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May, 1961
The Home Aquarium for Marine Tropicals

by JOHN BOUSROT

Continued from the April Issue

In time green and blue-green algae will gradually appear on the stones, coral heads and sides of the new marine aquarium. They help enormously in keeping the water crystal-clear, and in decreasing nitrates and phosphates in the water from as much as 225 milligrams/gallon to nil. Larger, more imposing, green algae will flourish in the tropical marine tank if given sufficient sunlight. However, too much light produces a vigorous growth of microscopic algae which soon coat the fronts of the larger plants and may even turn the water green.

Two large decorative species of algae for the tropical tank are Caulerpa taxifolia and menora’s shaving brush (Pamphile capitata). The former sends up 3 to 5 inch blades of a most pleasing green from runners lying on the surface of the sand or gravel and anchored to it by “holdfasts.” The latter resembles a bright-green shaving brush. Dealers in marine tropicals usually supply this species with a ball of sand or other particles adhering to the holdfast. This is an advantage, as more often than not tiny marine animals living in the ball of sand under aquarium conditions and soon cause trouble. If the sand is removed the algae still needs to be planted in sand too deep for practical aquarium purposes.

Encrusting calcareous algae are a strong feature of tropical seas, and some do well in a marine tank when air by a 40 watt bulb burning for 9 hours a day. A species of Rhizoclonium, appearing as liver-coloured spots and patches upon stones, and a species of Corallina growing in rose dix berry patches on stones, have lived in my seaurchin tank for years. These algae cannot be prized loose and then be planted elsewhere. They must be lifted from the sea together with the stone on which they are growing. It is a wise plan to brush or rub the stones in sea water with the paws of the hands in order to remove off possible enemies. Such treatment will not dislodge the algae. Should one of these encrusting forms die in the aquarium, and lose its colour consequently, the intention in the remaining white calcareous patch may become the home of blue-green algae, which lend a most delightful emerald colour to the part of the patch they inhabit.

The beginner will do well to encourage the growth of algae in the aquarium as an excellent aid to keeping the water pure and sweet. These will appear in time of their own accord, but I urge abstention from the larger algae until experience has been gained, when some red algae may be introduced with success, as they need less light than the green varieties.

It is repeatedly stated, perhaps more for reasons of logic than for any based on actual observation, that sea water aquaria should never be topped up with sea water but with fresh water, as the dissolved salts do not evaporate and by the addition of more sea water the tank will become increasingly salty. In an unseeded tank this practice is a sound one, but invariably to top up with fresh water where aeration is used is highly questionable. Salt does escape from an aerated tank in various ways. Coatings of salt will form on the cover glass around the holes for the admission of filter and air tubes, and spread down the outside of the tank in thin sheets. But this is not all. Owing to the fact that (in my tanks) each cover glass has a small round hole through the centre to lift it by, salt also forms on the electric light bulb and wires over the tank, and in damp weather a clummy feeling betrays the presence of delinquents salt on the neighbouring sockets and woodwork on the wall behind. Hence I often top up with sea water, and think it unwise to assert dogmatistically that marine aquaria should always be topped up with fresh water.

However, the prudent aquarist does not guess; he uses a hydrometer. In order to support marine life sea water must be of a certain density, not lower than 1.020 nor higher than 1.030. Dealers supply these hydrometers, which are sometimes conveniently marked off in red from 1.020 to 1.025 for Atlantic fishes, and in blue from 1.025 to 1.030 for Pacific fishes. In the aquarium, however, fishes do best in the lower range (say) from 1.020 to 1.023, though a degree either way makes no difference. Low salinity reduces the unnecessarily high rate of metabolism induced by high salinity. The fishes do better; they eat less, void less waste material and tend to be less pugnacious.

The temperature for marine tropicals should range from 75° to 85°F, although 1° or 2° above or below is of no consequence. A slight drop of 1° or 2° during the night is as healthy for marine tropicals as it is for freshwater tropicals. Avoid abrupt changes. Some fishes seem indifferent to the lower range of temperature; others, such as the clown fish, definitely prefer a temperature of 80-84°F.

The rule of never stocking a freshwater tank to its full carrying capacity holds true for marine tanks. A few brilliant, perky fishes in prime condition are a joy never to be forgotten. But overcrowded, drab, listless, disease-ridden fishes are shameful and burdensome. In my tanks, all understocked, aerators and filters are turned off from 12 p.m. to 3 p.m., and again from about 1 to 8 a.m. The fishes do not find a pleasant change during the day, and more restful and quieter at night. Lights are turned on at 9 a.m. and turned off at 7 p.m. regardless of the entrainments of visitors. At night tanks should be protected from other lights in the room by heavy black cloth wrapped round the glass sides. No light should shine in from the top.

Marine tropicals grow fast and have good appetites, and quickly learn to accept food from the fingers. Two or three feedings a day will suffice, but extreme care must be exercised in removing all unused food particles from the tank after feeding is over, especially if any algae of any sort are present. In order to obviate any danger allow four or five or six particles of food (according to the number of fishes) to sink through the water for 15 minutes and carefully watch the fate of each one. As interest of the fishes wane the number to one at a time in order to make it easier to keep track of its progress to the bottom and remove it before it becomes hard to see against the sand. Then stop feeding.

THE AQUARIST

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This method may seem fussy and laborious, but complete care is afforded from start to finish, and the quantity eaten by each fish is readily observed. Then, when feeding is over and the glass cover has been replaced, the aquarist will feel delightfully reassured that there is no uneaten food left behind to pollute the water. If, however, small showers of food are administered haphazardly some of the particles will inevitably reach the bottom or be driven among the stones by the swirling movements of the fishes.

Food for most marine tropicals suitable for the aquarium is the usual kind: brine shrimp, Tubifex, white worms, earthworms, Daphnia, seaweeds, prepared foods, freshwater shrimps (Gammarus), uncooked porridge oats, lettuce, crab, shrimp, heart and liver. The last four should be washed free of their juices before feeding. Bloodworms are accepted by some fishes, though mosquito larvae are usually refused by all. There seems to be little appreciation for insects of any sort.

In addition to the usual foods baby guppies are relished by the blue and gold fairy basslet, the golden-striped bass, and the squ Gerry fish. The curious and hardy Sargasso fish feeds readily and almost exclusively on other fishes, although they may be practically as large as itself. Upon becoming accustomed to its surroundings it will take whole dead shrimps from the end of a toothpick. Clown fish and sea horses will occasionally eat tiny guppies. Earthworms are relished by most of the commoner coral fishes, and the various species of tank like dog-biscuit. Opossum shrimps (Mysis sp.) when available are a delicacy for all fishes large enough to eat them. In a state of nature the beautiful marine angelfish are partly vegetarian, but in the aquarium they learn to take raw beef, heart, liver, shrimp and earthworm. These foods should be washed before feeding. But strips of lettuce are always eagerly pulled down from the surface when they are sufficiently narrow to be swallowed.

Clairness in the marine tank is of prime importance. It keeps nitrogenous compounds at a low concentration and the fishes in excellent colour. With careful feeding a weekly siphoning should be enough. I siphon off my marine tanks no other than once every 2 or 3 months. The siphoned-off water should be filtered through filter paper set in a funnel. A bottomless lidless tin resting securely on two stout supports laid across the top of another container will serve to hold the funnel upright. The filtered water is then tested for temperature, and if no drop has occurred it may be gently poured back into the tank. Should the temperature have fallen it must be brought up to that of the tank before being put back. If a large funnel is used with a correspondingly large sheet of filter paper it is wise to line the former first with plastic netting to give additional support to the latter; the filter paper will be less likely to tear when the water is poured down upon it. A small patch of clean white linen between the tip of the filter paper and the netting will make things doubly safe. It should be noted that no metal except stainless steel must come in contact with the sea water. Although water is not rendered harmful to fishes by coming in contact with plain iron in receptacles with chipped enamel, such receptacles should be washed under the tap after use in order to avoid needless corrosion.

The need for constantly changing the water in the marine tank is no greater than it is for the freshwater tank. Sea water in a healthy, well-administered, aerated and filtered tank will remain perfectly wholesome for months and even for a year or longer. Beware of even a partial change; it may put the fishes temporarily off their food, although upon regaining their appetite they seem to have benefited. Personal experience shows that marine tanks are like freshwater tanks in that the less you tamper with them the better and safer they are. But when a change is necessary the new water must be of the same temperature as that of the tank,
The Armchair Aquarist

by L. R. BRIGHTWELL

When Sir Richard Owen gave his blessing to Brighton’s original great effort he said that an Aquarium could be a major education factor. And ever since, any Aquarium that can claim to be something better than a mere wild-fish show, either issues an informative guide book or attaches a Museum, to show the many phases of aquatic life, such as metamorphoses, which cannot be shown in tanks.

To touch on a more worthwhile matter. Every imaginative aquarist must have longed to see the world Aquariums, now in some instances showing a breadth of vision that would have amazed Phillip Henry Gosse, the father of them all. Television does indeed give us glimpses of some of these. But the crowded programmes we now enjoy cannot permit more than glimpses, and for many of us they are all too tantalising. But how to see more without a banking account of a size that few of us possess? A next best experiment I have embarked upon with great success is the armchair method. Write for the Guide Book.

As a result my modest library now shows three shelves packed with these little brochures, and some amount to the dignity of tomes, a most generous repayment for the modest outlay of stamps. One of my favourites, a fairly recent acquisition, is that of Madras. It is most beautifully illustrated with line drawings by a native artist, a vast improvement on most photographs, for the still photograph of aquatic life is often too stodgy and impressionistic to be of any value on movement and detail. Coloured photographs are even worse.

The Madras Aquarium was the outcome of a Museum and the Guide Book was written by the late James Hornell, who will be remembered by his fine volume on the Sacred Chank of India. Hornell was, some 50 or more years ago, a partner of another remarkable man, Joseph Sinel, with whom he set up an Aquarium and Marine Biological Station at St. Helier, Jersey, in the Channel Islands. Then, when travel by air was yet a dream, the sea journey proved altogether too much for most intending students, and its passing is most regrettable. Hornell’s second venture at Madras is now a magnificent monument, sponsored by the Madras Board of Fisheries.

The Guide is full of fascinating sidelights on Aquarium keeping and fish husbandry. For instance, it makes a great feature of sea snakes, some extremely venomous, and it is surprising to learn that those active and voracious reptiles are much hampered by growths of acorn barnacles. However, each slough rids them of these pests. Another unique feature is that of the toad fish, a near relative to our own species but with a “lure” that takes the form of a little wheel, which by oscillations seems to be in constant movement. The fish’s colouring harmonises perfectly with every station taken up amidst the constantly changing panorama of most varied seaweed.

Owing to the great heat of the day, the Aquarium is very heavily visited at night, and one day of the week is specially reserved for women. Amongst the fishes, prominent are the file fishes, well known for their flesh containing poisonous alkali, the poison being most virulent amongst the more brightly coloured species. The file fish is very rarely found on our shores. One that called last year near me at Portloe, according to Couch was known at the same place in 1887.

My Guide Books cover the widest range, from Norway to the tanks of Honolulu. The most sumptuous guides are those of Chicago and Naples. The John Shedd Aquarium at Chicago has its own train, literally an Aquarium on wheels, which tours a wide range of sea ports, picking up desired exhibits as it goes. The Naples Guide is quite a natural history book, packed with information. New York even issues special guides, and one well worth writing for is a well-illustrated brochure on the porpoise in captivity. The porpoise in question is really the bottle-nosed dolphin (Tursiops truncatus), very frequently beached along our south coast. Whilst in Sussex I acquired one weighing 200 lbs., about the weight of an average man. The brain weighed just 18 ounces, about one and a third the weight of a human brain, and as heavy and richly convoluted as the brain of a chimpanzee.

To the aquarist really out to learn all he can about his pet hobby there are side by side with these illuminating Guides the list of specimens for sale—alive or dead. Who, for example, wants to buy the blood of the great spider crab, Maia spinifera, at so much per litre? Or who has hangings after the trilobite stage of the so-called “king crab”? All these things and many others are in the growing archives of my Armchair Aquarium—visiting-by-post Library.

Marine Tropicals

(continued from page 25)

I find that a slight variation of a degree or two in the salinity is of no consequence if the quantity of water to be changed is small in proportion to the total amount in the tank. When putting new water into a tank I do so by siphoning it into the stream of rising air bubbles, or by sprinkling it evenly over the surface from the end of the siphon. The inhabitants of the tank are thus saved a too abrupt encounter with the new water.

(Tob be continued)

THE AQUARIST
The Wall Lizard— A CASE HISTORY by J. S. COOPER

For 5 years I have made observations on the wall lizard (Lacerta muralis) in an outdoor vivarium, and their activities have been the subject of a paper in the British Journal of Herpetology (vol. 2, no. 7). There seems to be rising interest in European lizards, and a number of people have written of raising various species in their gardens. The following account is an example of the complex and interesting behaviour of the wall lizard.

In April, 1957, two male and two female wall lizards of the Italian variety Lacerta muralis brachygnathus were obtained. During the month of May, however, they all escaped from the vivarium, for I had not realised that their climbing ability was even greater than that of the common variety of Lacerta muralis. Although the four escaped at different times, all took up residence on a garage roof, a hundred yards away, where they remained throughout the season, according to the frequent reports from neighbours.

In August, 1958, one of the males was accidentally re-captured when a sudden storm washed it through the downspout of a greenhouse into a bucket of water. He was put back into the vivarium, but after a month, again mysteriously disappeared.

In the spring of 1959 the lizards were again reported on the garage roof and, on 12th May, a cat killed a female lizard containing six eggs which would soon have been laid. This gravid female was doubtless less quick-moving on account of her weight and more observable owing to the tendency of gravid lizards to bask in the sun.

In July, 1959, a large male was seen climbing a trellis in a garden several hundred yards from my own. Knowing that it had come from my vivarium, the owner of the garden made efforts to catch the lizard, but it did not surprise me to learn that he had failed, for the lizards are unbelievably swift.

On 29th August, 1959, a friend and myself were feeding the lizards in the vivarium when we again saw a large male at close quarters. He was nestling the glass walls of the vivarium as if trying to get in, possibly attracted by the food being dropped. But before I could devise a means of catching him, he darted into a crevice of rhusbark and disappeared.

On 7th May, 1960, while feeding the lizards midday, I was astonished to see, once again, a large male nesting around the vivarium and challenging the other males inside the glass, with his neck arched and puffed out in the characteristic "threat posture." I remained motionless near a corner of the vivarium and watched the lizard trying to find a way by which to reach the other males. He climbed the nearby walls, looking for a "jump-off" point from which to reach the frame of the vivarium. At last, having found nothing suitable, he climbed on to my shoe, scrambled up the leg of my trousers and, having gained sufficient height, leaped on to the corner of the vivarium. Running across the covering net, he took down at the other lizards and again adopted the threat posture. Finally, as if unable to contain his anger any longer, he dived down through the net and engaged in furious combat with another male, doubtless oblivious of the fact that, in doing so, he had caused his recapture.

In this remarkable way, he again came into my possession after 3 full years at liberty.

I naturally assumed that there was no other survivor of the two pairs originally lost. But on 30th May a neighbour reported that a lizard of interesting description had been seen in her garden. On the next morning, as I was about to leave my garden, I caught sight of a lizard's head peeping out from a hole in the wall, unmistakably another male of the same variety and of exceptionally fine size. Needless to say, I was unable to catch him, and on 15th June I was sorry to find his body on the garden path, killed, no doubt, by a cat.

How easily could my recaptured male have suffered a similar fate, if he had not regained the safety of the vivarium.

That the two lizards had survived for so long is remarkable. Apart from the natural hazards of hibernations, and the difficulty of finding food, they had avoided the many predatory animals, including cats, which have a great liking for lizards. The many children and passing traffic had also failed to put an end to them. Furthermore, both had attained a fine size and were in splendid condition.

What caused them to remain voluntarily in the district for so long? They had always been reported as being too close to human habitation, and the greatest distance travelled from my own garden was a matter of 400 yards. Much of their time at liberty they had certainly spent in my garden and a few adjacent ones. Doubtless the many stone walls with deep holes had been an attraction for "wall" lizards (so well-named) and probably served as their hibernacula. Is it possible that they could sense the presence of the other lizards inside the vivarium, particularly in the breeding season? Food would be unlikely to attract them unless they were close enough to see it being dropped.

The demonism of the male which returned to the vivarium seemed to indicate that he was anxious to gain access to the other males in order to fight them, having approached closely enough to see them through the glass.

On the day after "my" male had returned to the vivarium, another male and a female of the same variety (recently purchased) were placed with him. At once the two males began to fight, but the new one, being the smaller, was soon defeated and on 10th May he was found dead, bearing the marks of a violent struggle.

Having removed all opposition my male pursued the female. He had already been seen to mate with her on 9th May, and further matings were observed on 22nd, 28th and 29th May. By 5th June the female was becoming plump and taking every opportunity to bask in the sun.

Many of the European lizards become very tame in captivity and will take food from the hand, but the Italian wall lizard never becomes sufficiently tame to do this. To overcome the feeding difficulty, freshly killed mealworms, spiders, earwigs and flies were placed in a dish and left in the vivarium in the morning. The food had invariably gone by the evening and, occasionally, the lizards were seen fretfully taking something from the dish.

On 18th June I noticed that the female was refusing food.
a sign that egg-laying is imminent. The next morning, at 11.30 a.m., she retired under a flat stone and emerged at 4.30 p.m. characteristically thin, hungry and thirsty. Careful digging under the stone revealed four soft-shelled eggs at a depth of 7 centimetres from the surface. They were whitish and oval, with equal poles, and measured 10 millimetres by 6 millimetres.

Previous experience had shown that the eggs of wall lizards will not hatch without artificial heat, and they were therefore buried in a small box of soil and incubated at 80°F by day and not below 60°F at night.

The male loses interest in the gravid female, but as soon as the eggs have been laid, attempts to mate are resumed. Mating was in fact observed on 19th June, a few minutes after the eggs had been laid. A second clutch of five eggs was laid on 23rd July in the same site as the first, and these were also removed for incubation.

The eggs of the first clutch hatched on 3rd and 4th August and after 44 to 45 days of incubation. The second clutch hatched on 12th September after 51 days of incubation. All the young are doing well in a heated indoor vivarium, feeding on small spiders and young mealworms. It is my hope that both generations of lizards will continue to thrive and provide further information.

There are two small colonies of common wall lizards in Surrey, which were introduced there over 20 years ago and are said to breed regularly. My own experiences with these lizards in captivity have indicated that the hatching of the eggs is the only “weak link” in the chain of their lifecycle in our climate. But the incubation period of the Italian wall lizard seems to be shorter than that of the common wall lizard, and this would certainly favour the success of the “Italians” in this country.

It appears possible that this beautiful and wholly beneficial creature could become established here.

A Society Publication—by H. J. Vosper

The two main difficulties face societies wishing to publish some kind of magazine: firstly, the lack of interesting copy and secondly, insufficient funds to cover printing or duplicating a limited number of copies for circulation within an individual society. It is suggested that neither of these two problems need stand in the way, provided that a member is willing to act as editor and that access to a typewriter is possible. The latter proviso, a typewriter, is mentioned as a hand-written magazine might be considered too futile.

If a society exists at all it is because it does something interesting; members hear talks, hold table shows, make visits and so on. These various proceedings can be used to provide interesting material for a publication, suitably entitled “Proceedings.” Each meeting can be briefly reported, mentioning the highlights such as table-show results, details of special fish on view, special facts and other interesting information. Complete talks, perhaps written up from notes made by the editor at the time or from notes provided by the speaker (if he cannot be persuaded to write an article), form the main bulk of the publication, together with items culled from the aquarist world at large and with luck something from the pens of individual members.

The typing of material is done shortly after the meeting concerned, being retained until either a suitable amount of material is available or until a suitable moment such as the end of a quarter. Each collection of material forms a “number,” to be added to former numbers to make a yearly volume. In this way is produced an ever-growing magazine which not only records, in detail, the activities of the society but also provides a useful source of information to those absent from particular meetings and to newer members.

As each page is typed, two or three carbon copies are made and treated in the same way as the original. Stapled between cardboard covers and with a list of the “reading-circles” members on the front, the “Proceedings” are ready for circulation. If one member is made responsible for ensuring that every member of his “circle” sees the “Proceedings” and that individuals do not delay too long before passing the copy along to the next on the list, it will take some of the load off the shoulders of the editor. As a new number becomes available the copies are called in and the fresh issue is added, or each number can be treated as a separate entity. Reading circles have been an accepted system for many years, among such groups as the London Natural History Society, for instance. And what is a public library but a vast “reading circle”?

The Buckeye and District Breeder’s Circle last year introduced this system in lieu of their Newsletter (held in abeyance, though not through lack of material). The first two numbers of volume 1 provided 30 pages of matter, excluding two Editorials, list of contents and the index of subjects.

This group is perhaps fortunate in having members who are willing to produce articles, in having breeding reports which can be written up and so on, but even if reduced to publishing only those happenings and subjects of ordinary meeting nights there would still have been 22 pages of material, after but 3 months of the year had past.

Obviously the system is not perfect, for it is much better if all members have their own copies, but it does provide a forum of sorts. There will be some articles, such as breeding reports, which some members would like to have as permanent records, and this problem can be overcome by the use of “separates”—typed copies which are charged for, a suitable sum will prevent the too un-necessary requests.

It should perhaps be emphasised that the “Proceedings” are not simply the minutes of a meeting, for this reason the previously mentioned and matter concerning fishes is much more detailed.
Three-Spined Stickleback
(Gasterosteus aculeatus)

by A. BOARDER

It would be safe to say that thousands of aquarists started their interest in the hobby of fish-keeping by catching and trying to keep the humble stickleback, a fish found in most streams, ponds and rivers. I wonder how many have been caught, put into the inevitable jam jar and suffocated before their new owner has reached home! No one told us then that it would have been far better to have taken home three or four in comparative comfort than to have overcrowded them and so arrived home with none! Aquarists are inclined to look down on the stickleback, mostly because it is so small compared with other British fishes and also because it is so common. What we are inclined to overlook is the fact that it is quite alone in this country in its habit of showing parental care. The male of the species not only builds a nest but also looks after the fry when they are hatched. Much as we might admire the salmon, trout, chars, carp, roach, dace, pike, perch, chub, gudgeon etc., it must be admitted that not one of these takes the slightest interest in any of the fry, and apart from members of the Salmonidae covering the eggs, no others take the slightest interest in the eggs. Most of the fishes named spawn in masses, when the males in their excitement spread their milt over thousands of eggs, often from dozens of females. Which males fertilise which eggs is anyone's guess and those fishes are not in the least concerned about what happens to the eggs after they are laid; in many cases the parents eat some of the eggs.

How different then is the stickleback! The male at least is keenly interested in the process of reproduction. He builds a small nest, entices the females into it to lay their eggs, fertilises them and then fans them and keeps them aerated until they hatch. He then takes charge of the shoal of fry and protects them from harm. It is therefore strange that more aquarists do not keep a few of these interesting fish. They are very attractive, the colours being at least as good as those of most British freshwater fishes, and during the breeding season the male becomes very smart with his blood-red throat and heightened hues.

To be successful at rearing some young sticklebacks it is necessary to have a tank well-established fairly early in the year. A 24 in. by 12 in. by 12 in. tank will do; very small tanks are not recommended as it is essential that the females should have every chance of getting away from the male should he become too fierce. Spawning takes place in May and June as a rule, and so it is important to have everything ready for the fish when they are caught. They are easily caught with a fine net but do not be tempted to have too many at a time. To be sure of everything going well be content with one male and not more than six females. The females usually show by their swollen bellies that they are full of eggs, and the male will be more brightly coloured.

Sticklebacks are not fussy about food and will take most of the kinds used for goldfish. They are fond of most forms of live food, such as white worms, Tubifex, Daphnia, mosquito larvae, broken maggots and chopped small earthworms. Do not over-feed, so that the water becomes fouled, as these fish prefer a clear water. When they have settled down the male may start to make his nest. This is a small collection of tiny sticks and pieces of weed glued together with a secretion from the fish, supposed to come from the kidneys.

Once the nest is formed the male encourages the females to enter the nest and lay their eggs. When they have done so they take no further interest in the eggs and leave the male to look after them. This he does by fanning them and keeping a current of water passing over them. He will not allow any other fish to go near the nest and fights furiously with any which venture too close. It is often better to remove the females from the tank once they have laid their eggs; this is especially important if the tank is small.

When the eggs hatch, the time taken being about 10 days, according to the temperature of the water, some fine food for the fry should be added. Infusoria is the best first food for the fry but do not use too much and pollute the water. See that there is some food for the male also as he may not have had much, if anything, to eat whilst the eggs have been incubating. Once the fry are large enough to see easily it is a pretty sight to watch the male with his brood, as he takes great care of them until they are big enough to fend for themselves.

There is no need to have the water in the tank too deep; 9 inches will be enough. It will then be possible to set up the tank as an aquascape. Keep the compost away from the front glass and with two large rocks, one at each end, and by using a large slab of stone, create a platform across the back half of the tank. On this can be placed some compost and some small low-growing ferns etc. can be added. A pleasing picture can be made in this way and there will still be plenty of water space for the sticklebacks.

Do not wait too late in the year to collect the sticklebacks as they may by then have spawned. If healthy plump fish are taken there is no reason why a successful breeding should not take place.
The Garden Pond in May—— by ASTILBES

WATER plants in the pond should now be making active growth and perhaps by now some of the fishes may have spawned. Water lilies may be flowering and in general the pond begins to take on its summer attractiveness. Most pond owners will look hopefully for signs of spawning but it is not always that the fishes oblige. Healthy fishes will have the natural urge to reproduce but this is not always enough to set them off. What makes them suddenly take it into their heads to begin is hard to define. It is easier to give some reasons why they do not start to spawn. One of these can be that they are not sufficiently healthy or have not had the right kind of food or enough of it. If the water is impure it is not likely that fishes will be encouraged to breed. Water has to have a good oxygen content before they will be excited enough to start spawning.

To have a good chance of breeding success make sure that you have the two sexes among your fishes, that they are adequately fed (especially on live foods such as earthworms) and that the water is well oxygenated. How is the pondkeeper to know when the water is well oxygenated? An experienced aquarist will be able to tell at a glance whether a pond is healthy or not; there is a look about the water which can be recognised with experience but which is not easy to describe. A pond in good condition will have sparkling clear water, although one with some green algae in it is not unhealthy for the fishes even though it may not look too good. Algae are only plants and are good oxygenating ones, as long as the growth does not become too thick and prevent light from reaching well down into the water.

If the fishes do not show any inclination to spawn they may often be encouraged to make a start by removing some of the water and replacing it with some fresh. By allowing the hose to form a kind of fountain the water can be broken up and so be cleared of most of the chlorine compounds usually in tap water, and it will also carry plenty of oxygen into the water.

Feeding the fishes in the pond will always present problems to newcomers as there is really plenty to know about this subject. The difficulty of recommending an actual programme for pond feeding is that so few ponds will present the same conditions. If a pond has been well planted and everything is flourishing, there will always be something for the fishes to browse over and so obtain some nourishment. Feeding also depends on the number, size and kinds of fishes in the pond. A well-planted and stocked pond can function quite well with the minimum of attention. It would be safe to state that more ponds are upset and more fishes lost through wrong feeding than from any other cause. Owners think that they are being so kind to their fishes by constantly feeding them and they would strongly resent being told that their so-called kindness has only resulted in deaths of their fishes.

If the water becomes slightly green it may not be possible to see if the fishes are eating what is offered them, but there is an easy way to test the appetites of the inhabitants. On a fair day, when the temperature of the water is above 50°F, throw a piece of dry brown-bread crust in the pond. If the fishes are hungry they will soon be at the surface biting at the bread. If this is soon cleared up some other food can be given, but if no attempt is made to touch the bread on no account should more be given.

At this time of the year live foods which can be given include frog tadpoles, Daphnia and mosquito larvae. The advantage of feeding with foods such as frog tadpoles is that if the fishes are not hungry enough to eat them they will remain in the pond for a time doing a very useful job of scavenging. They will not pollute the water as unattractively dried food could and so are always safer to use if procurable.

Toad tadpoles are excellent scavengers but will not be eaten by most fishes. If you feed the fishes at the same place in your pond you will find that they will gather there when hungry and you will be able to see if any food given has been eaten.

During the warmer months of the year there will be many insects around the pond, some of which may lay their eggs in the water. The resultant larvae will make good food for the fishes and unless a pond is very overcrowded it is possible that little extra artificial feeding will be necessary. It is only towards autumn, when many of the natural foods become scarce and the fishes need extra nourishment to build them up for the winter, that judicious artificial feeding can be carried out with safety.

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Cacti in the Fish House

Some cacti should be in flower during this month, but a lot depends on the genera kept. Many of the Opuntias cannot be expected to flower until they are of a good size, but there are very many plants which flower every year with little attention. One of the easiest of genera to grow for flowers is Rebutia, which has quite large flowers mostly produced near the base of the plant. The plants do not grow very large and so are ideal for the small collector. The one usually procurable is Rebutia miniscula, which has trumpet-shaped flowers of pinkish red. Many of the Mamillaria are free flowering and some can be brought into bloom the year after sowing the seed. The Notocactus is also a very easy type to grow, especially those which resemble Notocactus strictus. These flowers are quite large and showy, usually yellow with a red stigma. Many cacti flower only if they make fresh growth each year, and so the actual care in cultivation can bring an abundance of flowers among these fascinating plants.

THE AQUARIST
The Wrestlers

by R. E. MACDONALD

I must state for the record that I have never kept the wrestling, half-beaks (Demagogyus pusillus) of the family
Hemiramphidae. I have had, however, ample opportunity of studying their characteristics on film, at a compensation.

The chief characteristics of this species are its pugnacious temperament towards members of its own kind, and its voracity (like)

labor bears living prey. It is a small fish, measuring only 3 inches in length when fully grown, and prefers quiet surroundings with a water temperature in the high seventies. The male possesses a gonopodium, so seizing the fish is an easy matter.

Because the half-beaks only wrestle with their own kind, they can be kept individually in a community tank without fear of attack on other fishes. Some considerable amount of trouble may be experienced if the half-beaks are housed in a transparent vessel for these fish suffer an inability to adapt themselves to transparency and can cause serious damage to themselves either internally or by breaking the lower jaw in a desperate attempt to swim through the glass sides of the aquarium. They should therefore be housed in vessels of an opaque nature such as earthenware.

Since 1964, the wrestling half-beaks have been cultivated in Thailand for contests of strength and endurance. This fish, of course, is not the only species propagated by the Thai people for sporting purposes; most aquarists are well acquainted with the celebrated Siamese fighting fish (Betta splendens), known the world over for its fighting capabilities and which is also native to Thailand.

The cultivated Demagogyus displays a greater propensity for fighting than the wild fish and is certainly rarely seen in an aquarium and technique. Wild fish caught and then separated for a few days will attack each other on sight, but the domestic variety loses more than a quarter of an hour as by this time the fish either tire or lose interest in the contest. On the other hand, cultivated fish make each encounter a fight to the finish and may combat for hours at a time.

Cultivation is achieved by selective breeding from stock possessing proved strength, endurance and wrestling technique. This last ability is most important when cultivating this species for fighting purposes, for it is found that the most effective holds used by these fish may result from generations of selective breeding.

Before a matched contest between two male Demagogyus is held, the fish are isolated from each other in opaque containers where they are conditioned by their owners. The fish are introduced to each other in the combat vessel, they attack each other immediately.

The most common hold used by the half-beaks when wrestling is an interlocking of the jaws at their base, but there are a great number of holds that are used most effectively and there are certainly no holds barred!

A contestant effects a hold on his opponent by closing his jaws across the eyes, or in a straight or an oblique manner across the body, or by grasping the pectoral, dorsal or caudal fins, or, most dangerous of all, by using a strangulation hold that closes the gill covers or gill openings with the jaws, from either above or below, so that the opponent’s respiration is impaired. An adversary may be held, head on, with his jaws in the mouth of the opponent, or may be held so that he is kept on his side or back for long periods. A fish will always seek to obtain a particularly effective

CONSTANCE KELLY says (in the modern idiom)

Dig those Crazy Cats!

fixed your peepers on those crazy wild cats now coming on to the market? Unlike their square,
sophisticated bronze brothers, these are the mostest, with the latest cut in black coats—and brother, do they send you.

After placing two in a 24 in. by 12 in. by 12 in. tank recently in kick their heels, I was troubled to notice one night that owing to the ‘stat sticking in the groove, the joint was hotter than a jazz session in a heat wave—over 80°F to boot. Boy, were those cats having a Ball!

No doubt now who was Daddyo. His polices were as pointed as the latest in Italian-style “winkle-pickers,” and Mams had the latest line in red waiscoats. Now the heat was on he was really going to town, moving faster than a Beaglier leaving an Old Tyme Dance, and only stopping to tickle Mamas’s back with his whiskers in passing.

To my way of thinking these cats looked real tough, and knowing they usually like to play it real cool, I replaced the ‘stat and at the same time gave the pump a twist to clear the air a little. Surprise! man, surprise, because next morning the front glass was covered with tiny, one sixteenth-inch size, yellow blobs. Mams had given out.

In an effort to save the eggs from that old creeping fungus, I dosed the tank with eight drops of a 5 per cent. solution of methylene blue (medicinal, none of this cut-up rough industrial blue). I could almost hear Daddyo crooning a snatch from “My Blue Heaven.”

Two days later (and a stone fighter), I noticed the bottom moving with tiny white, really groovy splinters. Some shrimp seemed the right mix and you and events proved right, because the young cats grew rapidly. Come the end

of the month and I had quite a pair of “real cool cats.”

The moral of all this is, if you want your cats to give out, jazz things up but then play it real cool, man!
AQUARIST'S Notebook

WHEN an Englishman buys a house or a car, a washing machine or a radio he expects it to last a lifetime. Very often he is right, the English build things to last. Our American cousins can never understand this trait of character; they believe in "off with the old, on with the new," which, at least, has the merit of being good for business. I am occasionally asked about items of apparatus used in the hobby something on the lines of "Just how long will it last?"

Provided that one buys the equipment from reputable manufacturers the answer is "A lifetime." Of course it is not as easy as that. Equipment which is subjected to careless usage, the attentions of children or which is constantly being changed about, cleaned or "improved" will have a much shorter life. The golden rule is to leave well alone; once set up do not touch your heater, thermostat or tank. Heaters should never be removed from the water if long life is wanted. They can be cleaned under water quite easily and when this is necessary. Left alone they will give years of service and this also applies to the thermostat. The external-fitting type is now probably the most popular, and, once set, no further interference is advisable.

Tanks are long-lived if treated properly. Don't mess them and never empy them. Nowadays tank bottoms are almost always of glass, and occasionally a piece of rockery is dropped on the bottom with tragic results, although I have had 40 gallons tanks which have held water for years after having enormous cracks in the base glass. Sometimes a heater is allowed to slip against the side glass for a period and a crack results. The best way to court trouble is to move the tank half full or to empty it completely and to leave it to dry out. I never remove more than half the water at a time, and a tank once set up is never moved. Of course, newcomers to the hobby can be excused if they wish to experiment in moving tanks about, but it is a risky business, particularly if the tank is of large size.

Secondhand tanks are not usually a good buy: they have to be transported empty and are often more trouble than they are worth. Tanks (through the mastic) can often be stopped with chewing gum—it works in most cases. Rust, of course, attacks the edges of the tank and this cannot be helped. No matter what you do the rust will arrive in time. However, is it so serious a matter? Over the years the metal will flake off alarmingly but there will always be plenty left; I have yet to hear of a tank rusting away completely and I have exposed some for years to outside conditions. The top odds are subject to the effects of condensation and this is mainly where the rust attacks. However, rubber-rimmed edges help to minimise this trouble, but cannot prevent it. Rust is not, therefore, a real worry although it should not be allowed to fall into the tank water—small fish hate it. Chrome tanks are not safe from rust either. The chrome will in time begin to peel off and rust follows. However, it is a slow process.

Tank covers must be aluminized if they are to have a reasonable life. Although this metal breaks down rather easily in tank water it enjoys long life. The heat from top lamps dries up large areas so that the condensation is mainly directed to the bottom edges or channels, and these soon get a film of algae on them which buffers the metal from the condensation water. Tank lights have a short life, burning out the wax or adverse conditions under which they work, and the lamp sockets need constant renewal, as water of condensation seeps in and damages the connections in time.

Rubber perishes and rubber piping will not last indefinitely. However, only a small part usually perishes and the good part can be used again. It is a good idea to use small lengths of glass or plastic tubing to connect these small pieces of rubber tube; there need then be no waste. Diffuser stones last a long time but can be treated as expendable at the price. Thermometers need never be moved. As a rule they are attached to the glass by a rubber suction disc, and during cleaning of the front glass they can be slid a few inches to one side and then returned to their original position. The limpet variety should not be cleaned or they may lose their water tight properties.

Aerators are of various types and need some attention. Rubber diaphragms need renewal from time to time but there is no oiling with this variety. Piston pumps don't wear out if properly treated, which means keeping them well oiled and not overloaded with too great a depth of water to pump against. They need frequent oiling for best results but no worries need be entertained over their tendency to become quite hot after a few hours working. From time to time piston pumps can be thoroughly cleaned out with carbon tetrachloride, which makes a thorough job. Electrical connections may be subject to wear and these need watching and renewing as and when necessary. Most filters last for ever but need frequent cleaning. Glass wool has no lasting properties but nylon wool is there for ever, if cleaned.

Recently the question of a fast day for animals kept as pets was brought up in the press. Suggestions were later put forward that this meant not a complete fast but a non-luxury diet. Whatever the pros and cons may be, it is certain that some of our overfed and pampered dogs and cats would benefit from such a course. Birds are another matter; you simply cannot afford to forget to feed your feathered pets—it is soon fatal with many. Fishes are in a different category. They can be left without food for several days and will not suffer, in fact some thrive. However, one must use some common sense and not leave small specimens with large ones, or predatory types with more humble bedfellows. Most inmates of the tarium can survive without food for a week or two. It is a pity that the relatives of aquarists all too often do not appreciate that fishes do not need breakfast, lunch and supper, not to mention elevenses. They mean well and are so hard to dissuade. Their favourite phrase is "The fish are hungry, the fish are hungry, the fish are hungry, the fish are hungry, the fish are hungry, the fish are hungry..." Good job fish food is so rarely wrapped up in covering papers; what a mess the bottom of a tank would be if fishes were litter lovers like so many on terra firma!

When new fishes are obtained from any source they should be quarantined in a special tank set aside for this purpose. Failure to take this precaution they may be a heap of trouble. My personal view is that at least 10 days should go by before the aquarist can be certain that all is well; a week is not long enough. White spot is the most commonly introduced pest. Fish often itch and scratch themselves a lot after new fishes have been introduced to a tank. This may or may not be white spot. As a rule this pest first appears on the tail or fins of fishes, once one spot is seen the tank should be dosed with 2 per cent mercury chrome solution (2 drops per gallon). When no spots are seen the trouble is mainly due to overcrowding (because of the novelty of the new specimens) and consequent fouling of the water, which produces manna for many little nuisances.
that bother the fishes although are harmless to all intents and purposes. Colour the rank water bright pink with potassium permanganate solution and this trouble will quickly disappear.

Something of an innovation in school swimming pools has been produced by Purley Timber and Trading Co. of Purley, Surrey. These pools require no excavation and have been produced to suit the needs of schools from 100 to 500 children on roll. The pool is erected on any convenient level site, and the instructor standing outside the pool is on the same level as the children inside. The plastic liner is tough, stol blue in colour, and two men can erect it in a few hours, the material being necessary. A large pool measuring 41 ft. by 25 ft. costs under £500. How does all this affect aquarists? Well, if the school is in the right direction and the day when almost any garden owner can have his own quickly erected garden fish pool is not far off. True, expense is still considerable. Fibreglass ponds are a reality, but rather formal and expensive, but if pools so large are possible for swimming the more modest needs of the aquarist should be easy to satisfy if the demand is there. Most pools are quite small, 10 ft. by 6 ft. being ample for most enthusiasts, although I read a letter in a country magazine recently in which a gentleman was having trouble with his garden pool of one and a half acres! Most water authorities now allow hosepipes without the need for a licence but the question of quantity of water used could crop up. If a pool has an outlet plug it will be relatively easy to empty (and refill) and the water board is likely to insist on a meter and full charges, roughly 2s. to 3s. per 1,000 gallons.

One aspect of the giant pencil fish (Anostomus anostomus) is the odd way it tends to worry angel fish. This fish is particularly fond of algae and spends long periods in vertical or upside-down positions nibbling at the edges of the leaves. Angel fish in the tank are fairly soon singled out for "treatment" and Anostomus makes their life a misery in the extreme, irrespective of size. Angels, being so cumbersome, are unable to take the avoiding action needed and are dead in the water while Anostomus nibbles at the edges of their fins and ventral area. One gets the idea that this is not bullying; the Anostomus finds something to his liking on the angel in perhaps the same way that young ducks feed off mother. I have not witnessed any actual biting of fins (as some authors have suggested) but the area under attack suffers and a slight fungoid growth is observed. The only remedy is to separate these fishes. I have often seen something very similar with mollies, who appear to feed off angels and cannot desist.

The Story of Beatrice

I CANNOT now remember who it was that gave Beatrice her name, and, except that "Beatrice Beetle" was a pleasant alliteration, it had no real meaning. At the same time, I am not exaggerating when I say that within a certain circle of friends she was well-known by name, in appearance and by repute for the greater part of 41 years.

Beatrice was a beetle, a specimen of the kind known more precisely by Dynastes marginalis or great water beetle. I should also point out that this is no rarity, and, except that she became domesticated, she was in no way different from the countless others of her kind.

Like many another little creature that has been brought to me—for purposes of identification, as a rule, Beatrice arrived imprisoned in a match-box that had been emptied of its contents and from which now came an intermittent scratching noise.

"Feyther said as how I wiz tae gie ye this," said the little boy, handing me the box. "He said it was a right wild sort o' beast but that mobe ye'd like it for yer collection."

Never have truer words been spoken. Beatrice was soon to prove herself to be quite the wildest inhabitant of any of my aquaria, and how enthusiastically did I make her welcome! From the little boy I also learnt that the "beast" had tried to bite his father, not once but several times. It appeared that the man had seen the creature afoot on the water of a little loch less than 10 miles from the city of Glasgow.

Following my usual custom, my first task was to give Beatrice a wash to free her from the signs of travel which she had willy-nilly accumulated; at the same time I was relieved to see that she had suffered no damage. I next transplanted her to a small aquarium measuring 12 in. by 9 in. by 10 in. deep, presently occupied by a pair of that most aggressive little fish, the three-spined stickleback (Gasterosteus aculeatus) and some half-dozen Caddis cases complete with occupants.

Again keeping to my usual custom, I did not immediately give Beatrice anything to eat but left her to explore among the weeds and to settle down peaceably (I hoped) in what were to become her permanent surroundings.

May, 1961

The Story of Beatrice

by NORMAN MCDONALD

One hour later, when I went to offer her a small dark-green sea-fly caterpillar, I at once saw that I had arrived too late to prevent slaughter. Beatrice had apparently been hungrier than I had imagined, for she had attacked both sticklebacks and they were dead. The female's severely gashed body was floating upside down and the even more mutilated body of the male was already half eaten—by Beatrice.

I did not need to be told; several times a week and with my own eyes I was to see that the great water beetle is the scourer of all pond creatures. In addition to the defenceless insects that might be considered her legitimate prey, fish (as I had just seen) and small newts and small frogs are regularly assailed and consumed. A year later, when I first introduced another Dynastes to the aquarium, carefully identifying him as a male by his smooth-surfaced wing cases, and in great hopes that they would mate, I was witness to another instance of beetle savagery.

Beatrice certainly accepted the stranger and for a time they dangled about in and out among the water weeds, occasionally coming to rest. Then, perhaps the attentions of the smaller male seemed to annoy Beatrice, and to my disappointment I saw that if she was going to accept him it was as a meal and not as a lover. I at once separated them, however, before any damage was done but never again did they show any interest in one another when I put them together in the same aquarium.

In many ways I greatly regret that Beatrice produced no offspring, for her larvae, though only to a degree and equally as fierce as their parents, would have been objects of great interest. But my pet water beetle was not only water beetle to enjoy 41 years of captivity, never failed to interest me but gave me a wider horizon in my life-long study of lesser worlds.

Yes, I have kept many pets—with two legs, four legs, six legs, eight legs and more. Pets, no matter what they are, become part of one's lives and part of one's thoughts. This was truer of Beatrice Beetle (1946-1951) than of any other creature that I have ever kept.
A Fish House in the House

by P. Dendy

When I started in to be a serious aquarist I was fortunate enough to have a ready-made fish house provided for me, in the shape of a general utility room which formed part of the house itself. It was complete with sink and hot and cold water laid on for routine tank maintenance. A minor battle with my wife, who tried to insist that the utility room was for doing the washing and other household chores, was most fortunately won and I was left in undisputed possession.

As the walls are cavity brickwork the insulation is therefore good and there are no particular heat-loss or condensation problems. Living alongside the fish undoubtedly means that they receive more attention than they would if visiting them meant making a trip in the rain or cold to a shed in the garden... I think now that my wife has forgiven me for stealing part of her house as she also takes an interest in the fish and at least has not to shout from the back door every time she wants me.

Such a set-up is to be recommended, though it means that all tank lighting has to be by artificial light and tanks must be completely covered by glass to exclude dust. It is surprising just how much dust, stirred up by the normal household pursuits, does collect on the cover glasses. Of course, evaporation must be kept to a minimum, too, and the cover glass takes care of this, so that very little topping up is required.

At the commencement of fish-keeping activities I consulted several books on the subject and there appeared to be fairly unanimous agreement that the intensity of lighting should be 30 to 40 watts per square foot of surface area for 8 to 10 hours a day... I decided that the fish would get up when I did and go to bed when I did, which gave them a 14 to 15 hour day, and on this basis I settled for 30 watts per square foot... I was quite rapidly in trouble with soft green algae, which started to smother everything and even the importation of one or two Plesiostoma did not help as they content to eat the algae but consumed the plants as well... I found light bulbs a problem, as their life was all too short even though I followed the old dodge of putting them in with the two filament supports to the tubes... Over several months I gradually reduced the intensity of the illumination to 8 to 10 watts per square foot of surface area, at which figure I find that practically no algae grow... In practice this means two 15 watt bulbs over a 36 in. by 18 in. tank, two 8 watt bulbs over a 24 in. by 12 in., one 15 watt bulb over an 18 in. by 12 in. and one 5 watt bulb over a 12 in. by 8 in. Even with this low level of illumination some tanks have been further reduced in brightness by the insertion of one or more sheets of Bronzite between the bulbs and the cover glass.

The immediate reaction to this statement will obviously be, "how about the plants?"—they won't have enough light to see by let alone to grow! My equally immediate reply is that the plants are doing better than before, much better in fact. I rely on Vallisneria, Sagittaria, Cryptocoryne, giant Hygrophila pectiniformis and Amazon sword plants, and I had found that the Hygrophila and Amazon sword all became very pale and sickly when close to the light bulbs, but did nicely when in a darker part of the tank. The reduction in lighting now means that these particular plants grow anywhere in the tank and look extremely healthy, and my electricity bill is that much lower, as is my bill for bulbs, which last very much longer. Lack of light can give rise to the formation of brown algae, but I have not been troubled by it.

I have experimented with several varieties of plants and have found that many of them do not do at all well under artificial light. Indian fern, Aponogeton, Cabomba, Ludwigia, Myriophyllum and duckweed survive after a fashion but do not really grow. Elodea densa, Najas pectinata, Rapaeda, bladderwort and the fancier plants like lace leaf do not even survive. This may be due to reasons associated with my water, which is of 14 degrees hardness (Clark's scale) and about pH 6.6 (i.e. slightly acid).

With artificial light there are at all intents and purposes no seasons for the plants and fishes and while it might be argued that this is contrary to nature and therefore a bad thing, it is extremely useful, particularly if you wish to do most of your breeding in the winter when there is not much to do in the garden.

Plecostomas, a catfish that will not vegetable matter, including algae...
OUR EXPERTS’ ANSWERS TO TROPICAL AQUARIUM QUERIES

I have read somewhere that a layer of peat under ordinary aquarium compost inhibits the growth of algae, and produces the clear water that the majority of fishes like. Is the peat sold for garden purposes safe to use in the aquarium, and, if so, how deep should it be spread over the bottom of an aquarium?

Granulated or compressed peat obtainable from a nurseryman is quite suitable for aquarium use. It should be placed in a bucket of clean water, and left to soak for a day or two before being spread to a depth of 1 in. over the floor of the aquarium.

I should be grateful for any information you can give me about large aquariums, and their care and stock. Alfred G. Meakin, Gorleston.

The glass perch settles down best in clear, slightly saline water maintained at a temperature range of 75° to 80°F. The fish have no liking for coarser food, but will eat any live food or pieces of meat with relish. It is not one of the easier fishes to breed, but when it does, the female, closely attended by the male, turns her eggs, and discharges her eggs into the feathery roots of floating plants, or plants with fuzzy foliage lying at the top of the water. The parent fish should be removed from the aquarium as soon as spawning is over. The eggs take about a day to hatch out, and the fry must be given copious amounts of small Infusoria.

Would it be all right to introduce some pretty marked sea-shells into my aquarium?

Sea-shells do not always make satisfactory ornaments for a tropical aquarium. Unclean food often lodges inside them and decays. The sharp edges and points on some of them are a danger to fast-moving and bolder fishes. What’s more, some sea-shells can make the water too alkaline for successful maintenance of plants and fishes.

I have made an attractive-looking sand and cement ornament for my aquarium, but an aquarist friend has told me that it will poison the water for the fish. What can I do to render this cement ornament harmless?

First of all, scrub the surface of the ornament to remove loose debris and sand. Then leave the ornament to pickle for about a week in a strong solution of vinegar and water, or weak hydrochloric acid. After another good soaking and rinsing in fresh water, it should be quite safe to place in an aquarium.

Is it true that water plants grow more luxuriantly in pots of soil than when they are rooted in sand alone?

Many aquatics, such as Cabomba, sputterdock, dwarf lilies and nipahs show their appreciation of a rich planting medium by producing stronger-looking stems and richer green foliage. But make sure that you place insect-free, sterilized garden soil in your pots. Better still, use a mixture of balanced clay, crumbled peat, charcoal and coarse sand. The pots should be topped with a fairly thick layer of grit to prevent the fish muddying the water.

About 2 months ago I set up an aquarium measuring 18 in. by 12 in. by 12 in. During the daytime, the temperature of the water averages about 70° to 72°F, but in the evening, when the room is heated, and the light over the aquarium is switched on, the temperature rises rapidly to the mid-eighties. Although the aquatics is kept scrupulously clean, I have lost several of my fishes with an illness that gives them a “wobbly,” and slows them down. Can you help me, please?

The health of your fishes has been undermined by the rapid rise and fall in the temperature of the water. Closed tanks and “water gardens” are usually subject to a chill, or an extremely run-down condition. You can reduce the amount of extra heat produced by top-lighting by substituting an electric lamp of a smaller wattage. We gather the fish are operating your heater without a thermostat. If our assum-

Many queries from readers of "The Aquarium" 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.

Could you tell me whether it would be safe to use built fibre as a planting medium in a tropical aquarium? I have been told that sand alone doesn’t give the best results.

The majority of aquarium plants in normal use do well in sand alone, but for those that really need a richer medium we recommend crocked pots of gritty loam or sand, mixed with a little fibre, which usually contains fragments of crushed shell and other additives. Alternatively you could carpet the floor of your aquarium with a thin layer of soaked peat, and then cover this with the usual thickness of washed sand. A two-sided half inch deep is about right.

I have just moved into a house where the water is delivered through copper pipes. If I use this water to fill my aquarium will it harm the fishes?

It is not advisable to fill an aquarium with water stored for any length of time in copper pipes, but if it is allowed to run from the tap for about 2 hours before it is used to fill an aquarium it should do no harm. Ideally, water from the tap should be left to stand for several days before introducing any fishes.

About 6 weeks ago my female black mollie gave birth to 30 young. They are all females. Can you offer any explanation as to why they should all be one sex?

Mollies are often late in developing the stick-like anal fins which characterizes the male sex. Furthermore, it is not uncommon for a female mollie to deliver a batch of young, and then change into a fertile male.

Please can you give me the names of some exotic fishes that would live comfortably at a temperature range of roughly 80° to 72°F?

The white cloud mountain minnow, the black-banded sunfish, the pygmy sunfish (Bleostoma corylioides), though this species would probably need gradual acclimatisation to the lower temperatures; Gyrinocheilus aequiculatus, the common paradise fish (Macropodus opercularis) and the Japanese weatherfish (Misgurnus anguillicaudatus).

I have some neon tetras which I first placed in my community tank 5 years ago. Is it unusual for such a small species to live for such a long time?

No, quite a number of the smaller fishes have a long life span. For instance, paradise fish, clown loach, Pristella, Nanostomus anomalous (to mention but a few) can live for upwards of 5 years. Although I never experience any difficulty in keeping Gyrinocheilus aequiculatus, I always used to add and die within the space of a few months. Do these catfish need anything special in the way of conditions or food?

It is essential that these sucker-mouthed catfish are kept supplied with algae or an alternative green food such as boiled cabbage or spinach. It must also be remembered that they are less active during daylight hours than are Gyrinocheilus aequiculatus, and it is a good idea to drop some Tubifex or white worms into their tank after dark.

May, 1961
COLDWATER FISH-KEEPING QUERIES answered by A. BOARDER.

We have a tank which is 32 in. by 25 in. with five common goldfish and shubunkins. Until recently the fish were healthy but lately some have become ill, with their dorsal fin lowered and attacks by fungus have occurred. We are told that fungus should never trouble fish if they are properly kept. We use an advertised substance to keep the water pure but when a fish is ill it soon recovers when removed from the tank and treated. However, as soon as it is returned to the tank it is ill again. What have we gone wrong?

The substance which you keep adding to the tank may be doing more harm than good. It is a mineral substance in a form of salt which will remain in the water and in time can become too dense in strength for the health of the fish. It is quite obvious that if the fish are all right when removed from the tank but fail in health when returned there must be something the matter with the water. Many aquarists are too fond of adding all sorts of supposed cures to the water when they do not know what is the matter with the fish in the first place. Empty all the water from the tank, and clean out well and make a fresh start. Then do go easy with the additions and your tank should remain quite healthy.

I am interested in the purchase of a polythene pond and I understand that it is a good idea to have some oxygen to keep the water from becoming stagnant. What can I do to provide this?

Water in an open pond will always get sufficient oxygen from the atmosphere to maintain a few fish. If you can of course add some under-water oxygenating plants such as any of the Elodea, but too much unfruit in the pond can cause foul gas to form which can upset the fish. Why not get a book such as Coldwater Fishkeeping (prices 2s. 10d., post free from The Aquarist)? This will help you considerably.

I have a pond about 28 feet by 15 feet. of irregular shape, in which I have more than a hundred fishes—goldfish, roach, tench and rudd. The water is very green although there are many pieces of water-lilies. The pond is exposed to the wind and shore. How can I get the water clear and fresh in order to prevent the fish to appear clear up. The pond has been made about a year. Is there anything I can do to improve the state of the water?

Your pond is rather new and it is a fact that it takes some time for a pond the size of yours to settle down and clear. I am inclined to think that your feeding may be helping the undesirable conditions. I have often noticed that many fishes do not digest maggots very well and have seen them voided in an almost completely unaltered state. If such is the case with many of your fishes it could be the cause of some pollution in the water. Once this happens the formation of green algae is encouraged. Try feeding with garden worms or even some dry brown bread for a change of diet, change most of the water if possible and you may find that conditions improve. In any case it is probable that the water will clear once the weather becomes colder.

I have a lot of goldfish and some shubunkins. I am told that a small shubunkin about 4½ years old which repeatedly gets attacks of fungus. The other fish do not seem to get this disease. I have cured the fish several times but it appears to be out of conditions. Is there anything I can do, as I do not want another fish to get the fungus.

You should isolate the shubunkin and I think that as thin fish is a weakness it would be better to destroy it. There seems little sense in trying to keep alive an ailing fish as you must realise this fish may breed in your pond and then you are likely to get a number of youngsters from it which may also be ailing. It is quite wrong to catch up fishes for breeding; only the very healthiest fish should be used for this purpose and if everyone stuck to this rule there would be fewer weaklings among fancy goldfish.

I am having trouble with the hatching of my goldfish fry. The parent fish are in a tank 14 in. by 8 in. by 8 in. in a conservatory. After hatching, the parent fish are removed and the eggs left to mature. When the fertile eggs are within 24 hours of hatching they start to swim about. Consequent the majority of the fry do not hatch at all; some die in the attempt of hatching and the remainder which do emerge all within a short space of time. Can you explain this?

It is obvious that the water in the tank is impure. The tank is too small for hatching goldfish fry. Another point probably partly responsible is the fact that when the fish spawn the males eject millions of sperms. A few very fine egg to fertilise and the rest soon die. The concentration of so many of these in a small tank would cause pollution in the water. You will be well advised another time to remove some of the eggs with eggs attached to another tank which has been cleaned out and filled with good mature water.

I am making a pond about 10 ft. by 6 ft. and my experience extends to digging large holes, brick laying and cement mixing. Can you recommend any books or publications which would provide some detailed advice on making the pond?

The booklets A Simple Pond for the Amateur, price 1s. 10d., and Coldwater Fishkeeping, 2s. 10d., both post free from The Aquarist, will be very helpful to you both for making the pond and for maintenance afterwards.

I have read several books on the construction and planting of ponds. In some one is advised to plant in pots for easy cleaning and to stop the earth from going down. I have made several cement boxes but with no holes at the bottoms. Will these be all right for water plants? If holes have to be made how can one stop the soil getting into the water?

The cement boxes will be all right for your plants. It is not essential to have holes in the containers as the roots of the plants can run out over the top when they have filled the pot and the plant will come to no harm. If you have holes in a pot, some coarse grass or rough peat can be placed over these to stop the soil from entering the water and some large stones can be laid on top to prevent the fishes from disturbing the soil.

I have a pond at Kuwait, Persian Gulf, and would like to know which water plants would grow around the edger. The temperature here in the summer is 32°C and 40°C and in the winter.

I think that any of the usual water-side plants will be all right for your pond-side. As long as plenty of water is available they will come to no harm. The heat affects plants badly mostly when they are unable to get enough water to make up for the wastage caused by the heat. I am well aware of the heat where you live as I was in Mesopotamia during the first world war.

A year ago I made a pond and lined it with polythene. I had a fine lot of fish but then the polythene developed leeks and I have had to build out to extend the pond all over. Now I have a small pond made at a higher level with an overfall feed by a small stream. I put the fish in at night and in the morning they had nearly all jumped from the top pool and even gone down the stream from the larger pool. Why did they leave the pond? Was it because the fresh pond had a more graduated slope to the overflow than the old one?

One reason for the fish leaving the upper pool was that the inflowing water became rather strong in current and as the overflow approach was shallow the fish were washed over. Another reason could be that the water in the newly constructed pond was too highly charged with free lime from the fresh concrete and the fish got out of this water as soon as possible. If the concrete had not been well scrubbed and washed before putting the fish in the water it could have been very uncomfortable for them.
Home Aquaria Competitions

IN view of the recent correspondence in The Aquarist on the Home Aquaria Competition held by the Merseyside Aquarist Society, I would like to point out that we at Merseyside are not so insular as to claim that the Home Aquaria Competition was our innovation. All that Mr. Raymond Yates pointed out was that we were in the process of using that particular type of competition; we had no doubt that it had been used before and will be used again.

It is obvious to me where this competition originated: Dundee, Inverness, Stroud and Chorley, the divine spark which each club simulates. We in Merseyside quickly learnt that there is nothing new under the sun, and especially in the aquatic world.

I have nothing but praise for Mr. Yates's "Notebook" (on which, incidentally, I base our Society magazine), and I hope that in the future he will continue to ferret out these forms of information that create such interest and controversy, especially if it comes from the Merseyside.

M. GEORGE CANAVAN,
News editor, Merseyside Aquarist Society.

Ways of Using Tape Recordings

A FEW years ago the use of colour slides and films etc. during society meetings was quite rare but to-day many, perhaps most, groups use these visual aids in the provision of interesting programmes.

Now tape recorders (sometimes condemned, sometimes praised) are being used as a further means of introducing variety into club meetings. We have not noticed any reports on the best method of utilising these machines but we should be glad to hear from societies on this subject.

At the risk of trying to teach grandmother to suck eggs, as they say, we should like to start the subject off with a brief note of our own experience so far.

The recording, on tape, of society meetings appears to be rather a useless operation owing to the disturbing background noises of chairs, coughs etc., while the unfortunate speaker later realises just how often he says "er," "ah," "lemme see now" and "actually, to be accurate" and so on.

Brockley Circle had their best evening of recent months when a speaker, thinking he would not be able to give his talk owing to an urgent call elsewhere, carefully wrote up his lecture (synchronised with a number of coloured slides) and "taped" the talk in the peace and quiet of his own home. When the evening arrived he was never-the-less able to present the play-back, operating the projector in time to the recording.

The advantages were: (1) The speaker, recording at home and surrounded by his models, photographs and references, was able to ensure that no aspect of his subject was overlooked and could concentrate very fully on each item without distraction of any sort. (2) The audience could examine the screened photographs, the models and specimens, without the distraction of the speaker's presence or mannerisms etc., and their attention was never divided between the screen and the speaker. They were unanimous in agreeing that the quiet, somewhat disembodied voice from their midst was a good idea and welcomed further experiments on these lines. The advantage of the speaker's work on the projector enabled the next able to be presented at the proper time, while questions raised could be answered "off the spot," which could not have been done, of course, if he had not been there.

While not suggesting that no other group has tried this method in the use of tape recordings, we find those who have not might find it rewarding. It appears to be essential to write out the whole story beforehand to avoid the "er" and "ah" (our first effort was a 1 hour talk—awful lot of writing!). Correspondence on such subjects would be very welcome by this group.

H. J. VOGDER,
Secretary, Brockley and District Breeders Circle (Aquarist Society).

New Idea for Shows

THE suggestions by Mr. Max Gibbs (The Aquarist, February) for exhibitors to provide their own show tanks would really start something if generally adopted. By and large the greater number of exhibitors come from a very small number of exhibitors, who may well have a dozen to a dozen and a half entries in a show. Would horticultural contractors quoet cut-price estimates for aquarists to cart their tanks about for them?

I think that I shall have to ask Mr. G. R. Parslow (The Aquarist, February) to name his weapons after his reference to "mongrels"! I told my guppies about it and they were absolutely furious and only calmed down when I said that he was probably talking about those very inferior ought-to-be-tipped-down-the-drain types which one sees about from time to time.

Whatever types Mr. Parslow had in mind, a deputation of my lady guppies has asked me to state quite categorically that they, in common with all other F.G.B.S. lady guppies, make it a point of honour always to breed true, and if there are any further supersions they can produce documentary pedigrees to prove their point.

P. DINDY,
Bisham, Worcs.
Mr. Max Gibbs seems to have an interesting scheme in his idea of exhibitors owning their own show tanks, and if a general specification for such tanks were arranged I believe the scheme could easily be put into operation. Perhaps the Three Counties Group Aquarium Society will give a lead in this matter.

I agree with Mr. Gibbs that certain other shows are not always ready for visitors when they should be. My own Society are holding our third Annual Open Show on the 4th, 5th and 6th of May and we hope to continue our usual practice regarding tanks and staging: all the washing and setting-up will be completed and the water brought to the right temperature during the night of Wednesday the 3rd. This gives enough time on the Thursday morning for final checks before exhibitors start to arrive.

Slough Aquarium Society are, obviously, fortunate in the facilities available at the Slough Community Centre and we try to make the visit of our exhibitors (and their fishes) a happy one.

E. C. B. KNIGHT,
Show secretary, Slough Aquarium Society.
Yorkshire Fish House

Since my article on "Fish House Design," published in The Aquarist (January, 1960), I have had a photograph taken of the "tasting room" of my fish house, with a wide-angle lens camera. Since publication of my article I have had many visitors from all parts of the country. I have been informed by my neighbours, however, that a number of people have come to Beverley on different occasions only to find no-one at home. I wonder therefore if you would inform any intending visitors to please write or telephone to say when they are coming in order to avoid any further disappointments.

E. FORSTER,
99, Colman Avenue, Beverley, E. Yorks.
(Tel.: Beverley 82183)

Clearing a Green Pond

If your pond water has turned very green and it is possible to catch the fishes and place them somewhere else for a time it is possible to clear the water by placing a quantity of Daphnia (water fleas) in the pond. These will multiply and eat up most of the algae and other floating matter in the water. After a time the water will clear and when the fish are returned to the pond they can have a good feed on the Daphnia. It is probable that if there are enough water plants growing in the pond the water will remain clear.

The AQUARIST

Crossword

Compiled by J. LAUGHLAND

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CLUES ACROSS

1. They build a house under water and stick it with an... (5, 7)
10. The Spanish (2)
11. The one from his head and returns (2)
12. He goes back to the day (3)
13. These fish are shadows (5, 4)
14. Young ones (6)
20. Terra from (3)
21. No wonder Luther is confused. He's not so young (5)
26. You find these fish on the road to Manilla (8, 8)
28. The smallest country (2)
34. One of 1 Across is one of these 12 back (7)
38. Eastern rivers (5)
37. Bake under water (6)
40. Call for help (3, 5, 1)
41. Uttar (8)
42. Countless numbers of these in a mass (4)

CLUES DOWN

1. Fishes with poisonous spines (6, 4)
2. The lot (3)
3. And so on (3)
4. This disease attacks fish (3)
5. Vacant (5)
6. Short enough, but an extra hundred would be a pinch (4)
7. Welsh salmon river (5)
8. A bird from an English river before 1918 (5)
9. A fish at a hotel around the world (5)
14. An important representative (8)
16. Small lily (9)
17. Place of fish travelling upstream to spawn (3)
18. You will find plenty of these in The Aquarium, and some real bargains, too! (abberes 1, 3)
26. God, 3rd of fish-eating bird (6)
27. Many is a 'T' but makes for numbers (8)
30. Another fishing bird, regarded as sacred in Egypt (4)
31. What you may reject from the kiln, perhaps (4)
32. A very gentle sort of whitewash (4)
33. Space (4)
36. American state in short (2)
39. One result of excessive alcoholism (3, 1)
40. Tail of the image (2)

(Solution on page 40)
Monthly reports from Secretaries of aquarists' societies for inclusion on this page should reach the Editor by the 5th of the month preceding the month of publication.

The Newsletter of the Association of Yorkshire Aquarists Societies gives notice that the Annual General Meeting of this association will be held in the Church Institute, Albion Place, Leeds, on Saturday, 28th May, commencing at 7.30 p.m.

Among the recent activities of the Harrogate A.S. has been a talk by Mrs. Matthews on various aspects of the hobby. It is hoped that members of the N.E. London Aquarists’ Association will be visiting the club shortly and a visit from Walton-on-Thames A.S. was also on the programme.

MEMBERS of the Ilford and District Aquarists’ and Pondkeepers’ Society present a group of marine fry to the Guppy Breeder’s Association, led by Mr. H. O. Fairley, gave a series of short talks on different aspects of their society’s activities including fish breeding, show standards, judging, etc. At the Ilford table show held the same evening the following were the results: Firsts: 1 and 2, Mr. Fairley, 3, Mrs. Serjeant; 4, Mr. Flitcroft; 5, Mr. Parker. Once upon the Watford and A.S. are holding their annual show and this year the date is the 27th June. The show is open for entries from sites London and a large entry is expected with special classes for lovers of marine fry, goldfish, and so on. The School for Boys, Brentwood Road, Watford, will be reached from Watford by car. Lunches will be served at the Mechaquarium.

ADVANCE Information is now available from Merseyside A.S. regarding their open day to take place on the 15th, 16th and 17th July. There are 17 tanks and the show secretary is Mrs. T. A. E. Leach, 10, Alderley Road, Widnes. They are open for entries at which there are a number of tank societies in attendance. The standing rules of the K.N.A.S. were discussed.

AT the last meeting of the Thames A.S. Mr. John Atkins of Huddersfield gave a very interesting talk on plants. Some members of the Southamptton Aquarists Society attended the meeting in order to hear Mr. Atkins. The result of this talk was that the best part of 80 fish was taken home by members of the society. It was an interesting evening. Coffee was taken at the Thames Club.

A furnished aquaria competition held recently resulted as follows: 1st, Mr. N. Banks, 29 points; 2nd, Mrs. Tippett, 21 points; 3rd, Mr. K. W. Wells, 21 points; 4th, Mrs. R. Standish, 12 points; 5th, Mr. M. Johnson and Son, 22 points.

At a recent meeting of the Hertford and District A.S. the following changes in the society’s officers were made: Honorary Secretary, Mr. H. J. G. White, 71, Elmersham Avenue, Mutt Hill, N.7; Assistant secretary, Mr. J. M. Milne; Show Secretary, Mr. J. B. Bruns, 30, Victoria Road, N.14, assistant show secretary, Mrs. K. Harries, 41, Victoria Road, N.14; assistant show secretary, Mr. W. Earle, 44, Victoria Road, N.14; assistant show secretary, Mr. P. O’Connell, 1, Albion Road, N.14; assistant show secretary, Mr. E. K. Wray, 44, Victoria Road, N.14.

The first annual open show of the Middlesex and District A.S. proved a great success. The show was held at the Pinehurst, Cricklewood, to which the society is indebted for all the arrangements. The results were as follows: Pacificus, Albertus, A. T. Travers; 2nd, A. W. Travers, 3rd, R. Whitman, 4th, A. W. Travers, 5th, A. W. Travers. The exhibits of the American A.S. were exhibited under the guidance of Mr. A. W. Travers.

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A SATISFACTORY attendance was enjoyed in spite of considerable expenditure during the year on show equipment, reported at the annual general meeting of the Devon A.S. at Paignton on 17th April. Several new members were admitted.

Recent activities of the Yowel and District A.S. included a talk by Mr. J. Morris, Entomologist, on the "Aguarinum Highlights," and a visit from Mr. J. Morris, Entomologist, to the Aquarium, as well as a visit from Mr. J. Morris, Entomologist, to an illustrated lecture on "Aquariums." The meeting was well attended.

At the annual general meeting of the Mansfield and District A.S., the following officers were elected: Chairman, Mr. A. E. Turner, Secretary, Mr. A. E. Turner, Treasurer, Mr. H. P. Finch, Assistant Secretary, Mr. A. E. Turner.

At the last meeting of the Reading A.S., the chairman spoke of the need for more members and thanked those who had attended the meeting. The next meeting was to be held on the 1st of June.

The East of Fife A.S. was held on the 10th of May, and the following topics were discussed: "The Evolution of the Shrimp," "The Ecology of the Seabed," and "The Life History of the Crab." The meeting was well attended.

A. AQUARISTS' CALENDAR

16th-30th May: Yorkshire Aquarium Society open show at the Yorkshire Aquarium Society, Leeds.
1st-15th June: Welsh Aquarium Society open show at the Welsh Aquarium Society, Cardiff.
16th-30th June: Scottish Aquarium Society open show at the Scottish Aquarium Society, Edinburgh.
1st-15th July: Northern Aquarium Society open show at the Northern Aquarium Society, Newcastle.
16th-30th July: Southern Aquarium Society open show at the Southern Aquarium Society, Plymouth.
1st-15th August: North-Western Aquarium Society open show at the North-Western Aquarium Society, Manchester.
16th-30th August: Central Aquarium Society open show at the Central Aquarium Society, Birmingham.
16th-30th September: Western Aquarium Society open show at the Western Aquarium Society, Liverpool.
1st-15th October: Northern Aquarium Society open show at the Northern Aquarium Society, Leeds.
16th-30th October: Southern Aquarium Society open show at the Southern Aquarium Society, Southampton.
1st-15th November: Welsh Aquarium Society open show at the Welsh Aquarium Society, Cardiff.
16th-30th November: Scottish Aquarium Society open show at the Scottish Aquarium Society, Edinburgh.
1st-15th December: Northern Aquarium Society open show at the Northern Aquarium Society, Newcastle.
16th-30th December: Southern Aquarium Society open show at the Southern Aquarium Society, Plymouth.

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Send for Wardley's Fish Food FREE!

Ex-Stocks, Millin, etc.

PLASTIC AQUARIUM SCRAPERS

Stick Scrapers........... 2.
Alkaline Scrapers........... 3.
Rubber Scrapers........... 3.

AIR PUMP ACCESSORIES

Turbin Elbow, 1/4"........... 1
Turbin Plate, 1/8"........... 1
"F" way, 1/4"........... 1
"F" way, 1/8"........... 1

DIFFUSER STONES

Oilng with household receipts........... 1/2
Oilng with 12 mm. insert........... 1/2

DIFFUSER STEPS


PRESSED STEEL

50 x 7 x 5 in........... 10
72 x 6 x 5 in........... 15
96 x 6 x 5 in........... 20
120 x 6 x 5 in........... 15
150 x 6 x 5 in........... 20

REMEDIES

Vitriol.................. 2
Vinegar.................. 2
Liquorice.................. 4
Pineapple.................. 4
Bromine.................. 5
Rattans.................. 4
Tables.................. 3

BREEDING

Bream White Spot Cure........... 3
Copepod Cure........... 1
Vitriol.................. 3
Liquorice.................. 3
Bromine.................. 4
Rattans.................. 1
Tables.................. 1

THERMOSTATS

Ex-Stocks........................ 4
Ex-Stocks.................. 3

350 watts........... 10
200 watts........... 8
150 watts........... 6
50 watts........... 4
30 watts........... 3
10 watts........... 2

PUMPS

Pumps & Attachments........................ 4
Pumps & Attachments.................. 4
Pumps & Attachments........... 4
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“PREMIER” BIOLOGICAL AQUARIUM FILTER

The most up-to-date method of Aquarium filtration.
For 18" TANKS........... 12.6
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LARGE ADULT PAIRS 40/- pair

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40,000 SMALL GOLDEN ORFE, GOLDEN TENCH, GOLDEN RUDD. SEVERAL THOUSAND OF  
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Most Species in sizes from 2"—10" (send S.A.E. for list).

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GIANT VALLISNERIA  
FOR POND OR AQUARIUM  
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20/- each

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AMARANTH FLOWERS AND  
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Ideal for Small Shallow Pools

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HOURS OF BUSINESS—Weekdays 10 a.m.—5 p.m.—Sundays 10 a.m.—12.30 p.m.—May.—July Saturday afternoon also from 2 p.m.—5.30 p.m.  
CLOSING ALL DAY EVERY MONDAY  
TERMS OF BUSINESS.—Cash with order please. Fish sent by rail. Tropical minimum order £5, all other orders and carriage 10%. Cold water minimum order £2 plus 10% can and carriage. Plants by post (minimum order 10/-) please add 1/6 post and packing.

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