issue of *The Aquarist* under the title "A Terrapin Pond." It is contrary to my own practice or to that of any herpetologist I know. The notes presumably apply to the European terrapin (*Emys orbicularis*) which is illustrated. These terrapins should always be allowed to hibernate. Reptiles which normally hibernate in nature should always be hibernated in captivity. If they are not then they may well lose condition, and normally will not breed. With *Emys orbicularis* even baby specimens can be hibernated outside quite safely.

Terrapin ponds should always be constructed with the thought of hibernation in mind. They must be deeper than the greatest thickness of ice which can be expected in a hard winter. If possible they should have a maximum depth in parts of about 2 feet, in which case the terrapins can hibernate safely under the ice in the severest of winters. I have always hibernated my *Emys orbicularis* in their pond without loss, and I live in the colder part of the British Isles.

I certainly would not advise a heater in the pond as this could quite easily result in keeping the specimens awake, i.e., preventing normal hibernation, but they would possibly not feed and would die in a month or two. Nor is *Emys orbicularis* a really suitable species for the indoor aquarium. It thrives much better out of doors.

ROBERT BUSTARD,
Dundee, Scotland.

Unfortunately the illustration to the feature referred to gives the impression that the advice deals with the European terrapin, whereas in fact it was intended to apply to the less hardy species. We regret that this was not made clear.—EDITOR.

To Me or not to Me

AS one who has on various occasions "stuck my neck out" and often with pleasing results, I am tempted to say to Mr. H. G. Rundle of Bagshot that I, and not he, am "The World's Biggest Prizewinner" in our hobby. To help in settling the argument we must get down to brass tacks.

(Continued on opposite page)

FRIENDS & FOES

No. 71 Water Snails



Shell of the freshwater whelk *Limnaea stagnalis* and egg mass of this species (about natural size)

Mollusca

PHYLUM: Mollusca, from Latin *mollis*, molluscus—soft, the neutral plural of *molluscus*.

CLASS: Gastropoda, from Greek *gastros*—belly, and Greek *podas*—foot.

THE phylum Mollusca consists of a large group of animals and includes all our freshwater snails, limpets and mussels. To the gardener molluscs are an unmitigated nuisance, pests to be destroyed on sight, but to the aquarist the freshwater genera have a few redeeming features, the principal one being that almost all of them are relished by fishes as live food.

Nevertheless, even the aquarist has to observe a modicum of discretion and a strict control over the increase of specimens introduced into his garden ponds or fish tanks, for unless watched they quickly get out of hand, multiplying excessively, consuming large quantities of food destined for the fishes and turning their attention if dissatisfied to the tender green plants which at first surround them.

The wisest plan, though too seldom adopted, is to culture the snails separately. Give over a small pond to them, and be sure that when required there will be plenty available. The same pond will prove a boon during summer, yielding huge crops of mosquito and gnat larvae, bloodworms, mayfly larvae and, if introduced, *Daphnia* and *Cyclops*. Indoors a fair-sized aquarium can be used to breed snails, although this should be kept covered as it is apt to become rather smelly, and can be an excellent source of infusorians of various kinds upon which to feed fry.

Whelks, winkles, cockles and oysters are salt-water molluscs which are not only tit-bits for marine fishes, but also for many aquarists. As they can hardly be cultured at home I have left them out of this series, however.

Freshwater Whelk

SPECIES: *Limnaea*, from Greek *limne*—marsh, pond, and *stagnalis*, from Latin *stagnum*—pond.

Very few aquarists can have failed to encounter the snail known commonly as the freshwater whelk or

Our Readers Write

(continued from page 154)

In my opinion the only awards bearing a true relation to the facts, are the award cards of first to fourth given by a reputable judge at the time of showing. All diplomas, best in show, etc., are only repetitions of the awards already given, and as such have only a relative value. The usual counting of points in clubs is four for first, three for second, two for third and one for fourth. I have by me most of the awards I have gained over the years but some, I know, have been lost.

The actual cards should be produced to settle any argument but meantime I have sent to the Editor my list of award cards and the total points they represent on the basis I have mentioned. My cards are available at any time if required. If Mr. Rundle would be pleased to add up his points gained in shows, my statement can be disproved or upheld. I have also the usual run of cups, plaques, specials, etc., but as I say, they are in addition to award cards.

R. G. MEALAND,
London, S.W.

We have also received Mr. Mealand's list of his numbers of first, second, third and fourth awards together with the points gained, which total 1,592—a truly impressive record.—
EDITOR.

giant pond snail (*Limnaea stagnalis*). In favourable conditions it is tremendously prolific, laying hundreds and hundreds of eggs arranged in jelly masses about three-sixteenths of an inch in breadth and up to an inch and a half in length. These are attached to stems of aquatic plants or on the undersides of floating lily pads. They can easily be removed by pushing with finger or thumb against the base of the mass. Masses are laid throughout the spring and summer months.

The species is hermaphroditic—possessing sex organs of both male and female varieties, and are independent of any other snail for breeding. Notwithstanding, they are frequently found in copulatory chains, cross fertilising each other's eggs. Where they are frequent, and in the stillness of the evening, a "plopping" noise can sometimes be heard as they glide under the meniscus of the water, cleaning it. They are dependent upon atmospheric air, which they take into a "lung" consisting of a hole richly lined with blood vessels. This places them in a group known as the pulmonates. If startled while taking in this air supply they will close the hole and emit air bubbles so that they can sink like stones to the bottom of the pond.

They are omnivorous, eating much vegetable matter, but relishing occasional animal food. I have seen them eat holes through the body wall of a dead fish. Excellent scavengers, but can be a real menace to plants. Small specimens are readily consumed by fishes. The adults eat *Hydra* (I have watched them do this), but are of little practical value for this purpose. If the *Hydra* is in the way they will eat it, but they will not seek them out to destroy them.

C. E. C. Cole

News from AQUARISTS' SOCIETIES

Monthly reports from Secretaries of aquarists' societies for inclusion on this page should reach the Editor by the 12th of the month preceding the month of publication.

AT the last meeting of the **Sunderland & District Aquarist Society** Mr. J. Capron gave a talk with microscopic projection on "Friends and Enemies" of the aquarist.

Some of the members brought along specimens they wished to be identified. These were projected on to the screen and opened up quite a wide field of discussion among the members present. Recently the Club has taken over two Aquariums in the local Museum which the members stock and maintain and two members have undertaken to look after them once a month. This has created quite a lot of local interest, and the club has been informed by the curator that for more interest has been taken in the tanks than ever before.

IN the Labyrinth show recently held by **Hounslow and District Aquarist Society** the first three places were filled by Mr. R. Luff who exhibited an opaline blue gourami, a dwarf gourami and a thick lip gourami. Mr. Stypall was first in the *Hypoclinemus* show with a bleeding heart tetra, Mr. Boulton and Mr. Luff tying for third place, also with neon tetras. The next feature in the club programme is the breeders' class show.

THE special award for the best fish in the show was won by A. Spurling Jewell, Dublin, with a goldfish, at the fifth annual show of the **Dublin Society of Aquarists**. There was a record entry and, for the first time, the show was open to the public.

Other special awards were: Catfish, Col. O'Gorman Quinn (Dublin); Gourami, Sean Cooke (Dublin); Molly, Dr. J. J. Craig (Dublin); Platy, Mrs. E. Spurling Jewell; Coldwater fish, H. Spurling Jewell.

The other principal prizewinners were: S. Cooke (Dublin), thicklipped gourami; Dr. Craig (molly); A. Spurling Jewell, goldfish and eel; J. Loughton, Belfast (lace gourami); Mrs. Jewell (Cachoeira and tropical fish).

Exhibitions of native fish were staged by the Inland Fisheries Trust; lizards by Mr. G. E. Crisp and Mr. A. Bell; marine life by Miss V. Poynton and snakes by Mr. P. Comerford.

THE monthly meeting of the **Ilford and District Aquarist Society** was held at the headquarters, Newbury Hall, Peryassa Farm Road, Ilford. An entertaining inter-club quiz was held with Romford Aquarist Society and won by the visitors.

The table show was very well supported and in the "egg-layers breeders class" Mr. Hunter won first place, Mr. Price second and Mr. Parsons third. In the "live-bearers breeders class" Mr. Stobbing won first and second place and Mr. Hunter third.

During the previous weekend the Society's Annual Home Aquarium Competition was held and the results were as follows: 1, Mr. Hunter; 2, Mr. G. Parsons; 3, Mr. Saunders; 4, Mr. Simpson.

THE second annual exhibition of the **Exeter and District Aquarists' and Pondkeepers' Society** was again very successful and was extended for a further week. The number of attendance was over 6,000. Tanks including tropical, coldwater, river fish and reptiles totalled 75, and the delightful display of colour and well planned tanks called for much admiration, as did the waterfall with its garden and pool complete with goldfish and water lilies.

The cup for the best furnished aquarium, was won by Mr. J. Canham, other prize winners being Mr. P. Parish and Mr. A. Clapple.

The collecting tank for the Hospital contained £12.

GOLDFISH SOCIETY OF GREAT BRITAIN

A PROGRAMME of interest to all goldfish lovers (novices included) is being arranged at the annual convention of the **Goldfish Society of Great Britain** which is to be held at Streatham Basin on the 11th October, at 3 p.m. Included in the afternoon's discussions will be reports on Goldfish culture for this season and the trends for the future. This event is a high spot in the calendar of the coldwater enthusiast.

THE committee of the **Bradford and District Aquarists' Society** feel that there is sufficient interest to revive the Annual Dinner and a provisional booking is to be made for Friday the 21st November. The Ladies' Night is to be held on the 3rd December. Last month's programme included a talk by Dr. F. Ghadially on the "Diseases of Fish."

THE results at the **Romford Aquarists' Show** were as follows:

Club Furnished Aquarium: 1, Walthamstow and District Aquarists Society; 2, Bethnal Green Aquatic Society; 3, Thameside Aquarist Society. Individual Furnished: 1, A. H. Scott; 2, L. Land; 3, Mrs. J. Joyce. Male Guppies: 1, 2 and 3 A. L. Siebbing. Female Guppies: 1, A. L. Siebbing; 2, R. Alley; 3, Miss

1, A. L. Siebbing; 2, D. Pinner; 3, A. L. Siebbing. Sawtooths: 1 and 2, H. Penton; 3, H. G. Rundle. Barbets: 1, A. H. Scott; 2, H. G. Rundle; 3, A. Smith. Danios, rainbow minnows: 1, A. C. Cathica; 2, H. G. Rundle; 3, E. D. Thompson. Characins: 1, H. G. Rundle; 2, H. Ainsworth; 3, J. Codery and Sons. Fighters: 1, J. Cordery and Son; 2, Mrs. Alley; 3, R. S. Barnes. Labyrinths: 1, Clive L. King; 2, H. G. Rundle; 3, E. D. Thompson. Dwarf cichlids: 1st J. Wyle; 2, C. E. Search; 3, I. L. Püntham. Cichlids: 1, J. Wyle; 2, H. Penton; 3, Mrs. J. Joyce. Catfish: 1, G. Hedger; 2, J. Wyle; 3, G. Howe. Egg laying tooth carps: 1, H. Ainsworth; 2, J. L. Püntham; 3, H. Ainsworth. A.O.V.: 1, G. Hedger; 2, H. G. Rundle; 3, F. Ahrens. Breeders egg-layers: 1, J. L. Püntham; 2 and 3, J. Wyle. Breeders livebearers: 1, R. Alley; 2, E. D. Thompson; 3, M. Challenger. Single tail goldfish: 1, H. Penton; 2 and 3, F. Ahrens. Fan tail: 1, F. C. Barry; 2, F. Ahrens; 3, H. Penton. Veiltail: 1, H. Penton; 2 and 3, F. C. Barry. Plants: 1, 2 and 3, R. S. Barnes. Best fish in show: F. C. Barry's fantail moor. Best tropical fish in show: H. Ainsworth's *Nekobraschra gasteri*.

AT the recent annual general meeting of the **Edinburgh and East of Scotland Aquarists' Society** the following office-bearers were appointed for the coming year: President, Denis Osley; vice-president, Geoffrey S. Wright; treasurer, Ian Christie; secretary, Ian M. Walker. At the same meeting it was decided that the Club would hold its Annual Show in the club rooms, in Infrary Street, Edinburgh from 18th to 25th October inclusive.

MIDLAND OPEN SHOW

THERE was an increase of over 100 entries compared with the previous year at the **Midland Open Show** held recently at Birmingham. The Inter-Society Stand competition was much appreciated by the visitors and excellent support was also forthcoming from the Trade. The results were as follows: Coldwater, Goldfish and Comets: 1, H. T. Jaco; 2, T. W. Pegg; 3, Miss D. Timmings. Breeders' Class, Two-tail, any variety fancy goldfish: 1, P. Close; 2, N.

The Boughton Trophy

This fine silver cup on a carved wooden base is the trophy subscribed for by a group of donors wishing to perpetuate the memory of the late Mr. Ambrose H. Boughton, for many years a prominent member of the aquarium world. Unfortunately the trophy was not ready in time for it to be offered at any of the major shows earlier this year, and it was at the last minute found impossible to make it available at the **Romford Aquarists' Society Show** in August as had been planned. It is now in the charge of The Twenty Club and is to be offered for competition in an open class at the **Romford Show** next year.



THE AQUARIST



A party of visitors from the Bristol Aquarist Society at the Midland Show

O. Grimston; 3, K. C. Juston. Bristol Shubunkins: 1, T. W. Pegg; 2 and 3, W. Hicks. Calico Veiltails: 1, E. A. Mason; 2, M. Welch; 3, T. W. Pegg. Bristol Shubunkins, bred 1958: 1 and 3, W. H. Ellis; 2, E. A. Mason. Scaled Veiltails: 1, 2 and 3, N. O. Grimston. Moors bred 1958: 1 and 2, N. O. Grimston; 3, T. L. Dodge. Bristol Shubunkins bred 1958: 1, E. A. Mason; 2 and 3, W. H. Ellis. Calico Veiltails bred 1958: 1, 2 and 3, C. D. Roe. Bristol Shubunkins; matched pairs: 1, E. A. Mason; 2, W. Hicks; 3, W. Butler. Orandas: 1 and 2, E. A. Mason; 3, J. Savage. A. V. Desal Minus, fancy goldfish: 1 and 3, G. V. Keeling; 2, J. Savage.

Moors: 1 and 3, T. L. Dodge; 2, F. Close. Bristol Shubunkins M.A.P.S.; members only: 1, 2 and 3, F. Close. A. V. Fantails: 1, M. Welch; 2, N. O. Grimston; 3, W. Butler. A.O.V. Fancy Goldfish: 1 and 2, T. W. Pegg; 3, T. Smith. Individual Coldwater Decorative Aquariums: 1, E. A. Mason; 2, R. W. Smith; 3, T. L. Dodge. Inter-Society Coldwater Decorative Aquariums: 1, Midlety; 2, Washall Aquarium and Pond Society; 3, North Birmingham Aquarium and Pool Southampton Pond and Aquarium Society. Bristol Shubunkins Novices: 1, Susan Close; 2, J. Ashley; 3, Stephen Close. Scaled and Calico Veiltails Novices: 1, Susan Close; 2, Stephen Close.

Tropical classes, barbs cummingi, Titteya, Oligolepis: 1, J. Bennett; 2, F. Holloway; 3, H. Webb. Tetrazona, nigrofasciatus and ticto: 1, F. Holloway; 2, J. Bennett; 3, D. W. G. Fretwell. A. G. Barbs: 1, J. Bennett; 2, H. G. Rundie; 3, F. Holloway. Brachydanio, pearls, spotted, golden, zebra, mountain minnows: 1 and 2, S. W. Richardson; 3, D. A. Richardson. Characins, hypsaebrycon, bloodfins and platies: 1, S. W. Richardson; 2, J. Bennett; 3, A. Saxton. Characins, hemigrammus and penguins: 1, B. Pengilly; Burnley; 2 and 3, S. W. Richardson. A.O. Characins: 1, J. Bennett; 2, H. Webb; 3, A. T. Smith. Male fighters: 1, J. Bennett; 2, H. Webb; 3, S. W. Richardson. A.O. Anabantid: 1, H. G. Rundie; 2, L. Lewis; 3, H. Webb. Cichlids, angels: 1, N. C. Pines; 2, Miss M. Hill; 3, H. G. Rundie. Cichlids dwarf: 1, H. Webb; 2, H. G. Rundie; 3, A. Hodgkiss. A.O. Cichlids 1 and 3, Pengilly; 2, M. E. Beech. A.V. Male guppy: 1, S. Prior; 2, H. Smith; 3, S. W. Richardson. A.V. Mollies: 1 and 2, H. G. Rundie; 3, J. Bennett. A.V. Platies: 1 and 2, S. Prior; 3, S. Swadling. A.V. Swordtails: 1 and 2, L. Lewis; 3, A. E. Allsopp. A.V. Tropical fish: 1, B. Pengilly; 2, H. G. Rundie; 3, S. W. Richardson. Breeders' class, egg layers: 1, F. Holloway; 2, J. Bennett; 3, L. Naylor. Livebearers: 1, S. Prior; 2, R. L. Wright; 3, S. Swadling. Any Characins: 1, Miss M. Hill; 2, R. W. Milton; 3, J. H. Price.

Danio, brachydanio or white cloud mountain minnow: 1, D. A. Richardson. Barbs: 1 and 2, D. W. G. Fretwell; 3, Miss M. Hill. Livebearers: 1, E. Madder; 2 and 3, J. H. Price. Male Anabantid: 1, S. Swadling; 2, M. E. Beech; 3, D. A. Richardson. Traders' class. Any variety tropical fish: 1, Stuart Erskine, Birmingham; 2, H. Webb, Hereford; 3, McLynn Aquarium, Ewhurst, Surrey. Individual Decorative Tropical Aquariums: 1, A. E. Allsopp; 2, R. W. Smith; 3, S. W. Richardson.

Inter-Society Decorative Tropical Aquariums: 1, Stourbridge and District Society; 2, Smethwick Society; 3, Burton and District Society.

PATIENTS in an isolation hospital at Broadal, Derbyshire, are learning to breed tropical fish as a hobby to relieve boredom.

WILLESDEN AND DISTRICT AQUARISTS' SHOW

AS usual the annual show of the Willesden and District Aquarists was of a high standard. Although there was a drop in the entries on the tropical side there were some exceptionally good fish on show, and a very large entry in the coldwater section attracted considerable attention from the thousands of visitors. The awards were as follows:

Inter-club Furnished (Cold): 1, Hendon; 2, West Middlesex; 3, Willesden; 4, Harrow. Inter-Club Furnished (Tropical): 1, Riverside; 2, Harpenden; 3, Willesden; 4, Independent. Individual Furnished (Cold): 1, Mrs. Wingrove; 2, R. Bevis; 3, Master Chalmers; 4, A. Sutton. Individual Furnished (Tropical): 1, F. Watts; 2, B. Hawkins; 3, C. Walker; 4, J. Joyce. Common Goldfish: 1, F. Keen; 2, Mr. Gerken; 3, R. Bevis; 4, F. Keen. Shubunkins: 1, F. Keen; 2, F. Keen; 3, H. Mann; 4, R. Bevis. Native or Foreign Coldwater (A. S. or V.): 1, F. Keen; 2, Master R. Poets; 3, M. Langridge; 4, G. King. A.O.V. or S. Coldwater: 1, J. Laine; 2, R. Esson; 3, R. Albeck; 4, J. Laine. Male Guppy: 1, R. Cooper; 2, J. Rowe; 3, G. Mann; 4, P. Welsh. Female Guppy: 1, V. Large; 2, Mrs. J. Farnen. Mollie: 1, L. Flintham; 2, G. Gale; 3, E. Landau. Platy: 1, R. Cooper; 2, E. Daynes; 3, R. Fisher; 4, R. Daynes. A. V. Swordtails: 1, Mrs. J. Farnen; 2, H. Amworth; 3, P. Tonkins; 4, Mrs. J. Farnen. A.V. Barbs: 1, E. Landau; 2, C. Walker; 3, S. Bullen; 4, G. Mann. A.V. Characin: 1, H. Amworth; 2, E. Landau; 3, E. Daynes; 4, S. Bullen. A.V. Labrynth: 1, G. Gale; 2, E. Landau; 3, K. Pye; 4, E. Landau. A.V. Catfish: 1, E. Landau; 2, K. Pye; 3, Mrs. V. Large; 4, K. Pye. A.V. Cichlid: 1, E. Landau; 2, E. Landau; 3, Mrs. J. Digby; 4, R. Fisher. A.O.V. Tropicals: 1, E. Landau; 2, A. Hill; 3 and 4, E. Landau. Best Fish in the Show: marble cichlid, E. Landau. Best Furnished Aquaria for the Brooks Shield: Mrs. S. Wingrove. Best Club furnished for the North West London Group of Aquarists' Societies: Harpenden.

FEDERATION OF SCOTTISH AQUARIST SOCIETIES

SOME 70 aquarists from 7 Societies in Scotland attended the first full meeting of the Federation of Scottish Aquarist Societies which was held in the Clubrooms of the Edinburgh Aquarist Society, Working Men's Club, Infirmary Street, Edinburgh.

At the business session the following office bearers were elected—president, Mr. D. Oxley, of Edinburgh Aquarist Society; vice-president, Mr. P. N. Greening of Dundee Aquarium Society; hon. secretary, Mr. Alexander Cross, 49 Ferry Road, Monifieth, Angus, of Dundee Aquarium Society; hon. treasurer, Mr. Gordon B. Hirkland, 2 Kerrington Crescent, Barnhill,

Dundee, of Dundee Aquarium Society. These four are to form a working Committee and will draw up a Constitution for the Federation to be submitted to the member Societies for approval. These four together with one delegate from each member Society will form the full Council which will meet at least six-monthly or more frequently if necessary.

It was agreed that the Federation year should run from 1st September to 31st August, and that the levy of 1s. per head on Club Membership should continue. To accommodate aquarists who are not members of a Society or whose Society is not affiliated to the Federation it was agreed to admit to the Federation individual Members at an annual subscription of 5s., which would include free copies of the quarterly Newsletter.

It was decided that full meetings of the Federation should be held at six-monthly intervals and the next full meeting was fixed for Sunday, 1st March, 1959, at Dundee when the Dundee Aquarium Society will be hosts. Full details of this meeting will be issued in due course.

A total of 80 entries were put forward for the Table Show. The winners were: Guppies (25 entries): 1, A. R. Bell, Dundee A.S. (Veiltail); 2, H. Kerr, Edinburgh A.S. (Veiltail); 3, Miss Kerr, Edinburgh A.S. (Platyl); 4, Alex. Robertson, Dundee A.S. (Veiltail). Platies (23 entries): 1, R. Dearness, Edinburgh A.S. (Red Wagtail); 2, A. Cross, Dundee A.S. (Variatus); 3 and 4, Mrs. J. Taggerty, East of Fife A.S. (Variatus). Barbs (26 entries): 1, W. S. Bisset, Edinburgh A.S. (B. oligolepis); 2, D. Auchterlonie, Kirkcaldy A.S. (B. ticto); 3, H. Kerr, Edinburgh A.S. (B. nupifasciatus); 4, I. Cunningham, Edinburgh A.S. (B. titeya). Fighters (6 entries): 1, D. Mackenzie, Kirkcaldy A.S. (Blue); 2, G. Wardrop, Glenrothes A.S. (Red); 3, I. Walker, Edinburgh A.S. (Blue); 4, D. Wilson, Glenrothes A.S. (Blue). Best fish on show: This award went to W. S. Bisset for his *Barbus oligolepis*.

British Aquarists' Festival

A new setting-up date is announced in connection with the above exhibition. This will be Thursday the 6th November, and not Wednesday the 5th November. Judging will take place early on Saturday the 8th November. These unavoidable alterations are due to a change in exhibition arrangements by the management of Belle Vue.

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