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OCTOBER, 1960



MONTHLY  
Vol. XXV No. 7

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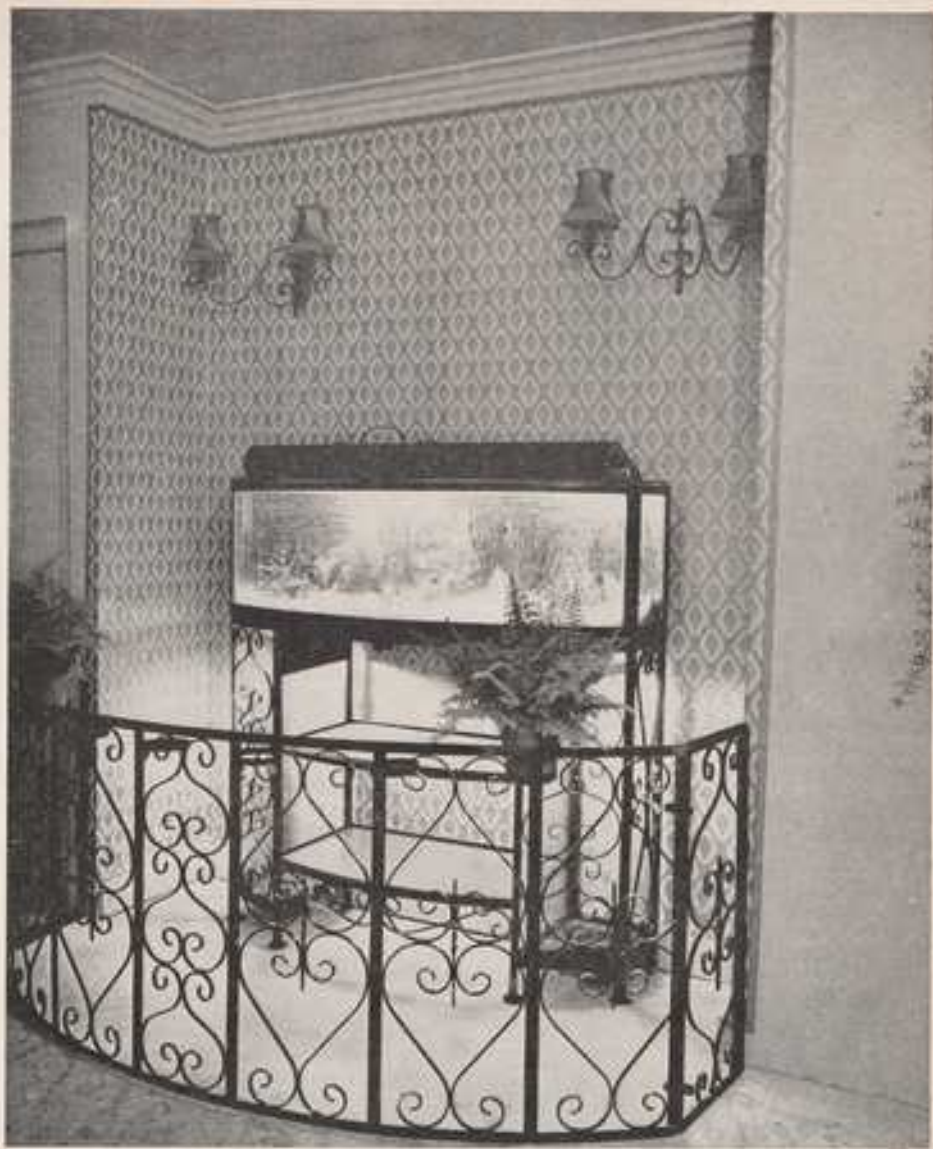
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VOL. XXV No. 7

1960

## Editorial

PET-ANIMAL keeping is often said to be a national characteristic of the British. It certainly seems true that we have strongly developed within us a further urge to make a living from the animals that command our interest. Perhaps it is only another example of supply looking after demand, but we know from enquiries received that ideas of throwing aside the cares of the office or of shedding the worries of the factory work-bench and settling down to winning a plentiful supply of bread by breeding and selling fishes appeal greatly to many aquarists. We are usually chary of giving encouragement to such would-be professionals because, of all the methods recognised as efficient for the rapid dissemination of a tyro's capital, dealing in livestock comes high on the list.

However, even in this sphere successes are sometimes recorded. One such success story that we heard of recently came from Victoria in Australia, where Mr. Franz Wucherpfenning has turned 25 acres of swampy land at Boolarra into a prosperous fish farm. Mr. Wucherpfenning went to Australia from Hamburg 8 years ago and worked there first as a foreman bricklayer. He built a garden pond for a hobby and then found that there was a ready market for the young goldfish that his pond produced. Over the course of 3 or 4 years he increased the number and size of his ponds in his time off from his other work and developed his fish business. To-day he has 50 stocked ponds and a large fish house used for breeding tropical fishes, and he claims to be able to produce his stock at prices lower than those at which fishes can be imported into Australia from Hong Kong or Singapore.

Some features of the story are worthy of special note by anyone who is thinking of turning his hobby into a full-time business and who is heartened by this tale. These are that it is prudent to make the change gradually rather than to risk losing all at the outset, and, of course, that we do not have here the climate that Australia enjoys!

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# Dwarf Plants for Tropical Aquaria

by C. D. SCULTHORPE

(Photographs by the author)

A GREAT variety of dwarf species of aquatic plants is available to the aquarist for interrupting the monotonous, horizontal lines of rock strata, for establishing a contrast with the more common, taller plants and for general use in the foreground of an aquarium. Young specimens of the larger species may also be used to achieve the same effects, but the results are naturally not permanent. In previous articles I have discussed dwarf species of *Marrubium*, *Pilea*, *Gymnosoria*, *Isoetes*, *Littorella*, *Lobelia*, *Hydrocotyle* and *Elodea*, and I now wish to give some account of tropical genera which contain species with similar low-growing habits.

The family Araceae, much exploited by aquarists, contains, amongst others, the three genera *Acorus*, *Amblar* and *Cryptocoryne*. *Acorus gramineus* var. *pusillus* (Siebold) Engler is a dwarf variety of the Japanese rush, *Acorus gramineus* Solander. Both the main species and its variety are naturally bog plants which survive for long periods when growing submerged in cool or warm water. From the sloping rhizome of the dwarf rush, leaves are produced on each side of the growing point, giving rise to the fan-like growth habit. Each leaf is linear, tapering to a fine point, and has sharp margins and a tough texture. The rhizome, which should be partially buried when the variety is planted, is yellowish to reddish-brown, whereas the leaves are bright green. The clusters of leaves usually grow to a height of no more than 2 to 3 inches, and the plant is therefore admirably suited to a foreground position in the aquarium. The adventitious roots produced by the rhizome are quite long and there is no difficulty in anchoring the plant, even in very coarse gravel.

*Amblar nana* Engler, from tropical Africa, is a beautiful dwarf plant which is unfortunately rarely available. It is similar to almost all the other aroids in being a bog species, and after introduction to an aquarium it frequently loses most of its tough, glabrous leaves. Once established, however, it will grow steadily, though extremely slowly, for several years, requiring very little attention. From the stout, almost vertical rhizome the leaves rise to a height of 3 to 6 inches. The blade of the leaf is usually 2 to 2½ inches long and ½ to 1 inch wide, and is lanceolate to oval, tapering at the base and pointed at the tip. The dark-green blade is often borne horizontally on the petiole in a manner similar to that shown by the leaves of the small form of *Cryptocoryne nevilli*. The inflorescence has a thick, greenish, persistent spathe and an erect spadix bearing the sessile, unisexual flowers. Since the plant flowers infrequently and viable seeds are not always formed, the usual method of propagation is to divide the rhizome, although the slow growth renders this difficult. The species tolerates very high temperatures but does not require intense illumination.

There are some six or seven species of *Cryptocoryne* which have a naturally dwarf habit and are therefore suitable foreground plants. A few of them are of only recent introduction to the commercial supplies of Europe. All of them are perennial, semi-submerged species from Asiatic countries near the equator. One species, which is thought to be of Indonesian origin, is available under the possibly incorrect name, *Cryptocoryne "dambi"*. Resembling other species of the genus in its elongated, underground rhizome it has

distinctive brilliant-green foliage reaching a maximum height of about 5 to 6 inches. Each blade, borne on a smooth, slender petiole, is roughly triangular in shape and is one-half to one-third of the length of the petiole. From the pointed tip the blade widens almost to the base, where it narrows abruptly, forming a distinct small lobe, which is often curled at an angle different from the plane of the rest of the leaf, on each side of the petiole. This species has not the fast growth rate of others, such as *C. affinis*, but seems to be tolerant of temperatures from about 68°F to 84°F or more.

*Cryptocoryne lata* Alston seems to be a rather variable species broadly resembling *C. beckettii* Thwaites ex Trimen in morphology. It does not usually reach a comparable size, however, and specimens frequently grow no higher than 5 to 6 inches, though this is not always the maximum. The species therefore has some use as a dwarf plant. Described by A. H. G. Alston in 1931, and introduced to European aquarists several years ago, *C. lata* differs from *C. beckettii* in some or all of the following features. The leaves are often broader and therefore more obviously heart-shaped and usually have slightly ribbed, or minutely indented, margins. The apex of the spathe of the inflorescence is longitudinally furled and bends over backwards, whereas the base of the spathe is much slenderer than that of *C. beckettii*. Though variable in colour the leaves are darker green and without the fairly distinctive olive shade of *C. beckettii*.

*Cryptocoryne nevilli* Trimen resembles *C. lata* only in originating from Ceylon. It is a species inhabiting damp lowlands and was discovered by Nevill and described by Trimen in 1898. Two forms, tall and dwarf, are available in commercial stocks. Dwarf plants have bright-green foliage with a rapid growth rate but not usually exceeding a height of about 5 inches. The blades are horizontal, as was noted for *Amblar nana*, and lanceolate, tapering to a not very fine point. This plant, which is still sold by many traders as *C. beckettii*, blooms quite frequently when cultured in damp, rich soil in a very humid atmosphere at a temperature of 70°F to 75°F. The spathe of the inflorescence reaches a height of 2 to 3 inches and is white or flesh-coloured near the base, light pink higher up and dark purple at the top, around the opening. At its base the spathe bears a short, purple, spur-shaped bract. It has recently been shown, by Dr. R. A. H. Legro at the University of Agriculture in Wageningen, that *C. nevilli* is a "short-day" plant; for specimens to bloom, when grown under natural illumination, the daily period of exposure to light must be 12 hours or less.

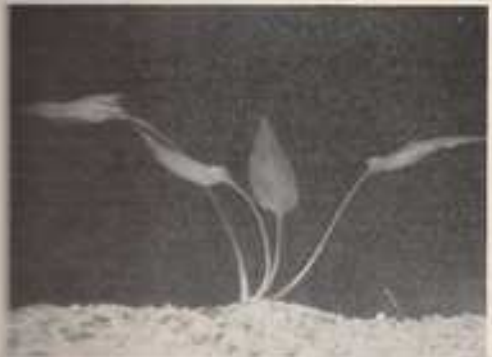
A third dwarf Sinhalese species which was collected from the rain-forests by G. H. Kendrick Thwaites, Director of the Peradeniya Botanic Garden from 1857 to 1880, and which has recently become readily available in Europe, is *Cryptocoryne thwaitesii* Schott. This species forms a distinctive rosette of leaves arising from the stout rhizome to a height of 4 to 6 inches. Young leaves are lanceolate and smooth-edged but more mature leaves are broad, oval and narrowly heart-shaped at the base. The blade is from 2 to 2½ inches long and its margins are finely or coarsely toothed. When the plant is grown submerged the leaves become



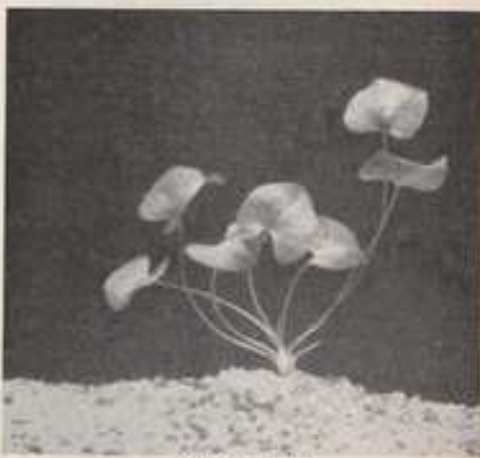
Left to right: a young specimen of *Acorus gramineus*, *Acorus gramineus* var. *pusillus* and a young specimen of *Cryptocoryne ciliata*



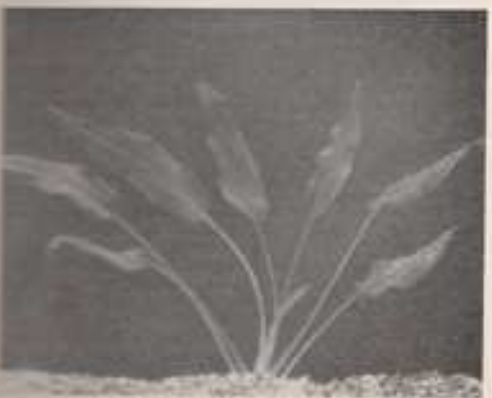
Hair grass (*Eleocharis acicularis*)



New species of *Cryptocoryne* at present known as *Cryptocoryne djambi*



*Niphar pumilum*



Unidentified low-growing species of *Cryptocoryne*

Water rose  
(*Sagittaria flabellifolia*)



bronze-green to brownish-purple, and their upper surfaces are often mottled with dark brown or purple. *C. thalassii* is a slow grower and produces few stolons, which must not be separated from the parent rosette until the young plants are very well established. Flowers are formed only rarely; the spathe is lilac-pink externally and speckled with bluish-violet internally.

One of the only two species of *Cyrtocoryne* known to inhabit New Guinea is the dwarf *C. vestigii* Engler, which was found by G. M. Versteeg on the Lorentz River in 1907. Seldom obtainable in European countries, this species does not usually grow higher than 4 or 4½ inches. The leaves are triangular and rather thick and fleshy, the blades being a glossy green above. Slight undulations of the blades' margins are sometimes present, purple or brown markings never. The spathe of the flower is white, tinged with purple near the base, deep yellow towards the apex, the margin of the opening being purplish-brown and warty in appearance. Grown in moist, tropical swamp conditions, on wet loamy soils, *C. vestigii* produces subterranean stolons and blooms during the winter months. Though it is an attractive and unusual species its rate of growth in tropical aquaria is variable and it may produce very few new leaves.

Professor H. C. D. de Wit, of the University of Agriculture at Wageningen, has recently described another Asiatic species, *Cyrtocoryne nesouii* de Wit, which has a low-growing habit. Attaining a height of 4 to 6 inches, the leaves become broadly lanceolate, with indented margins and occasional dorsal striations. Each blade appears as a narrow spear-head as a result of the pointed tip and abrupt base, which is straight, at right angles to the petiolar axis. The colour of the leaves varies from a plain green to a brownish green. An unidentified species, available from a Midland nursery as *Cyrtocoryne* species no. 7, is another Siamese species suited to a foreground position in the tropical aquarium. Reaching a height of 3 to 4 inches, the leaves are an attractive yellowish to reddish brown with a reddish anthocyanin pigmentation on the under surface. The shape of the leaves is linear to lanceolate, sometimes, but not always, tapering at the base as well as at the tip. Both this and the foregoing species are easily cultivated but are unfortunately in short supply.



Specimens of water rose growing in the foreground of a tropical aquarium



*Acorus pusillus*

Hair grass, *Elocharis acicularis* (L.) Roemer et Schultes, forms thickets of very narrow, cylindrical stems and grows, in tropical aquaria, to a height of about 5 to 8 inches. New plants are produced at the nodes of slender stolons which creep along, or just below, the surface of the substratum; the species spreads very rapidly in clear water and a fine compost. When first planted in the aquarium it should be given a sandy compost in which the trail roots can easily anchor themselves, for in a coarse-gravel medium it is apt to be uprooted by bottom-feeding fishes. The predominantly vertical growth of the species gives it great value in relieving the horizontal lines of rock strata.

*Echinodorus tenellus* (Marius) Buchanan, the pygmy chain swordplant, which is still sold as *Sagittaria microfolia* by some traders, is a dwarf, rapidly growing, rosette plant suited to warm water. New rosettes of the tiny, pointed, green leaves are formed at the nodes of horizontal runners from the parent plants. Once established this species soon forms a dense carpet on the aquarium bed.

Most species of the genera *Nymphaea*, *Nuphar* and *Nymphoides* are too large for the average coldwater or tropical aquarium, but there is one species, *Nuphar pumilum* (Timm) de Candolle, one of several species commonly referred to as spatterdocks, which is sufficiently small to be useful in the foreground of an aquarium. Suitable for cool or warm water, the species grows from a stout rosette, the leaves spreading out so that their blades are exposed to the maximum illumination. The margins of the leaves are often furled and the colour is a rich, translucent green. The species bears yellow surface flowers when it has reached maturity.

The water rose, *Samolus floribundus* Humboldt, Bongland et Kunth, is a bog species of widespread distribution over the American continent. It forms compact rosettes of lanceolate to oval, pale-green leaves which are prominently veined; flowers arise only when the plant is growing semi-submerged with most of its foliage out of the water. The water rose grows profusely in almost any compost, reaching a height of about 4 inches and reproducing itself by offsets arising close to the crown of the rosette.

The water orchid is an uncommon specimen plant; the fern usually grown in aquaria is probably a dwarf tropical variety of *Spiranthes latifolia*. From the fleshy, tuberous roots, which are essential for the survival of the plant, there

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## THE OTHER SIDE OF THE GLASS

by PETER DENDY

GEORGE, the plecostomus, flicked his tail and moved his ponderous body over to a more tempting piece of algae. As he did so he touched his wife Maggie, and she turned her boss-boss eyes towards him, taking in his bulk and the rhythmic sucking of his mouth. George hid his wife's eyes upon him and stopped his grazing to clear his throat.

"It's a funny life Maggie, isn't it?" he said slowly, "and sometimes I wonder about some of the odd things that go on around here. You remember the time when that round tube thing, the one you like to warm your mouth on, suddenly went crack and killed Amos who was sleeping near it? Everything began to get very cold and it was nearly a day before the man animal who lives outside the water came along and put a new round tube in to make things warm again. That could have been very serious, as the silver thread in the tube fixed to the glass went right down and nearly disappeared altogether. If the man animal had been thinking about us as he should have done he would have been able to put things right much sooner and we should not have lost those pretty little moons who caught pneumonia and died."

George settled himself a bit more comfortably on the ground and raised a cloud of muck and bits of dry food which swirled round his wife and made her cough. "Steady as George," she said reproachfully, "you know how this stuff gets into my throat and upsets me."

"And that's another thing," said George, "all this muck being about is quite unnecessary; you can't even turn over in bed at night without stirring it up. It may be all right for the fishes and guppies, they swim about where the water is clear, but it is a bit hard on those of us who live near the bottom. Do you remember last year, when we first came here, it was very different then, all this muck was taken away every week by the pipe which moved over the bottom and everything was always clean and bright. That was while we were on our honeymoon Maggie. They were wonderful days." George stopped to look fondly at his wife, the muck was beginning to settle and he could just see her through the cloud.

"I can remember the good old days, too," said a wagtail plover who was swimming nearby and had overheard the conversation. "You're lucky, you know; things are much worse for us even if we do swim around in clearer water. At least you can find plenty of algae to eat round the place but the rest of us have to rely on the food that comes in from the top. In the good old days food used to arrive four times a day, regular as you like and different at each meal, too. There used to be *Daphnia* and worms as well, which the stupid fish particularly liked. Now, however, a dollop of any old thing comes in once a day and not always every day either. When it does come it is usually too much to eat at once and a lot falls to the bottom and goes grey and smelly." The wagtail nodded to Maggie and made off to another part of the tank.

George thought about it all for a time and then went on talking to his wife. "You know, Wag and the others have more to put up with than we have, so perhaps we mustn't grumble too much. All the same I wish the brightness up top was on for regular periods each day. Sometimes it does not go on until late and last week it was on all night—most disturbing it was, too. Then there was that time a while



"This may be the end, old thing!"

back when the man animals in white coats came and painted the world outside the water and everything was smelly for days afterwards."

A mollusc lolloped by and began to nibble at George's pet algae. Normally he would have chased her out of it, but now, his mind on other things, he called out to her. "Hey, Molly, do you remember the time we had the paint smell in the water?" "I'll say I do," the mollusc said. "I shall never forget it. That was when I lost my old man. He was not feeling too good at the time and the smell finished him off. It's lucky I've got some babies to remember him by, but I must say this is not the best sort of a place to bring up kids in. If it is not the smells from paint it is smells from that stuff used to kill off flies. As a matter of fact I think that is even worse, as it leaves a scum on the top of the water."

"I say Molly," said a young gourami, "do come and look at the pretty sparks in the round thing that hangs up near the tube with the silver thread in it," and the gourami darted away excitedly followed by the mollusc. "Silly little thing," said George morosely. "It hasn't the sense to realise that the sparks mean that quite shortly it is going to get very cold again."

Suddenly there was a sharp crack, which could be heard all over the tank, and the brightness up top went out. Slowly the temperature of the water dropped and the silver thread disappeared completely. The mollusc and guppies swam about more and more slowly and one or two turned on their backs and died. With an effort George pushed himself close to his wife and touched her with his mouth. "This may be the end old thing," he whispered. "If only the man animal would remember that we have lives just like him and need care and attention, too, perhaps we could have gone on living for ages yet." George paused to gather his strength as it was really very cold by now, then said in a faint voice: "A little regular care and attention shouldn't have been too much to ask should it? After all be used to look after us well enough when we first came here, but that all seems so long ago—". George's voice trailed off into silence and his eyes closed.

## Where to Site Tropical Aquaria

by B. POPLAND

(Illustrated by the author)



Aquaria in a tier on one side of the chimney breast

A WELL-KEPT aquarium, colourful and exotic, lends interest and beauty to any room. In most instances it will be found in a hall or lounge, possibly at one side of the chimney breast, but except for the occasional attempt to incorporate the aquarium into a bookcase, it will almost always be on an angle-iron stand. In most cases this will be quite attractive, either with wrought-iron embellishment or a lattice design for hanging plant pots on, but the aquarium in the home is invariably presented as a piece of furniture in a room rather than as a part of the room.

Most hobbyists, once bitten by the fishkeeping bug, stay bitten and are likely to keep fishes over many years. It follows therefore that a more attractive presentation, even if this is a more permanent arrangement, would not be unreasonable. With the present boom in do-it-yourself, many tropical-fish enthusiasts must be capable of minor building jobs and I should like to present one or two ideas which might improve the room and the presentation of the aquarium.

Features have appeared in this magazine showing aquarium fronts shining out of flush walls, which I suppose is an ideal arrangement, but, of course, much too wasteful of space for the average home. However, if we cease to regard this presentation as building out a wall to enclose

the tanks and think in terms of placing the tanks in a recess and building them in, it becomes immediately apparent that by using the recess at the side of a chimney breast, an excellent opportunity arises for this kind of treatment, without wasting space. Since the flue of a chimney is invariably at least 9 in. wide and is enclosed by a 4½ in.-thick brick wall, the chimney breast will almost always project at least 1 ft. 2 in. into a room. By a happy coincidence, fish tanks are rarely more than 1 ft. wide, so that if the tank is fixed approximately 2 in. forward of the back wall, by means of timber packing pieces, so that the front of the fish-tank angle iron is 1 in. behind the plastered face of the chimney breast, this face can be extended and the recess flushed.

For the purpose of this article, let us deal with a standard, and widely used, size of tank, a 36 in. by 12 in. by 15 in. This can usually be housed in the recess at the side of a chimney and in many houses will already occupy this position. Our object is now to build in the tank, say, a two-tier stand and tanks, and to complete the composition a recess can be formed over the fish tanks for display or bookcase purposes. The style of construction and ornamentation is to be contemporary.

Cutting away the external angle of the plaster on the chimney breast must be the first job; approximately 2 in.

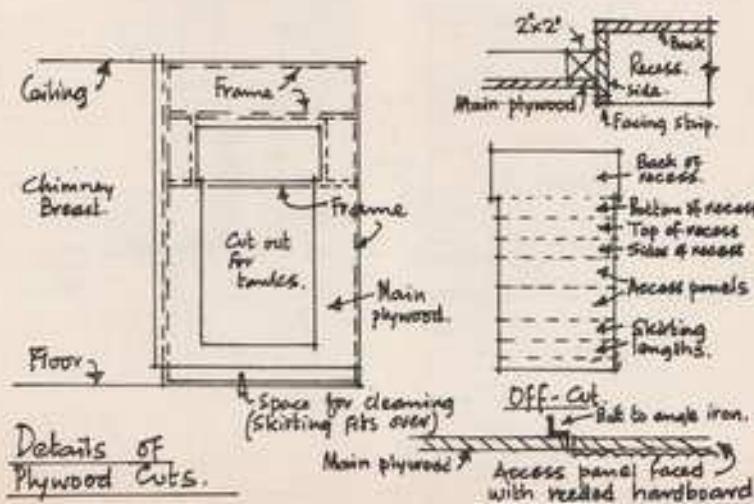
of brickwork should be exposed to provide a seating for the plywood panel, which will fit flush across the front. The thickness of plaster will be about  $\frac{1}{4}$  in., so if  $\frac{1}{4}$  in. plywood is used, the difference can be made up in packing, giving us a variable to ensure a flush joint between the plaster and plywood. In the average size room, one 8 ft. by 4 ft. sheet of plywood might well do the job all in one piece. A frame of 2 in. by 2 in. rough sawn timber should be fixed in the opening and plugged to both walls, ceiling and floor. This frame will have horizontal members above and below the display recess, and when it is in position measure the exact position and size of the area to be cut out of the plywood for the tanks. Cut this out neatly with a keyhole saw, drilling a few holes to start the saw. The large off-cut will be about 2 ft. 10 in. wide and 5 ft. 9 in. high and this will provide no. 2 access doors and the eill, head and sides of the display recess. The sketches shown should help to illustrate this description.

A rebated projecting surround frames each fish tank after the plywood has been fixed, and even the projecting skirting, to match the remainder of the room, can be cut out of the plywood off-cut. Very little waste will ensue. The edge of the plywood which butts up to the plaster should be splayed to provide a housing for the making good to the plaster and to make possible removal of the blockboard if necessary. The switches for lighting can be mounted on the access panels, with the lights which they control mounted on the inner face. Reflectors can be mounted over the lights to direct the light at the water surface and the access panels can be hinged. Face the access panels with reeded hardboard, which can then be painted according to the colour scheme of the room, and provide a catch or fastener, easily operated, for the daily feed. Paper the whole chimney breast and plywood in the one type of paper and screw the skirting in position so that it can be easily removed from time to time, to allow cleaning up any slops of water caused by cleaning. This treatment would, of course, not be carried out where breeding or regular moving of fish occurs, but where the appearance of the tank as a decorative feature is the major consideration. The effect of this recessed aquarium will be infinitely more attractive than one which stands in the room like a piece of furniture.



Aquaria in use as a room-divider

Another presentation not often seen is the use of aquaria as room dividers. The dining recess, so fashionable to-day, can be very effectively formed by a room divider, and a 30 in. by 12 in. by 15 in. tank on a stand forms an excellent



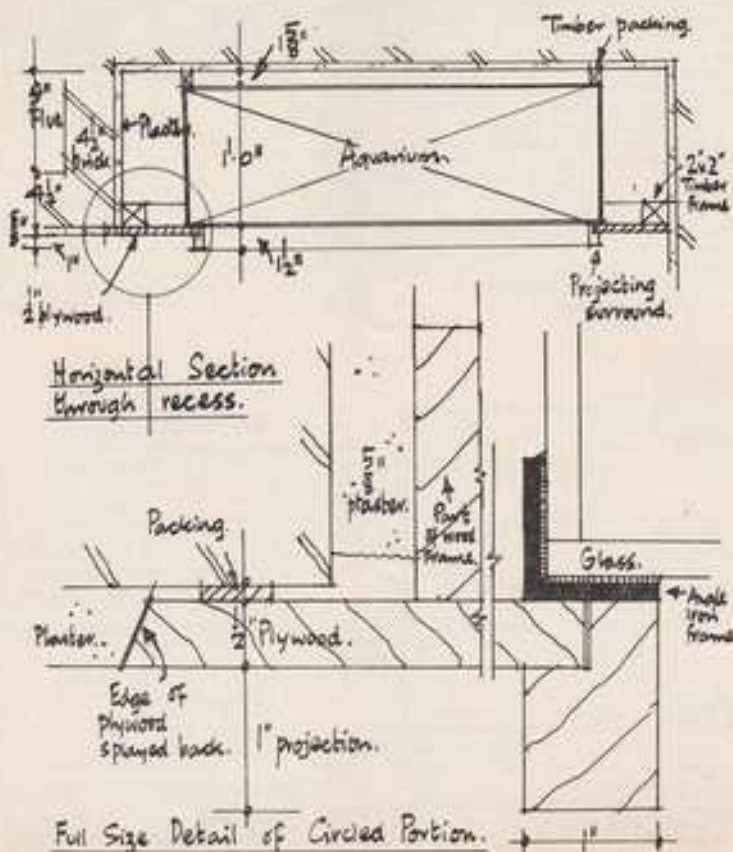
base. Many different designs can be evolved; a simple one would be to form an upper portion of two hardwood shelves, one 8 in. above the tank and one 8 in. below the ceiling, braced apart with 1 in. diameter dowel rods at 6 in. centres. The lower shelf can be fixed to the tank at the end by drilling the angle iron of the frame, and providing a triangular end, as shown in the sketch, bolted to the aquarium. Two or three of the dowel rods can run through to the ceiling level for a fixing at the top and the ends of the shelves can be fixed to the wall with angle-iron brackets. At least 8 in. space over the tank is necessary for lifting the hood to allow feeding and the cleaning out of the tank.

This idea of an "island" tank, with no background, presents new and interesting problems in layout. Conventional sloping of the gravel to the back of the tank no longer applies; a level gravel base will develop or possibly a gentle rise to the centre. Rockwork will be placed centrally, smaller pieces near the glass, larger pieces toward the centre; plants to be favoured are the slower-growing varieties like *Cryptocoryne* and *Sagittaria*, and the only position admissible for the varieties which bunch, *Valisneria*, *Gambusia* and *Hygrophila*, will be at the end of the

tank near the wall. Tall-growing species in the centre and smaller plants, hair grass, *Cryptocoryne* and Japanese rush, nearer the glass on both sides of the tank. Owing to the passage of daylight straight through the tank some of the fishes with subtle coloration will be found to show better, but I should advise the inclusion, if a community aquarium is being set up, of fishes with solid colour: red platys, black mollies etc.

An interesting and unusual aquarium could result from this application, and, to complete the picture, trailing and climbing plants can be placed on the shelving to form a living screen. If this divider were used for a dining recess, the aquarium lighting would lend an unusual touch with its diffusion over the area of the tank. A central light fitting could be dispensed with and a number of table or wall lights could be employed to supplement the lighting value of the aquarium.

These are but two ideas which it might, with slight adaptations, be possible to apply to many houses and which I hope will be of interest to other enthusiasts who are, like myself, not only interested in fish, but also in aquaria and the picture they present.





## The Garden Pond in October—by ASTILBES

**O**CTOBER is a very important month for the pondkeeper. Many imagine that as the season of breeding is over there is no more to do, and the pond is then left to its own resources. Then at the end of the winter when troubles with the fishes commence, such pondkeepers are very surprised and do not think of blaming themselves in any way for what has happened. Very often it will be noticed that goldfish in a pond go through the winter apparently in good health and then when the weather starts to warm up a bit some of them develop fungus and losses occur. A good feeding programme in the late autumn helps a lot but it is of little use feeding the fishes well if no attention is paid to the state of the water.

As long as the water remains pure and well oxygenated then pond fishes will go through the winter in good health. The amount of cold will not harm them, and the pond can be frozen over for some time with little harm if the water is pure. If the water contains decaying material foul gases are formed, and then when ice forms on the water this foul gas will be trapped and the fish can die, not perhaps from lack of oxygen but through being poisoned by the gases. There is little doubt that the safest plan for the small pond is to clean it out once most of the leaves have fallen from trees which may be near the pond and after the water-lily leaves have died down. Do not neglect the latter. It does not seem to be recognised by many pondkeepers that water-lily leaves, although so handsome during the summer, can be very dangerous in the winter. These leaves will pollute a small pond very quickly and one can easily prove the truth of this statement.

If a water-lily is required for another pond or to dispose of and it is placed in a container with some water it is surprising how soon the water becomes polluted and develops a very bad smell. Therefore it is essential to make sure that most of the dead lily leaves and flowers are removed as soon as they start to decay. I think that these are the worst culprits, and, of course, the smaller the pond the worse is the trouble likely to be. Many of the other water plants have decaying leaves in the late autumn but most of the above-water ones can be easily seen when they start to fade and can be removed. The underwater plants do not appear to be as dangerous as they are often taken by the fishes as they become softer.

If it is not possible to clean out a pond completely because of soil at the bottom and the presence of a large amount of water plants then it will help considerably if most of the water is emptied out and fresh water run in. The experienced pondkeeper soon sees if the water is not as it should be. There is always something queer about foul pond water. It loses its brightness and takes on a smoky look. It can begin to smell and when very foul it will be almost opaque, with a blue-grey look, and the water plants will start to be covered with a pink fungus-looking substance. Such water is quite poisonous to most fishes and should be changed immediately.

If the water is rather green there is no need to worry unduly. The fishes may not be in evidence for a time but once the weather turns cooler most of the algae will die and the water will become clear again. Be careful, though, if the water becomes very green, as if there is too much of this green algae it can pollute the water when it dies. Therefore if the water is very thick with green algae in the autumn remove most of the water and refill with fresh. Remember that a little care and attention now will mean a considerable saving of trouble later on.

As the weather cools so will the appetites of the fishes lessen and it is most important that the pondkeeper recognises this fact. There is no sense in continuing to give the



Photo: H. & V. Jod

same amount of food to the fishes once the water cools as the fishes will not be able to eat it and digest it as quickly as they could have done when the water was warmer. Most of our pond fishes will eat far less once the water temperature drops below 50°F. Just a little uneaten food can soon start pollution. The water then becomes impure and the fishes are unable to eat and digest the food. If feeding is continued on the same lines then trouble is sure to ensue.

It is surprising how soon fishes can be upset once the water becomes overcharged with foul gases. All types of goldfish will eat a fair amount of vegetable matter and in a healthy pond there should always be something for them to browse upon. It is very noticeable in a tank which has been left unattended for a fortnight from the copious dark droppings from the fish that there has been no lack of food in the tank in the form of soft algae and fine plant leaves.

### Dwarf Plants for Tropical Aquaria

(continued from page 138)

grow emerald-green, lanceolate, spreading leaves. The plant grows only slowly unless it is maintained in a small pot of rich loam in the aquarium. Though it is not an easy plant to cultivate, its pleasing appearance and dwarf habit render it an unusual and valuable foreground specimen. If the species is grown in shallow water under intense illumination it will produce an erect aerial stem which bears pale-yellow flowers.

From this rather brief account it will be seen that the aquarist in need of plants with a dwarf habit should have little difficulty in finding some species to his taste. It is a notable fact that of the 14 species which I have discussed, only one, *Najas pumilus*, is a genuine aquatic plant. All the others are species from bog or marsh habitats which will be drier or wetter according to the season of the year. It is perhaps because of the natural variation from dry to rainy seasons in such habitats that these plants adapt themselves so readily to submerged growth in the tropical aquarium.

## KING SNAKES—by ROBERT BUSTARD

THE king snakes combine many of the points which one looks for in a pet snake—attractive, bright coloration, docility, long life in the vivarium and ease of feeding. Specimens of the chain king snake (*Lampropeltis getulus getulus*) and its sub-species also grow to a convenient size—5 or 6 feet.

The king snakes are natives of North America and these, together with the chicken and rat snakes of the genus *Elaphe* (subjects of a later article), are my favourite U.S. snakes. In the East the chain king is the common species and it ranges westward to the Mississippi. Allied forms extend westward to California, where a very attractive sub-species known as the Californian king snake (*Lampropeltis getulus californiae*) occurs. This snake is a rich chocolate brown with white cross bands. The coloration of the chain king is jet black with white or yellow markings or "chains."

### Food and Housing

In nature the king snakes feed on lizards and snakes as well as on rodents, and they are very muscular to be able to constrict other snakes. In many parts of the United States enlightened people protect them, since they kill and eat many deadly poisonous snakes as, for instance, the rattlesnakes (*Crotalinae*). King snakes are comparatively immune to the poison of these snakes and kill them as they would any other harmless species. Indeed they are immune to the venom of New-World poisonous snakes but die in the normal way if bitten by Old-World venomous snakes.

Owing to their feeding habits they must be kept in a vivarium by themselves. King snakes will live in harmony with members of their own genus but should other snakes be added they will soon be eaten. I have found it most satisfactory to feed my specimens on mice, which they eat readily. I feed them about every 10 to 14 days and a specimen of 4 to 6 feet gets two mice at a meal.

The vivarium for these snakes should be large and roomy. King snakes are poor climbers. Mine is 36 in. by 24 in. by 24 in. The floor area is covered by sand with loose dry moss. A small dish of drinking water is provided. A temperature of about 75°F is suitable for these snakes,

which are comparatively hardy, although they should not be allowed to hibernate. As with all snakes from warmer climates, it is important to guard against draughts and damp conditions.

### Other King Snakes

I have always found the chain king an extremely docile species. I have no recollection of a new arrival, on being removed from the snake bag, even trying to bite. I was most surprised therefore when I received a couple of the salt-and-pepper king snakes (*Lampropeltis getulus holbrooki*), so called because they have small bright-yellow spots dotted all over the shiny black, to find that they were decidedly snappy. They behaved in a manner reminiscent of that of any of the rat snakes (*Elaphe*) when these are first purchased.

Another popular species of king snake is the milk snake (*Lampropeltis elapsa troglodytes*). This snake is pale brown or buff with darker brown markings which are edged in black. It receives its common name because farmers blame it for low milk yields from their cows. This, of course, is quite without foundation, as even if the cows would tolerate a snake with sharp teeth attaching itself to their udders the quantity of milk which this small snake (which reaches a total length of 30 inches) could consume would not make any noticeable difference in the yield. The milk snake, like so many others, frequents farm buildings to feed on the mice.

Some of the most attractive snakes I have kept have been king snakes. The Arizona mountain king snake (*Lampropeltis pyromolana*) is really beautiful. The ground colour can be considered to be yellow, but this is only seen as narrow bands crossing the body. It is interrupted by much broader bands of red, which are edged with black on the anterior portion of the snake. Further back these give way to broad bands of black (which still alternate with yellow) and which have red markings let into their sides. The tail is black and yellow.

The coral king snake (*Lampropeltis elapsoides elapsoides*) combines the same three colours also to startling effect. If anything, it is more attractive since it is actually banded in these three colours in turn throughout the length of the

(Please turn to page 151)



This picture shows the Florida chain king snake (*Lampropeltis getulus getulus*) in the act of egg-laying. One egg is emerging from the cloaca and others inside the snake can be seen distending the scales above the tail.



Coral king snake (*Lampropeltis elapsoides elapsoides*), a small but exquisitely coloured species.



Photo:

T. Johnson

## Breeding the Argentine Pearl Fish

(*Cynolebias nigripinnis*)

by DR. GEORGE CUST

I HAVE been interested in this fish since 1954, and in spite of having a few pairs each year since then, I succeeded in getting the eggs to hatch successfully only this year.

This is an "annual fish," which lives in the Argentine. It is found in shallow pools and turbid streams that generally dry up in summer. During the summer, as the water evaporates with the heat, the adults die, but having buried their eggs in the mud or sand on the bottom of the pond; these lie dormant throughout the dry period until the coming of the autumn rains. When the rains come and the pools begin to fill up the eggs hatch in a few hours. In nature it does appear that the period during which the eggs must remain dry varies from a few weeks to a few months. The reaction of the water in the pool varies between pH 6 and 8, and the water is described as soft.

The male Argentine pearl fish is particularly beautiful: a dark royal blue in colour with bright turquoise spots on the body and fins, particularly along the edge of the dorsal fin. In very bright light, as in the conditions of photograph, or when the fish is upset, the body tends to become brown. The mature male is 1½ inches long. The female is a drab brown in colour, very similar to the pigmy sunfish (*Azostoma nerioides*); when mature she is about 1¼ inches long.

These fish when together are particularly vicious; the males will fight as much as fighters. The male is also a virile driver and if one male is placed with one female he will soon finish her off.

A big difficulty I find about these fish is that they are very short-lived; imported fish tend to be relatively old and have been well spawned before you buy them. As they are almost old-age specimens when you get them they don't last long.

To keep and spawn these fish I use a small tank (12 in. by 10 in. by 10 in.). The water is rain water, hardness varying between 3 and 4 D.H. (degrees of hardness). I then add enough peat to make a layer 1 inch deep on the bottom.

The peat is first boiled for a few minutes in soft water, allowed to cool and then squeezed dry. This gets rid of the excess of humic acid in the peat, which would interfere with the development of the eggs. The reaction of the water in the tank is then pH 6.4 - 6.8. Temperature range is 65° to 75°F, usually under 70°.

I run one male with three females—in this way two females can rest whilst he is chasing the other one. The fish must be kept well fed with live foods; the females soon get hollow-bellied if they don't get brine shrimps, *Daphnia*, *Tubifex*, white worms or earthworms at least once a day. They eat out of all proportion to their size. *Daphnia*, *Cyclops* etc., are the most appreciated foods.

In the spawning act the male chases the female, finds one which is willing to spawn and drives her down towards the peat. He appears to pick the spot, enters the peat head first and is followed immediately by the female, who positions herself at his side. They disappear completely and a cloud of peat particles is sent up into the tank. After, usually, 10 seconds the male appears, followed 20 seconds later by the female. The female tends to rest before being willing to spawn again. Only one egg is laid with each spawning act. The eggs are relatively large for a small fish and have a thick egg membrane.

I allow the fish to spawn for a fortnight and then remove the peat with a very fine-mesh net. The water is allowed to drain off and the peat containing the eggs is placed in a plastic box 8 in. by 4 in. by 2 in.; this is put in an incubator at 70°F. For a few days I leave the lid off the box to get rid of the excess of moisture. The lid is then replaced to prevent the peat from drying too much. It is important when breeding these, and any other of the "egg buriers" (see *Encyclopedia of Tropical Fishes* by H. Axelrod and W. Vorderwinkler) with a long incubation period, to mark the date on the box and lid and the species of fish. If not, one ends up with a load of boxes and one can't remember what is in them when it is necessary to add water to them.

I now use a detailed breeding card as well for each spawning. I first added water to these eggs after 7 weeks. No fish hatched. W. Bertholdt (*The Aquarium, U.S.A.*; November 1957) found that he could hatch these fish by adding water between 6 and 8 weeks. I then drained off the water and incubated the eggs again. I tried hatching them again at 10 weeks and 12 weeks respectively without success and dried them out again each time. Water was then added at 15 weeks in the evening and by next morning the fish had

hatched and were free-swimming. In most of the "egg hatching" I find that if the eggs are going to hatch they do so within 12 hours. The fry take brass shrimps immediately and grow very fast. The sexes can be differentiated at 4 weeks; the fish are an inch long by 6 weeks and are sexually mature and beginning to spawn. The amount of live food they eat is astonishing. By 6 months of age they are all dead. A short life but a merry one!

They are most interesting fish to keep and breed.

## Tropical Fishkeeping for Beginners

by C. WRIGHT

THIS article has been prepared for the reader who has been put off the keeping of tropical fish time and again by remarks like this: "I wouldn't keep tropical fish—they are too expensive," or "you've got to be an expert to keep them," or "I lost £20 worth of fish, the heater burnt out (or the thermostat stuck) and I did not know it; no more for me—I got rid of the lot," and many others in different strains.

I believe I have covered the most essential items and pitfalls that you are likely to meet; outside of these, tropical fishkeeping is a matter of common sense. If you have no electricity don't be dismayed—read on. I have also dealt with gas and oil heating. Let us consider facts and figures.

The first item we need is an aquarium. This can be purchased at any aquatic dealers, but before you make up your mind which one, pay a visit to several of them. Ask the proprietor if you can have a look around his stock; you can explain that you are not spending at present but becoming very interested. Even though you know nothing about fish it should not take you long to realise at which shop you are likely to receive most assistance when starting. If you enter a shop where the aquaria are all cloudy and look un cared for, in which the fishes look miserable with all their fins pinched up instead of being spread out to show their beauty, even if this is your nearest shop ignore it and choose a shop where the aquaria look cared for. The tanks may not be crystal clear when you enter, for the assistant or proprietor may have been disturbing the tanks to catch other customers' fish just before you arrived, but the fishes will look different, swimming happily around with fins erect and looking sprightly.

When you have finally decided at which shop to deal, ask if you can have a word with the proprietor (not on Saturday afternoon if you can avoid it, as he will most probably be very busy and not able to give you the attention that he would like to). Tell him that you have decided to keep tropical fishes and ask for the prices of the following equipment that he can faithfully recommend: an aquarium, 24 in. by 12 in. by 12 in. or 24 in. by 15 in. by 12 in. (although the latter may cost a few shillings more, you will find the extra 3 in. in height a great advantage when it is furnished). Insist on 1 in. by 1 in. angle iron with quarter-plate glass for the base and nothing thinner than 3/2 oz. glass (approximately 1/2 in.) for back, front and ends. You may have pressed-steel aquaria offered to you because they are a few shillings cheaper; ignore them, the best value is with the angle-iron aquarium. I have some now that have been in use over 12 years and are still good for a few more years.

I do not advise a beginner to make his first aquarium, because there are bound to be a few snags, but, having purchased the first one there are no reasons why he should not make others that may be needed later on; should he

do this I would like to suggest that he buys, for the modest outlay of 2s. 6d., a copy of *Aquarism*, by Anthony Evans, published by Poyles; this book will be found to be very helpful.

Our next thought must be with heating the water. Most homes have electricity so this method of heating will be dealt with first. There are two main types of electrical-heating systems on the market at present. The most popular is the heating coil housed in a Pyrex glass tube, in various wattages from 25 to 150 watts; it must be completely immersed in the water (my preference for position is the back left-hand corner, with the lead coming out and down the back); 100 watts is usually sufficient for a 24 in. by 12 in. by 12 in. and 120 watts for a 24 in. by 15 in. by 12 in.

If the room the aquarium is in is very cold or very warm you may like to work out for yourself what wattage is required. Here is a handy formula: it takes 2.5 watts of electricity to raise 1 gallon of water 1° above room temperature and, to be on the safe side, this should be worked out from the lowest room temperature in midwinter.

The other type of electric heater is a long flexible element covered in a water- and heat-resistant covering, enabling it to be hidden under the sand; the main disadvantage with this type is that in the event of heater failure the tank must be stripped down to replace the heater. The advantage is a very even distribution of heat over the whole of the aquarium. The disadvantage with the Pyrex tube is that it can look unsightly if not concealed; this can be done with the aid of plants as I shall explain in the section on planting.

The heat of the water must, of course, be controlled. For this we have quite a large selection of thermostats: 1, total immersion, which is very similar to the Pyrex tube heater; 2, three-quarter submerged with outside control, similar to 1; 3, one that clips (by means of a spring holder) on to the outside of the glass; 4, one that, by means of an adhesive, is stuck to the glass outside of the aquarium. The disadvantage to no. 1 is that to set and adjust it to the required temperature it must be disconnected from the mains before making any adjustments, and you may have to do this several times before you are finally satisfied; its advantage is that, should for some reason or another the water level fall, it will still be working whilst in the water. Type no. 2 has a screw on the top for adjustments and you can also see what you are doing without disconnecting from the mains; the disadvantage is that the top must be above the cover glass or reflector and can look unsightly. The clip-on type (3) is set in degrees, usually from 60° to 90° F, and has a small pointer which you set to the right temperature. The disadvantage is that if the water level should fall more than about 3 inches the heater will be switched on for longer periods, resulting in the temperature of the water rising. Type no. 4 can be fixed midway on the outside glass, thus eliminating the fault of no. 3, and has the

## Two Colourful Tropical Fishes



Cardinal tetra (*Cheirodon axelrodi*)

TO a first glance the cardinal tetra resembles its relative the neon tetra, but differences in disposition of the bright red and blue colours of the two fishes are detectable when careful comparison is made. Cardinals have been bred in aquaria but the event is exceptional rather than commonplace.

IN its most spectacular state the stripe at the sides of *Rasbora pauciperforata* is a brilliant red and is marked below by a black line. This fish is best kept as a group that will form an attractive shoal in the aquarium. It is not a ready spawner but aquarium breeding has been accomplished.

(Photographs by HENDON AQUATIC SOCIETY)



*Rasbora pauciperforata*

same dial method of adjusting the temperature, but both 3 and 4 types can look a bit out of place and are a temptation for young children to turn the knob to see what happens.

Having made up your mind about the aquarium, heater and thermostat you now require sand and plants. How much sand? If the aquarium is 12 in. from back to front you require 1 lb. of sand to every inch in length; thus a tank 24 inches long will require 24 lb. of sand, 30 inches 30 lb. and so on. This will give you 2½ to 3 inches depth along the back and sides, sloping to an inch in the front. Besides giving you depth for planting where you want it the slope encourages the sediment to fall to the front from where it may be easily removed. Before putting in your sand it should be thoroughly washed in running water. When this is done (if you are using the flexible heater, this should be laid in the bottom of the aquarium first) and the sand is in the tank as described above, procure a piece of clean plywood and lay it on the sand. On to this you pour your water slowly and you will find that the plywood will rise with the water, without disturbing the sand, and the water will be crystal clear to start with. Fill the aquarium to within 3 inches of the top. If you are using the glass heater and thermostat, place the heater in the back left-hand corner of the aquarium and the thermostat in the right-hand corner and connect the wires as directed; these can hang out of sight down the back.

My recommendation for plants is one *Vallisneria* (grass-like plant) every inch along the back and six for each back corner; these will hide the heater and thermostat. There are two types of *Vallisneria*, the twisted (*Vallisneria spiralis*) and the straight (*Vallisneria spiralis*); of the two I recommend the twisted. It has a much broader leaf and is a darker green. These should be sufficient oxygenating plants to start with; if you wish to buy more, do so. The aquarium will be all the better to look at and beneficial to the fishes. There are a number of *Cryptocoryne* and other decorative plants that you can finish off with, and these can best be seen in the dealers' tanks and he will be able to explain to you what they are.

There are two methods of putting your plants in. The first is to roll up your sleeves and push the roots into the sand with your fingers, or you can make or buy a pair of planting rods; these have a V cut in one end. Hold the plant down with one rod (using the V cut) and with the spade end of the other rod press the root well down, spreading the roots as much as possible; this is the method I always use. If you want to put rocks or even large pieces of coal in for effect place them in position before putting in the sand; do not place them on top of the sand. I have had two large pieces of coal in a tank, set up as I have described over 6 years ago, and this tank has never been stripped down and the water keeps crystal clear and the fish are perfectly happy and breeding. When you have placed in your rocks and finished planting you can top up your tank with hot or even boiling water, but be careful to pour it in very slowly. Do not use the plywood for this as if the water is very hot it could splash off and crack the glass; this heating of the water will save your heater a lot of unnecessary work. Buy an aquarium thermometer for the checking of water temperature.

Our next important item is lighting. As there are so many types of reflectors and all-over covers on the market I must leave it to your dealer to show them to you. For a 24 in. aquarium I would recommend two 40-watt lamps alight for at least 10 hours a day. If you are like me you will switch them on when you rise in the morning and off when you retire at night. Please do not think that this is a waste of electricity, because the lamps give a fair amount of heat, which warms the surface of the water. This heating of the water from above will cause the thermostat to cut out your heater, which, were it not for the lights, would be consuming 100 watts of electricity. The lights also keep

the plants growing and healthy to the benefit of the fishes, as, like the garden plants, they require plenty of light to keep them growing. The more they grow the more waste do they take from the humus in the sand, keeping it fresh, and the more oxygen they will disperse into the water.

There are a number of paper designs that could be stuck to the back glass but, personally, the back and sides of all my tanks are painted cornflower blue; I have tried all colours but I think that blue is a colour that does not clash with any of the varieties of fishes that may be chosen. Position of the aquarium is governed by the lay-out of the room, but I suggest the darkest corner, which is invariably opposite the room door and looks nice and cheerful when you enter the room on a cold winter night, even if there is no fire in the room. I do not suggest that you put it in front of the window, unless you are prepared to take down and put up the curtains and clean the windows when required and maybe stop the outlook to a nicely laid-out garden!

Here are a few do's and don'ts which will help you to be a successful fishkeeper.

#### Don'ts

- Don't overfeed is most important. Don't feed late at night.
- Don't give fishes double the amount of food one day if you have forgotten to feed them the day before. Don't worry if the temperature fluctuates by 1° or so; the average temperature should be about 75°F.
- Don't put hot water in the tank should the heating fail for some reason; rectify the heating fault as quickly as possible and let the temperature rise gradually; even if it is down to 45°F this is by far the best and safest way of saving the majority of the fishes, but you may lose the weaker ones.
- Don't worry about leaving fishes while on holiday if for no longer than 2 weeks; there is usually plenty of *Daphnia* about at that time of the year so for about a fortnight before you go feed them well (not excessively) on live foods, siphon off the sediment on the sand and in fact have a general spring clean and check heating arrangements. If you are working a thermostat connect your lights into the same plug that is on your heater so that while your heater is switched on the plants will get the benefit of the light and will not be set back for lack of light. Then go and have a good holiday and let your fish have one as well; they won't starve and will be looking just as healthy as you and ready for a meal when you return.
- Don't use water that has to come through copper tubing; make sure that all water used comes through iron or lead pipes. There are plenty more don'ts but these in my opinion are the most important ones.

#### Do's

- Do have a glance at your thermometer before you leave home in the morning; heaters have a nasty habit of breaking down on a cold winter's night when they are working for longer periods, and if left till the next evening when you discover the trouble you will also find that the shops are closed; the answer is to have a spare heater. They are like electric-light bulbs and break down without any warning.
- Do keep your tank topped up; nothing looks worse than a water level an inch or so below the top angle bar.
- Do have a check on the fishes before you buy them; choose ones with upright fins, clear bodies and a good swimming attitude, not ones skulking in the corner or with fins all closed and shrunk up.

(To be continued)

# AQUARIST'S Notebook

by  
RAYMOND YATES



**T**HE red-nosed tetra (*Hemigrammus rhodostomus*) is a fascinating fish to keep in the tank. Unfortunately it is not always available and is never cheap as tetras go. I have found them most sociable fish, which are not easy to scare; in fact, they have a rather insolent way of going where they want, when they want, as if to say, "Make way for a person of pedigree." They are decidedly dainty feeders and do not rush in with the coarse manners of herbs or even many tetras.

They are usually shown in public aquaria in small, over-planted tanks where there is little room to move. In such conditions they tend to remain motionless for long periods and lack interest. Give them a large, roomy tank and they will enjoy its length of swimming space, its shoal formation, preferring the lower two-thirds of the water depth. They particularly enjoy an aerator, the addition of new water and also a quiet, dark corner to which they can retire at will.

The red in the nose varies from fish to fish; in some it is very obvious and in others much less noticeable, although I have not observed any day-to-day change in my own fish as has been suggested by other writers. This tetra is rather longer and thinner than the majority of the members of this genus, the female being about half an inch longer than her partner. The striped tail gives one a vague impression of the scissor-tail: the black bars on the tail lobes are on the slant in some specimens but straight in others. Between the head and the tail the fish is merely a silvery olive with a yellow tinge which is not unlike the yellow tetra, commonly called the "Jemson."

A temperature of 70° to 85°F suits them very well although 74° to 82°F is probably better. Spawning these fish and rearing the fry is still an art although it has been done. The red-nosed tetra is very partial to *Daphnia* but will take most foods if fine. Shrimp, including brine shrimp, is useful in the earlier stages. Coming from the upper waters of the Amazon, this variety is quite happy with clear water about pH 6.8. If you have not yet kept this interesting fish take the first chance that comes your way to get a pair. This is one of the few instances of being able to take an interest in red-heads without risk of domestic trouble.

There is an amusing extract from a book *May this house be safe from tigers* (by Alexander King) in *Fin Fun*. In chapter two, Mr. King deals briefly with his unfortunate experiences in the world inhabited by tropical fish. With one or two slight amendments of Americanisms from the original, Mr. King relates: "Once, quite a while ago, I was for some reason or another pretty deeply involved in raising hundreds and hundreds of tropical fish, and I must say I derived a great deal of fun and even satisfaction out of this expensive pastime. But I finally had to give it up, because early one morning, while I was watching the spawning of *Poecilia galaxias*, a shattering flash of illumination came upon me. To tell you the truth the effects of that bitter moment of enlightenment have never completely faded from my mind. Even now, I sometimes still find myself under the unhappy spell of it, although it all happened more than 30 years ago. Yes, to this very day, I always manage to pass the façades of the various pet shops in town in something close to a double trot, just out of fear that I might get an accidental glimpse of their suffocatingly overcrowded aquaria.

"You must understand that it's not that I'm afraid of being tempted back into my costly hobby again. No, no! Not a bit of it! Quite the contrary. It's only that I can no longer bear to look at all those dopey fish opening and

closing their mouths a million times a day. It just gets me down. It gets me down because I know that the poor blighters aren't simply breathing or gasping for air. I know for a fact they're all really screaming, screaming like crazy. Yes, screaming and giving off heart-breaking, soul-shattering submarine howls. Anil, do you know what it is that they're all shouting? They're shouting, 'Look at ME. Please LOOK at me! I'm so original! I'm so irreplaceable! I'm so darling! I'm so cute! Just look at ME and see how unique I am. Look at me and love me! Love me! Love me! Why don't you love me? Please. Please!' That's what those poor blighters are saying. It's awful. And what makes it so terrible for me is that I know only too well that that's exactly what everybody else all around me is constantly saying, too. I just don't care to have a swampland of pop-eyed, screaming fish go on reminding me of it all the time."

There seems little doubt that Mr. King knows his fish and his remarks are just as apt for fish behaviour here as in U.S.A. However, fish being the crafty creatures that they are let us down when we most need their theatrical talents, when entered for a show or when the important aquarist friend comes round to "see the fish." Do they play up, then . . . not on your life. I always remember one lady hobbyist who entered a furnished tank complete with a dozen flying foxes (when these fish were first obtained) and who failed to get a prize. The judge, when asked why, mentioned that no fish were to be seen in the tank!

Snails are a pest but you should have at least one tank where they are on view. There is no doubt the sight of a few attractive snails helps to bring to life a well set-up underwater scene and they add a note of reality to what might otherwise seem too artificial. Snails are seldom if ever still and their meanderings cannot fail to attract the notice of the visitor. Crushed snails are relished by almost all tropicals so any surplus can be put to good use. Few snails have any practical value to the aquarist but they do little damage and any that do are easily removed. I agree that snails are not wanted in breeding tanks for egg-layers, but this does not put them out of court generally. Many aquarists suggest that snails make a great deal of dirt in the tank. They certainly add their quota but it joins the muck of the tank floor and is welcomed by the plants. Much that is unwanted in the aquarium is consumed by the snails, from fish-food left-overs even to such things as dead fish. Of all the snails available the best in my opinion is the Malayan trumpet snail. This you have to buy, or have given you, because you will never find it sticking to any plants which come your way as with other snails. Once you have bought some Malayan snails you have them for life, as they multiply quite rapidly although this is not always observable. The reason for this is because this snail spends most of its time in, on or under the gravel and is seen on the tank sides only after dark or when a light is suddenly switched on. Like most snails they tend to die round the heater, perhaps more than usual owing to their burrowing habit. They are also more easily lost when siphoning out the detritus as they are very lightweight and are quickly sucked up the tube with the grit. A quick

search through the gravel which has been so removed will often disclose several of the snails, but the minute youngsters are too small to see against a matching background and are lost. It will be seen that over-population never occurs. I have yet to see any fishes take the slightest notice of them. When purchasing them make sure that all those passed on to you are alive; as they have to be scooped out of the gravel it is possible for empty shells to be obtained. The dark-red flesh of a living snail is always visible on inspection, and if the snails are put in a small jar of warm water they will quickly demonstrate the fact that they are always on the move. Malaysians are warm-water snails and cannot be kept in lower temperatures for any length of time, so they are useless for coldwater aquaria.

Most aquarists know of the risk which exists of a turned-off aerator "running back" when it is below the water level of the tank. It does not often occur but it can. Either keep your aerator above the water level or remove the air pipe and stone when switching off. I always do the latter, after having had one or two very nasty "run-backs." I had a narrow escape the other day with a coldwater tank. I had siphoned off all but 4 inches of water and had put in the end of a hose pipe to re-fill. When I turned on the water the pressure was too much for the very ancient and rather rotten hose connection and it broke off and fell to the floor. I turned off the water and went indoors for something to cut the rubber with neatly and found on my return that the hose had siphoned back the tank water on to the floor and my big fish were floundering in not more than 1 inch depth. All ended well but it was a good job I was not delayed.

I often wonder what happens to all the hundreds of tortoises one sees for sale, when winter comes. Most have found an owner. Just what do these owners do with them with the onset of winter? Hibernation is a must for the creature. Most are kept by children or for children to whom the mysteries of hibernation mean nothing. Tortoises which have sunk into their deep sleep must not be artificially awakened before the proper time or they will not survive. Many children are too impatient to understand this or too careless to worry usefully about their pet's welfare. Ideally a deep hole in the ground is needed, out of the reach of frost and rain and rats, with a covering of dead leaves in quantity. An outdoor shed will do if the animal is kept in a box and suitably protected from the elements and rats. They can, of course, be kept in the house, preferably in a colder, little-used room where they are unlikely to be disturbed by visitors or temperature changes. When your pet awakes in March he will need drinking-water and the eyes will require bathing with warm water. Shells can be polished up with olive oil to give a well-groomed effect. Sometimes the mouth needs bathing. Ticks are often found on newly imported tortoises and often the dealer removes these before sale. Adhering to the neck or underparts these can be easily removed by touching them with a brush dipped in turpentine. Sex of the tortoise is mainly immaterial but as a general rule if you must know it is the male who is carinate on his under shell, the curve being slightly inwards, the female's being flat.

Since the fire at Belle Vue Zoo, Manchester, there has been considerable rebuilding and alteration. Considerable changes for the better have been made in the catering sections and also in the amusements. Some of the animal houses have been completely changed and many of the birds on show have now much better quarters. The bears have new pits behind the firework arena and the monkey house is now really good. No changes appear to have been made in the Aquarium as yet, which has 29 tanks, almost all of

them for tropicals. When I went round in August last there was a representative selection, with a number of African fishes, but no new additions of particular interest. The plants were not in good condition. Public-aquaria authorities have it both ways, because in winter they argue that it is the off season and in summer they find staff holidays and rush conditions against them. Belle Vue is a good example because there the staff have many other things to attend to besides looking after the fishes, the popular children's zoo being a case in point. One tank contained tiger barbs, clown loach and clown barbs. The result was unsatisfactory; contrast was missing.

It has been suggested that nowadays there are fewer aquarists than formerly, compared with the peak years of 1950-1953. I am not at all sure that this is true. Granted that clubs are no longer flourishing, and that shows are few and far between compared with days gone by. After the war there was a great upsurge in the hobby and there was considerable clamour for fishes, equipment, clubs, shows, speakers and judges. More or less from scratch all these things were found. Enthusiasts wanted information and were not satisfied until they got it. The demand called for the supply and dealers were able to provide in due course almost every gadget imaginable. Clubs provided lectures and lecturers and the urge to show off was met by shows all over the country. The position now is different. Newcomers to the hobby have everything ready and waiting for them. Equipment such as was undreamed of in the early days of the hobby, numerous varieties of fishes, much lower prices than obtained a few years ago and numerous up-to-date and really expert books with everything about the hobby from A to Z. The small band of enthusiastic hobbyists who knew all the main angles on fish-keeping in 1945 has now increased to many thousands of really competent aquarists. It is true that some have left the hobby: the disillusioned incompetent, the "get rich quick" type and the "pet hunter."

I must admit I am not fond of competitive shows, although I realise that human nature being what it is few shows could be attempted without this element. A non-competitive show really presents the hobby at its best. Unfortunately, the risks of losing fishes militate against it. Nowadays shows rarely offer the wonderful specimens we used to see; what has happened to them? The answer is simple; owners no longer care about risking their valuable fishes for no real purpose. Shows to-day are mainly entered by the relative newcomers whose fishes are good but nothing extraordinary. We all know the chap who points to the best fish in the show and mutters "Look at it, I've got half a dozen better than that at home." Time was when you smiled at this; to-day he is right. He has better fishes, so have you. Coming back to numbers, you will find that dealers are not going out of business, not really complaining. Why not? Because if you know them well and ask them they will tell you that they still have loads of enthusiastic customers; not the experienced know-all variety out to impress, but the stolid, solid backbone of the hobby. The tumult and the shouting has died but the hobby goes on.

I remember years ago writing about a large angel of mine which had managed to trap itself behind a rock and had died uselessly and stupidly. Recently the same thing happened again. If you must put rockery in your tank, and we all do, so arrange it that it is quite impossible for any fish, however large or small, to wedge itself in any crevice or between the rockery and the glass. Many fishes are curious but some are bullied into hiding and push themselves into positions from which a backward retreat is impossible. Deny them any chance of this. Neons are experts at this form of suicide.



## OUR EXPERTS' ANSWERS TO TROPICAL AQUARIUM QUERIES

Can you please give me a rough idea of the life span of *Corydoras* catfish?

Generally speaking, *Corydoras* catfish have a life span of at least 5 or 6 years.

A few days ago I added some mollies, *Mollynia schottlandi* and Malayan angel fish to my beautifully planted aquarium. Now to my dismay most of my plants have been nibbled down to the bare stems. I am away from home most of the day, and have not been able to discover the culprit or culprits. I wonder which species is causing such havoc in my tank?

Mollies like to browse on algae and will soon clear a tank of duckweed. Malayan angel fish will nibble at delicate foliage, and often chew the tips of underwater grasses, but they do little visible damage in a large, thickly planted aquarium. The *Mollynia*, however, will clear a tank of all plant life within a very short time. Long ago we made the experiment of submerging pots of moisture-loving house plants such as *Tradescantia* and *Philodendron* in a tank housing a pair of *M. schottlandi*. In less than a week, all the leaves had been stripped and eaten from the stems of the plants. We now keep *Mollynia* in an unplanted tank, and satisfy their insatiable appetite for green food by giving them lettuce, chopped cabbage leaves and similar vegetables from the garden.

A tank inhabited by a pair of *Cichlasoma* *seazon* has become overgrown with a slimy blue-green alga. What can I do to get rid of this unsightly pest?

Blue-green alga is not always easy to eradicate from a tank. It is encouraged to grow by leaving the rich droppings of the larger cichlids to accumulate and act as a fertilizer on the floor of the aquarium. What's more, an alkaline condition of the water will cause it to flourish. In the first place, you must remove as much of it as you can from the aquarium. Then do not neglect to keep the bottom free of excreta and other debris by frequent application of the dip-tube. Give the fish live food in preference to dried food, and acidify the water if it is at all hard by straining it through waterlogged peat. A thick carpet of floating vegetation with vigorous roots, such as Indian fern or *Saxifraga* *fraxinosa*, will help to absorb some of the nutrients upon which such growths prosper.

I have noticed a worm-like creature in my aquarium, and wonder whether it will harm the fishes? It is brownish in colour, and seems to adhere to the glass and move over it in looping movements by means of a sucker at its blunt end. Fully extended, this creature measures about 1 1/2 in. long.

We think that the creature you have noticed in your aquarium is a leech, probably introduced on a plant. As a rule, the leeches we occasionally find in our aquariums are harmless to fishes, but they can cause havoc among fish eggs. It would be best to remove the unsightly though interesting creature from the aquarium as soon as possible.

I am going to set up a tropical tank in the near future. I have a quantity of crushed white coral, and wonder whether this would be all right to use as a bedding medium for the plants?

We do not advise crushed white coral as a planting medium. Food will probably get lodged in the interstices, decay and pollute the water. Furthermore, it is unlikely that the plants would root well in it. Washed coarse sand from a stream bed, or the bagged compost sold by reputable aquarium dealers, is the most satisfactory planting medium to use.

Will the White-Cloud minnow flourish in acid water? I have been told that the species must have alkaline water. Is this correct?

The White-Cloud Mountain minnow is a most adaptable little fish, and though it probably prefers alkaline water, it will live and breed successfully in acid conditions. The temperature of the water seems of more importance to this

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

fish than its pH value. It succeeds best at a temperature in the middle sixties or low seventies than in truly tropical conditions.

I have a large black female mollie that has developed an ulcer or open sore on her side. How should I treat this trouble, please?

Take the fish out of the aquarium and spot-treat the sore place with a medicament such as iodine or T.C.P. Keep the fish in a scrupulously clean, well-aerated aquarium, and make sure that its diet includes plenty of live and green food. A few weeks' convalescence in a hospital tank with a level teaspoonful of evaporated sea salt added to every gallon of water in it will prove beneficial.

Would a tank measuring 18 in. by 10 in. by 10 in. be large enough to spawn a pair of *Pomacentrus* *arthurii*?

A larger tank would be preferable, but if your fish are in ripe spawning condition they will not think twice about laying eggs in your small aquarium. It must be appreciated, however, that the fry will soon outgrow a small container, and unless they are transferred to a larger aquarium as soon as possible they will die of suffocation.

I have a large tropical tank in which I have built a raised rock shelf bedded with peat. I should like to grow some decorative terrestrial plants on this platform. Please can you give me the names of some plants that would flourish in such a permanently boggy situation?

*Tradescantia* (in variety), *Pilea* *pumila*, *Heliconia*, *Philodendron* *scandens*, *Aglonema* and *Selaginella* should do well in such warm, boggy surroundings. But there should be at least 9 in. of air space between the cover glass and the bog shelf to accommodate the foliage. And if electric illumination is used, make sure that the lamps are not so close that they will scorch the leaves.

## KING SNAKES

(continued from page 144)

body. The width of the various bands has varied on the several specimens I have kept; those with wide bands of coral red and bright yellow, have, in my opinion, been unsurpassable.

The best food for these smaller king snakes (the two species just described seldom exceed 2 feet), is possibly lizards or pink mice. The bright coloration is mimicry. They tend to mimic other snakes which are poisonous; for instance, the coral king snake mimics the coral snake (*Micrurops* *fasciatus*). Harmless animals frequently adorn themselves with very bright colours and red and yellow are warning colours in nature. The bright yellow and black of the spotted salamander (*Salamandra* *salamandra*) and the red ventral region of the fire toad (*Bombina* *bombina*) will be familiar to most readers.

The cost of the king snakes is likely to be at least 4 pounds for a good-sized specimen. Despite this somewhat high cost they have remained popular, since collectors know that, nothing unforeseen happening, they will live for many years. They also make very reliable pets and I have no hesitation in recommending them to anyone. Many a king snake has proved an excellent ambassador for reptiles in general and won someone over to our fascinating hobby.

## our readers



# write

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

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

### Goldfish Nomenclature

I'M glad to know that Mr. N. E. Perkins and I agree on the terms metallic, nacreous and matt, but why did he have to go back 8 years in an obvious attempt to "have a go" at me, particularly when his example had nothing to do with the point? The term "scaled" was still used by the G.S.G.B. when Mr. Snell made his observations and even to-day is used by Bristol A.S. I used it myself when I talked to the Bristol aquarist. My adverse criticism was for the misuse of G.S.G.B. terms.

Mr. Perkins is off beam on the second point in my letter. He stated (April, 1960) that when the G.S.G.B. first classified goldfish into metallic, nacreous and matt (1948) he did not think this "entirely accurate." Mr. Perkins was a keen member of the Society at this time but I cannot find anybody who remembers hearing his statement at the time. Now in his last letter he says that Miss Morris' fish have "an unfortunate likeness" to the fish previously referred to.

I have been working on the inheritance of reflecting tissue for the last 6 years using specimens kindly given by Miss Morris as well as the more well-known types. However, I must remind Mr. Perkins that he started the discussion by hinting that he and others knew more about the inheritance of reflecting tissue in 1948 than the rest of us. Let us have the facts, Mr. Perkins, not evasions.

The reply to the kidney problem is another evasion. What deductions? What established knowledge?

Discussions in these columns can be useful for the writers and readers but only if we all keep to the point.

R. J. AFFLECK, M.Sc., Ph.D.,

President, The Goldfish Society of Great Britain.

### A Travelling Set-up

AS a professional soldier I am compelled to change my residence every few years. In view of this, it is obviously impossible for me to more than hover on the fringes of the hobby, since a large and intricate set-up such as would please me most is patently denied me. However, despite these circumstances, I have been able to establish a portable outfit which consists of six small tanks, using the "nesting" principle. The sizes of the tanks are: 18 in. by 12 in. by 12 in., 16 by 12 by 10 in., 14 by 10 by 10 in., 12 by 10 by 8 in., 10 by 8 by 8 in. and 8 by 6 by 8 in.

A moment's reflection will reveal that not only do these tanks nest together satisfactorily, but when in use they can be conveniently housed on two shelves 30 in. long; the three smaller go together on the lower shelf and the 14 in. and 16 in. tanks are on the higher shelf. The 18 in. tank is kept in the living room as a community tank. It will

further be seen that the five smaller tanks can be controlled by an outside thermostat, with these heaters: 16 in.—100 watt; 14 in.—75 watt; 12 in.—50 watt; 10 in.—30 watt; 8 in.—20 watt.

By using this method, one such as I, not over-endowed with this world's wealth, can get by with just two thermostats. The other, of course, is used in the display tank.

CORPORAL M. J. MOORWOOD,  
B.F.P.O. 16.

### Polythene Pond



THE small pond pictured in my garden measures 4 ft. 6 in. by 2 ft. 3 in., and is about 10 in. deep normally. It was put in just 2 years ago and the whole job took 90 minutes and cost 10s. 6d. The essentials for such a pond are: a hole, a piece of heavy-grade polythene, 6 ft. by 9 ft., and some broken flag-stones. If the hole is made carefully, and preferably when the soil is moist, the top corner will be firm and a neater job will result. The polythene is laid in carefully and corners are folded to make a waterproof box. The overlap, which I preferred to keep fairly wide, but probably unnecessarily, is held down with the flag-stones. Gradually the garden plants have crept around it, and as can be seen, it has blended well into the scene. The first winter it withstood freezing to a depth of 3 to 4 inches, with two goldfish locked under the ice, and was frozen

again last year. At the moment it has a second spawning of goldfish, about 3 weeks old.

A word of warning—do not plant raspberry canes within yards of a polythene pond! I thought I had removed all the roots, but a shoot has burst the top edge and others are showing round about, so I expect to have to dig out the whole lot very soon. For any of your readers who do not relish the very hard work of making a formal concrete pond I can thoroughly recommend the polythene one, and feel sure that they will last for many years—if raspberry shoots are absent!

A. DAVIES, Stafford.

#### Overcrowding

I AM a boy of 13 years of age, therefore my knowledge of fishes may be somewhat limited.

I own a 24 in. by 12 in. by 12 in. aquarium and I have an expensive piston pump; in my tank I have one 3 in. bream, four 6 in. roach, five bullheads and a number of crayfish.

Surely by all normal standards this aquarium is outrageously over-stocked, but yet the fish are all healthy and apparently quite happy; I know the aerator may help, but not to such an extent. What I am trying to say is that one can keep more coldwater fishes in a tank than was ever imagined. I have read in a past issue where a reader asked if two 3 in. rudd could live in a tank such as mine. The reply was that they would have to be removed when they grew a bit larger. I have proved this wrong because in past years I kept six smaller specimens in an 18 in. by 10 in. by 10 in. tank without aeration. This is not meant in any way as an insult to your magazine, which I believe to be an excellent one, but I have tried to prove that there is no need to be "snodgy" about room in your aquarium.

I might add, too, that the fishes do not in the least appear crowded and if the fishes are not too large it improves the tank.

T. HERRI, Northampton.

#### Community-Aquarium Spawning

I WAS very interested to read Mr. H. Rushton's letter in the July issue about the spawning of his dwarf cichlids, *Pelmatochromis kribiaensis*, in a community tank. I have had a similar experience. My tank holds approximately 32 gallons, and contains 40 other fishes, ranging in size from neon up to red-tailed sharks and large catfish, apart from an adult pair of *P. kribiaensis*. Seeing these fish digging at the rear centre of the tank, I encouraged them by placing a small flowerpot over the chosen spot. Within a few days I was quite pleased to see the parents squiring a brood of about 50 young around the tank, fighting off any fishes that approached too closely, but harming none. I allowed the parents to raise the young for 1 month, then removed the whole brood to another tank. The actual count was 52. The parents are still in the community tank, preparing for spawning number two.

D. DENOS, Birmingham, 8.

#### Sticklebacks

REFERRING to "Aquarist's Notebook," in the August issue, on the necessity of live foods for sticklebacks, you may be interested to know that I have a ten-spined stickleback caught locally last March, and kept in a 20 in. tank with two 3 in. goldfish and a N. American catfish. In rainwater at room temperature these fish have received a variety of dry foods, with a very occasional meal of white worm. The stickleback shows very little interest in any dry food, and is only able to snatch one or two of the worms. After nearly 6 months in these conditions the stickleback is very active, in good colour and looking better than when introduced into the tank.

E. J. RUTTER,  
Hamstanton, Norfolk.

## The AQUARIST Crossword

Compiled by J. LAUGHLAND



#### CLUES ACROSS

1. Terror if seen (anagram) (5, 4, 3)
10. Paced in the year (4)
11. Flag for our life (4)
12. Egg-laying (3)
13. Short N.C.O. (3)
14. Author of *Treasure Island among the girls* (1, 1, 1)
15. Goggles' tail the seams (3, 1)
16. Yorkshire dogfish? (4)
17. *Le cause* (anagram) (7)
18. Tree that has lived longer, perhaps (1)
19. Pictian lion face before peasant appears (5)
20. Original home of the jewel fish (6)
21. Relating to high mountains (5)
22. Death (3)
23. Afterthought (1, 1)
24. One of the great divisions of Australia (1, 1)
25. Life plan for a cold country (7)
26. Rudimentary form of a living thing (4)
27. Root of a stem (4)
28. Exclamation (2)
29. Paternal return of god of love (4)
30. Good (abbrev.) (2)
31. Baby tetra? (3)
32. Language of the country from which St. Patrick drove the snakes (4)

#### CLUES DOWN

1. Speckled beauty of the stream (3)
2. This gourmet sounds as if he had been in a fight (3-6)
3. Burn pip in red (6)
4. Pin (4)
5. American President of our times (1, 1, 1)
6. A little egg (3)
7. Uncle Tom's boss (5)
8. Senior service (1, 1)
9. That is this (1, 1)
10. Sea beast (3)
11. Pouch for liquid (3)
12. Not quite ripe (3)
13. Not quite yellow (4)
14. But this fish is yellow (4)
15. Less than lean to bring forth young (3)
16. Preying (6)
17. If you know your Ripley you know this poem (2)
18. This fish is no good in the cure all mixed up (6)
19. Tangle a tree for Michaelmas daisies (6)
20. Those of you can should be waterproof if the sea is not to leak out (6)
21. Small isle (5)
22. Oref (3)
23. This is some fish, no kidding (3)
24. Fish snare (3)
25. Fish eggs (3)



# from AQUARISTS' SOCIETIES

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

**THE next meeting of the Stroudbridge and District A.S.** will be held at the Seven Stars Inn, Eye Cross on Tuesday the 19th October. The secretary is Mr. H. Oliver, 15, Beck Hill St., Quarry Bank, Bicester 164, Staffs. and new members will be welcome.

**AT the last meeting of the Dundee Aquarium Society** the final table show was held to decide the winners of the Scott Trophy. The placings were as follows: 1, A. R. Bell, 16 pts.; 2, P. N. Greening and G. B. Kirkland equal 10 pts.; 3, A. Cross, 8 pts. The Society meet in the Y.M.C.A., and the secretary is Mr. G. B. Kirkland, 2, Kensington Crescent, Banchell.

**RECENT activities of the Bradford and District A.S.** have included a show of colour transparencies by Mr. K. Smith and a talk by Mr. Hodgson of Skipton on "Air-Lifts for Ponds and Aquaria." The annual dinner will be held on the 25th November.

**AT the last table show of the Merseyside A.S.** a selection of fishes was provided for the members to judge. The official judges then gave their decisions on the fishes, announcing how the points were obtained, which gave the members an opportunity to compare their own findings with those of the judges. An interesting talk on "Water Life and the Naturalist" was given recently by Mr. Eric Hardy, and was illustrated with colour slides. The new show secretary is Mr. W. R. Hare.

**THE second Annual Open Show of the Oram A.S.** was held recently with 247 entries which comprised over 80 varieties of fish. The results were as follows: **Partial Aquaria:** 1, H. Penhall (Oram); 2, K. Collins (Oram); 3, J. Collins (Rochdale); **Amphibians:** 1, K. Williamson (Rochdale); 2, J. Hodgson (Barnley); 3, K. Ridd (Bradford); **Fishers:** 1, J. Cook (Blackpool); 2, R. Revell (Middleton); 3, J. Hodgson (Barnley); **Birds (small):** 1, K. Whitaker (Oram); 2, J. Cook (Blackpool); 3, J. Hodgson (Barnley); **Birds (large):** 1, H. Wainwright (Middleton); 2, B. Dore (Blackpool); 3, L. Lewis (Barnley); **Larvae and Shards:** 1, H. Wainwright (Middleton); 2, E. McKown (Oram); 3, C. Walker (Ollham); **Charaxes (small):** 1, K. Collins (Oram); 2, W. Holland (Barnley); 3, J. Hodgson (Barnley); **Charaxes (medium):** 1, J. E. Shore (Oram); 2, W. Holland (Barnley); 3, J. Hodgson (Barnley); **Charaxes (large):** 1 and 2, H. Wainwright (Middleton); 3, H. Williamson (Oram); **Snappers:** 1, L. Wainwright (Middleton); 2, J. Hodgson (Barnley); 3, K. Whitaker (Oram); **Cichlids (small):** 1 and 2, K. Whitaker (Oram); 3, B. Dore (Blackpool); **Cichlids (large):** 1, H. Brockton (Ollham); 2, J. Cook (Blackpool); 3, R. Collins (Oram); **Cichlids (very large):** 1, R. R. Walsh (Blackburn); 2, L. Lewis (Barnley); 3, J. Hodgson (Barnley); **Tooth cups:** 1, J. Hodgson (Barnley); 2, W. Holland (Barnley); 3, K. Williamson (Rochdale); **Loaches:** 1, B. Dore (Blackpool); 2, J. Hodgson (Barnley); 3, H. Wainwright (Middleton); **Catfish:** 1, H. Williamson (Oram); 2, G. Platt (Oram); 3, J. Hodgson (Barnley); **Swordtails:** 1, L. Wainwright (Middleton); 2, L. Lewis (Barnley); 3, R. R. Walsh (Blackburn); **Molluscs:** 1, R. Collins (Oram); 2, L. Wainwright (Middleton); 3, R. Collins (Oram); **Plants:**

1, R. Revell (Middleton); 2, L. Wainwright (Middleton); 3, R. Collins (Oram); **Guppies:** 1, R. Dore (Blackpool); 2, P. Wainman (Barnley); 3, P. Eason (N.G.P.S.); **Breeder's egg-layers:** 1, B. Dore (Blackpool); 2, J. Hodgson (Barnley); 3, R. Hodson (Rochdale); **Breeder's livebearers:** 1, J. Cook (Blackpool); 2, J. E. Shore (Oram); 3, R. Shaw (Ollham); **A.O.V.:** 1 and 2, H. Wainwright (Middleton); 3, J. Hodgson (Barnley); **Pair egg-layers:** 1, H. Wainwright (Middleton); 2, J. E. Shore (Oram); 3, B. Dore (Blackpool); **Pair livebearers:** 1, R. Collins (Oram); 2, J. E. Shore (Oram); 3, R. Shaw (Ollham); **Goldfish:** 1, S. Taylor (N.G.P.S.); 2 and 3, J. G. Euston (N.G.P.S.); **Shubunkins:** 1 and 2, J. G. Euston (N.G.P.S.); 3, S. Taylor (N.G.P.S.); **Veinals and fantails:** 1 and 2, J. G. Euston (N.G.P.S.); 3, H. Penhall (Oram); **Ornate and Loricata:** 1 and 3, H. Penhall (Oram); 2, J. G. Euston (N.G.P.S.); **A.O.V. Coldwater:** 1, 2 and 3, H. Penhall (Oram).

**The Oram Annual Achievement Trophy,** presented by Norman Wright was won by R. Collins in a very close finish. The Best Fish in the Show was an *Astronotus ocellatus* exhibited by R. B. Walsh of Blackburn and was awarded the Wild Dropper, presented by G. E. Wild and also an F.N.A.S. Diploma. The Whitaker Trophy was presented to the Best Coldwater Fish in the Show, a shubunkin, exhibited by J. G. Euston of the Northern Goldfish and Pondkeepers Society. The Variety Rose Bowl, presented to the Best Pair of Fish in the Show was awarded to H. Wainwright of Middleton, for a pair of *Barbus labeo*, which also were awarded an F.N.A.S. Diploma. Diplomas were also presented to Bill Dore of Blackpool for a Breeder's team of *Neonolunatus* redstarts which were adjudged Best Breeder's Team in the Show and J. E. Shore for an *Ampiphetes* (varied) which was adjudged Best Ocean Exhibit in the Show. The Oram Trophy was awarded to Mr. H. Penhall for the best furnished aquaria.

**THE results of the East London Aquarists and Pondkeepers open show** were as follows: **Club Furnished Aquaria (Tropical):** 1, Walthamstow and District Society, 84 pts.; 2 and 3, Chingford and District, 83 pts.; **Club Furnished Aquaria (Coldwater):** 1, Walthamstow and District Society, 77 pts.; **Individual Furnished Aquaria (Tropical):** 1, E. D. Jessop, 82 pts.; 2, A. Field, 76 pts.; 3, A. Fairweather, 75 pts.; **Plants:** 1 and 3, W. Bannage, 2, A. Stubbings; **Plants (A.O.V.):** 1, D. Bostwell; 2, W. Bannage; 3, B. Stubbings; **Livebearers (Breeder's):** 1, W. Ryan; 2, A. Jessop; 3, C. Polesman; **Egg-layers (Breeder's):** 1, R. Castle; 2, J. Wyke; 3, H. Barlow; **Coldwater (Breeder's):** 1, 2 and 3, P. Adams; **A.V. Guppy (Male):** 1, B. Gardiner; 2, H. Tronell; 3, J. Cobden; **A.V. Guppy (Female):** 1 and 3, A. Stubbings; 2, G. Baker; **A.V. Platy (Female):** 1, A.V. Swardfish (Pair); 1, W. Ryan; 2, C. Polesman; 3, J. Wyke; **A.V. Molly (Pair):** 1, A. Stubbings; 2 and 3, D. Ellis; **A.V. Characin (Single):** 1, P. Eason; 2, P. Adams; 3, D. Cooper; **A.V. Barb (Single):** 1, J. Cook; 2, W. Ryan; 3, D. Coomb; **A.V. Barb (Pair or W.J. Minnow):** 1, W. Ryan; 2, A. Field; 3, R. Gardiner; **A.V. Cichlid (Single):** 1, J. Howe; 2, E. Myers; 3, B. Bishop; **A.O.V. Eaglefish (Single):** 1, G. Parsons; 2, W. Bannage; 3, D. Coomb; **Fishers:** 1, Polesman; 2,

1, Cobden; 3, J. Bann; **A.O.V. Labryinth:** 1, J. Howe; 2, W. Ryan; 3, A. Field; **Common Goldfish:** 1, T. Sherwood; 2, H. Berger; 3, R. Castle; **Shubunkin and Fantail:** 1, C. Polesman; 2, F. Adams; 3, T. Sherwood; **A.V. Common Goldfish, Shubunkin over 5 in.:** 1, 2 and 3, F. Adams; **A.O.V. Coldwater Fish:** 1 and 2, P. Adams.

**AT their September meeting, Cambridge and District A.S.** members were privileged to hear, through the good offices of the Workers' Education Association, a most instructive and interesting talk by Mr. Marshall M.A. (Cambs) on "The Production of Marine Plankton."

Members learned of the conditions which usually cause the great multiplication of plankton in well-defined regions, and its effect in attracting the fish population of the sea into these areas, so forming a vital link in the food chain of the ocean.

**THE Haden A.S.** were again successful at the Midland Open Show for Tropical and Coldwater Fishes. The society took first prize in the Fisheries section of the Show with an exhibit which took the form of a fully equipped bar; bottles on the shelves and glasses on the bar counter contained fish. A barrel with glass ends illuminated externally and containing plants and fish was positioned at one end of the counter. A large panel was cut into the counter front through which could be seen a large tank full of coldwater fish.

Considerable success was also achieved by members' individual entries. Messrs. Smith, Devision, Price I, and Price A, all receiving several awards. In the competition for the Midland Association of Aquarist Societies Trophy awarded for the highest aggregate of points, the Haden Society was placed second. The Society meets on alternate Tuesdays at the Labour Club, Collier Gate, Cradley. All unattached aquarists are cordially invited to any of the Society's meetings.

**THE results of the table shows held recently by the Goods and District A.S.** were as follows: **Cichlids:** 1, E. Condit (Plymouth); 2, J. N. Banks (Barnstaple); 3, J. N. Banks (Barnstaple); **Catfish:** 1, F. Dingle (Croydon); 2, J. N. Banks (Croydon); 3, J. N. Banks (Croydon); **Goldfish:** 1, F. Dingle (Croydon); 2, J. N. Banks (Croydon); 3, J. N. Banks (Croydon).

**At the meeting in between members** based a lecture by Mr. T. Wright of Stainesford, on the chemistry of water with emphasis on pH values and the hardness of water. J. N. Banks, a member, gained a third place in the Midland Counties Open Show in the Novice Livebearer class with a pair of red-eyed red swordfish. He was the only exhibitor from Yorkshire.

**THE entry of over 300 for the seventh annual show of the Dublin Society of Aquarists** was the highest in the history of the society. The prize for the best fish in the show was won by Captain G. O'Garraun Quinn, Dublin, with a *Pelmatichthys*, a first-price winner in the class for Cichlids.

A. Robbins, Bangor, Co. Down, won the reserve with an *N. brachius Gumbel*, first-price winner in the class for egg layers of under 21 inches. Other first-price winners were:—A. Spurling Jewell, Dublin; A. Robbins, St. Anne; Mrs. N. Greenbushy, Dublin; Mrs. B. Spurling Jewell, Dublin; Mrs. S. Redmond, Dublin.

**HOW to prevent the "Silent Fighting" fish** from eating its eggs when brooding was one of the interesting questions dealt with at an open evening at a meeting of Hounslow and District A.S.

**A TABLE show for egg-layers other than livebearers** was held by the Regent A.S. of Derby at the September meeting, when there was a terrific competitive entry. Mr. Frank Holloway, noted prize-winner, as leading show, was the judge and made the following awards: 1, M. Carter (tiger barb); 2, E. Everett (harlequin); 3, J. Barrell (Barbus oligolepis).

THE first meeting of the new season of the Perth Aquarist Club was held recently. A table show of characins attracted a fair entry and the leading results were as follows—1, N. Cranfield (royal terna); 2, J. G. C. Barr (vearon); 3, N. Cranfield (loracon); 4, Miss H. H. Berrinson (Rams fish). The judge was Mr. S. A. Mackenzie.

SPECIMENS of deep-water brackish ornate developed from the Bay of Biscay by the research vessel *Serra* have added a splash of colour to the aquarium at the Marine Biological Association's laboratory on Plymouth Hoe. "It is the first time we have got these deep-water ornate on display," said Dr. D. F. Wilson, deputy-director. "They are almost certainly the only ones to be seen in this country in an aquarium."

#### FEDERATION OF SCOTTISH AQUARIST SOCIETIES

A HUNDRED aquarists attended the fifth meeting of the Federation of Scottish Aquarist Societies which was held in September.

During the evening session demonstrations were given by Ian Motion, Kirkcaldy A.S., (The Culture of Live Food) and David MacKenzie, Kirkcaldy A.S. (Testing the pH and Hardness of Water). In the afternoon session short talks were given by Ian Walker, Edinburgh A.S. (Aphrosynon), David Fird, Edinburgh A.S. (Breeding Neon) and William Cockburn, Dundee A.S. (My Failures with the Angoli, while Robert Gold, East of Fife A.S. gave a display of films.

At the A.G.M. the following Officers-In-Charge were re-elected: President, Peter N. Gorington, Dundee A.S.; Vice-President, Muir Kerr, Edinburgh A.S.; Hon. Secretary, Alexander Cross, Dundee A.S.; 49 Perry Road, Montrose; Angus; and Hon. Treasurer, Gordon B. Kirkland, Dundee A.S.; Hugh Laidie, Edinburgh A.S. was appointed Tape Librarian.

The table show results were: Platina 1, Peter Harrison, Kirkcaldy A.S. (*Xiphophorus variatus*); 2, Dr. A. Carverell, Dundee A.S.

(*Xiphophorus maculatus*—Red); 3, Gordon B. Kirkland, Dundee A.S. (*Xiphophorus maculatus*—Fascioid); 4, T. Williamson, Edinburgh A.S. (*Xiphophorus maculatus*—Red). Barbicent, James and tropical tetras: 1, Dr. R. E. Evans, Alloa A.S. (*Rasbora daniconius*); 2, F. Goodison, Kirkcaldy A.S. (*Danio malabaricus*); 3, R. Venters, Kirkcaldy A.S. (*Tetraodon albanus*); 4, William Cockburn, Dundee A.S. (*Rasbora daniconius*). *Synbranchia*: 1, J. Smith, Kirkcaldy A.S. (Blue); 2, J. Gamblell, East of Fife A.S. (Red); 3, R. Venters, Kirkcaldy A.S. (Red); 4, David MacKenzie, Kirkcaldy A.S. (Blue). *Gouramis*: 1, R. Woods, Alloa A.S. (*Trichogaster trichopterus*); 2, Robert Cooper, Kirkcaldy A.S. (*Colisa labiosa*); 3, David Warran, Glenrothes A.S. (*Heterotis niloticus*); 4, H. Jones, Kirkcaldy A.S. (*Colisa labiosa*). Best fish on show, Dr. R. E. Evans, Alloa A.S. (*Rasbora daniconius*).

THE Essex, North & East London Aquarist Association is organising the Aquaria Section of the Hackney Borough Fair, Flower, and Aquaria Show on Saturday, 26th November. Details from Show Secretary Mr. B. Sumner 111 New Road, Chingford, E.4. Other Association activities are table shows, lectures, quizzes and social etc.

A HOME aquarium competition of the Nottingham and District A.S. resulted as follows: 1, J. O. Wood (85); 2, C. Hill and H. Adkinson (61); 4, H. Oldham (54).

Panel exhibition: 1, A. Alcock; 2, George Ross; 3, A. W. Lynn.

A DISCUSSION on two varieties of tropical fish—barbs and characins—was the main subject at the meeting of Ilford and District Aquarists and Pondkeepers' Society.

The table show for these fish was won by Mr. Law, who also took second and third prizes with his rosy barb and two tinfo barb. Fourth was Mr. Peice with a schubert barb. Mr. Parsons took all four places in the characins class.

Anyone interested in fishkeeping who would like further details of the society should write to the secretary, Mr. V. Price, 1, Horsey-road, Beckenham.

MEMBERS and guests of the Woking Aquarist and Zoological Society had a very enjoyable evening in September, when Mr. C. H. Keeling F.Z.S. gave a lecture on unusual pets.

On the 11th November the Society will hold its first Annual Exhibition of Animals and Tropical Fish. The Exhibition will be held at the St. Julian's Ambulance Rooms, Central Avenue, Woking, and it is hoped to include monkeys, a penguin, tropical birds and tanks of tropical fish. Any society wishing to visit the Exhibition can obtain further information from Mr. Albert M. Drakin, Hon. Secretary, 14 Canal Road, Woking, Surrey.

#### Crossword Solution

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



## BRITISH AQUARISTS' FESTIVAL 1960

22nd and 23rd OCTOBER

BELLE VUE ZOOLOGICAL GARDENS, MANCHESTER

26 Classes covering Tropical, Coldwater and Aquascapes

Two additional features at this year's Exhibition which should not be missed are a lecture by Dr. Gwynne Vevers, curator of the London Zoo Aquarium, and a Slide Show from America's Steinhart Aquarium, to be presented by the Hendon & District A.S. Both these events will take place on Sunday afternoon, the 23rd October

SHOW OPENS 10 a.m. to 8 p.m. (7 p.m. Sunday) Admission to the Festival including also Belle Vue Zoo and Amusement Park 2/- (children half price)

## "PLEASURE"

THE UP-TO-DATE  
ALL-BRITISH FOOD

Enjoyed by all aquarium fishes

"PLEASURE" is manufactured by a special process in which the finely divided ingredients are mixed and converted into granules. Low temperatures are used throughout to preserve the maximum nutritional value of the food.

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The firms listed are wholesalers or retailers or both in fishes, tanks, plants, appliances and accessories, reptiles and amphibia. Abbreviations: **W.**—Wholesale only. **R.**—Retail only. **WR.**—Wholesale and Retail. **C.**—Coldwater. **T.**—Tropical. **P.**—Plants. **AA.**—Appliances and accessories. **R. & A.**—Reptiles and Amphibia. **E.C.D.**—Early closing day.

### BERKSHIRE

**The Reading Aquarist**  
94, King's Road, Reading  
Telephone: Reading 53632  
E.C.D. Wednesday R. C.T.P.A.A.

### BUCKINGHAMSHIRE

**Brown, K. G.**  
100, Amersham Road,  
High Wycombe  
Tel. 1573 R. C.T.P.A.A.

### CHESHIRE

**Grassby, Joe., F.R.H.S.**  
"The Glen" Fisheries, Mobberley, Nr. Knutsford  
Tel.: Mobberley 3272 W. C.T.P.A.A.R. & A.  
**Robert Jackson (Naturalists) Ltd.**  
Holly Bank Nurseries, Grove Lane, Hale  
Telephone: Ringway 3301 WR. C.T.P.A.A.R. & A.

### DURHAM

**Metcalf, G. R.**  
2, High Northgate  
(On main A.1 road) Darlington  
Telephone: Darlington 5991  
E.C.D. Wednesday. R. C.T.P.A.A.R. & A.

### ESSEX

**Goodmayes Aquaria**  
Shaftesbury Parade, High Road, Chadwell Heath  
Telephone: Goodmayes 2594  
E.C.D. Thursday. R. C.T.P.A.A.  
**The Hamlet Aquaria**  
14, St. Helen's Road (off Hamlet Court Road),  
Westcliff-on-Sea  
Telephone: Southend 44724  
E.C.D. Wednesday. WR. C.T.P.A.A.

### HAMPSHIRE

**Arundel Aviaries & Fisheries**  
211/213, Arundel Street, Portsmouth  
E.C.D. Wednesday. WR. C.T.P.A.A.R. & A.  
**Wingate Zoological Supplies**  
46, Jewry Street, Winchester  
Telephone: Winchester 2406  
E.C.D. Thursday. R. C.T.P.A.A.R. & A.

### HERTFORDSHIRE

**Cura, L. & Sons**  
Water End, Hemel Hempstead  
Telephone: Water End 44  
E.C.D. Saturday. W. C.P.R. & A.  
**Wat-Pet Stores**  
66-68, London Road, St. Albans  
Telephone: St. Albans 55439-55507  
E.C.D. Thursday. WR. C.T.P.A.A.

### KENT

**Aquatic Suppliers**  
1, Castle Street, Tunbridge Wells  
Telephone: Tunbridge Wells 291  
E.C.D. Wednesday. WR. C.T.P.A.A.  
**Kingfisheries Aquarium**  
138, Croydon Road, Beckenham  
Telephone: Beckenham 3716  
E.C.D. Wednesday (all day). W.(P). R. C.T.P.A.A.

### Sherwood Pet Stores

(Proprietors, Fairbairns Aquaria, Ltd.),  
252, Sherwood Park Avenue, Siskup  
Telephone: Bexley Heath 7217  
E.C.D. Thursday. R. C.T.P.A.A.R. & A.

### LANCASHIRE

**Hornby's**  
Trafford Bar, Old Trafford,  
Manchester, 16  
Telephone: Trafford Park 2989  
E.C.D. Wednesday. R. C.T.P.A.A.R. & A.

**Letty Kreamer**  
34, Chesham Hill Road,  
Manchester, 4  
Telephone: B1a 2163  
E.C.D. Wednesday. WR. C.T.P.A.A.R. & A.

**Liverpool Aquaria Company**  
23, Sir Thomas Street, Whitechapel, Liverpool, 1  
Telephone: Central 4891  
E.C.D. Wednesday. R. C.T.P.A.A.R. & A.

**"Stanleys"**  
110-112, Shakespeare Street, Southport  
Telephone: Southport 5369  
E.C.D. Tuesday. R. C.T.P.A.A.

### LONDON (Central)

**St. Martin's Kennels, Aviaries and Aquaria**  
49, Monmouth Street,  
Upper St. Martin's Lane, W.C.2  
Telephone: Temple Bar 4532  
E.C.D. Saturday. R. C.T.P.A.A.R. & A.

### LONDON (North)

**The Aquarium**  
41, Commerce Road,  
Wood Green, N.22  
Telephone: Bowes Park 8786  
E.C.D. Thursday. R. T.P.A.A.

**Phillip Castang Ltd.**  
91, Haverstock Hill,  
Hampstead, N.W.3  
Telephone: Primrose 1842 and 9452  
E.C.D. Saturday. W. T.P.A.A.R. & A.

**Paramount Aquarium**  
95, Haverstock Hill,  
Hampstead, N.W.3  
Telephone: Primrose 1842 and 9452  
E.C.D. Thursday. R. C.T.P.A.A.R. & A.

### LONDON (South)

**Fairbairns Aquaria, Ltd.**  
15, Well Hall Parade, Eltham, S.E.9  
Telephone: Eltham 5859  
E.C.D. Thursday. WR. C.T.P.A.A.R. & A.

**The Jaynor Organisation**  
(James North (London) Ltd.)  
316, Lee High Road, Lewisham, S.E.13  
Telephone: Lee Green 3577  
E.C.D. Thursday. WR. C.T.P.A.A.

**Johnson's Aquarium**  
223, Longley Road,  
Tooting Junction, S.W.17  
Telephone: Biltam 6742  
E.C.D. Wednesday (all day). WR. C.T.P.A.A.

**South Western Aquarists**  
2, Glenburnie Road, Trinity Road,  
Upper Tooting, S.W.17  
Telephone: Balham 7334  
E.C.D. Wednesday. WR. C.T.P.A.A. R. & A.  
**Tachbrook Tropicals**  
244, Vauxhall Bridge Road, Victoria, S.W.1  
Telephone: Victoria 5179  
(Open all week except Sundays).  
WR. C.T.P.A.A. R. & A.

**LONDON (West)**  
**Owen Reid's Aquarium Dept.**  
12, Spring Bridge Road, Haling Broadway, W.5  
Telephone: Ealing 3259  
E.C.D. Wednesday. WR. C.T.P.A.A. R. & A.

**NORTHAMPTONSHIRE**  
**The Pet Shop**  
120, Kettering Road,  
Northampton  
Telephone: Northampton 841  
E.C.D. Thursday. R.C.T.P.A.A.

**NOTTINGHAM**  
**Taylor, H.**  
201, Denman Street,  
Radford, Nottingham  
E.C.D. Thursday. R. T.P.A.A.

**OXFORDSHIRE**  
**Headington Pets Supplies**  
150a, London Road,  
Headington, Oxford  
Telephone: Oxford 61706 and 58673  
E.C.D. Thursday. R. C.T.P.A.A. R. & A.

**STAFFORDSHIRE**  
**Walsall & Wolverhampton Aquatics**  
47, Oxford Street, Bilston  
46, Stafford Street, Walsall and  
147, Horsley Fields, Wolverhampton  
Telephone: Bilston 42604, Walsall 21783 and  
Wolverhampton 24147  
E.C.D. Thursday. R. C.T.P.A.A. R. & A.

**SURREY**  
**Thameside Tropicals and The Pet Shop**  
Bessy House, New Zealand Avenue  
Walton-on-Thames  
Telephone: Walton 24076 WR. C.T.P.A.A. R. & A.

**SUSSEX**  
**The Hastings Pet Shop**  
53, High Street,  
Hastings  
Telephone: Hastings 4418 R. C.T.P.A.A. R. & A.  
**Preston Aquarium**  
44, Beaconfield Road, Brighton  
Telephone: Brighton 29620  
(Open all week). R. C.T.P.A.A.

**WARWICKSHIRE**  
**The Coventry Aquarist (Prop. W. Dymond)**  
43, Melbourn Road, Earlsdon, Coventry  
Telephone: Coventry 72772  
E.C.D. Thursday. R. C.T.P.A.A.  
**Fanday Aquaria**  
Fanday House, 129, Stratford Road, Sparkbrook,  
Birmingham  
Telephone: Victoria 3537  
E.C.D. Wednesday. WR. C.T.P.A.A. R. & A.

**WORCESTERSHIRE**  
**The City Aquaria, Bird and Pet Supplies**  
(Proprietor: Mrs. M. Hemming)  
34, Friar Street (opposite Union Street), Worcester  
Telephone: Worcester 2005  
E.C.D. Thursday. R. C.T.P.A.A. R. & A.

**YORKSHIRE**  
**The Corner Shop (Prop. J. Wilde)**  
526, Abbeydale Road, Sheffield, 7  
Telephone: Sheffield 54172  
E.C.D. Thursday. R. C.T.P.A.A. R. & A.

**SCOTLAND**  
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Telephone: Dundee 68308  
E.C.D. Wednesday. R. C.T.P.A.A.

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Anolis caroliniana (T)	2/-
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Cabomba (T)	1/6
Caesalpinia byana (bush) (T)	2/6
Cryptocorynes (For 26 species see plant list)	
Echinodorus paniculatus (T) (Amazon sword)	7/6
Echinodorus (For 15 species see our list)	
Eloides Duna (T & C) ... ..	6d. each, 4/- doz.
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