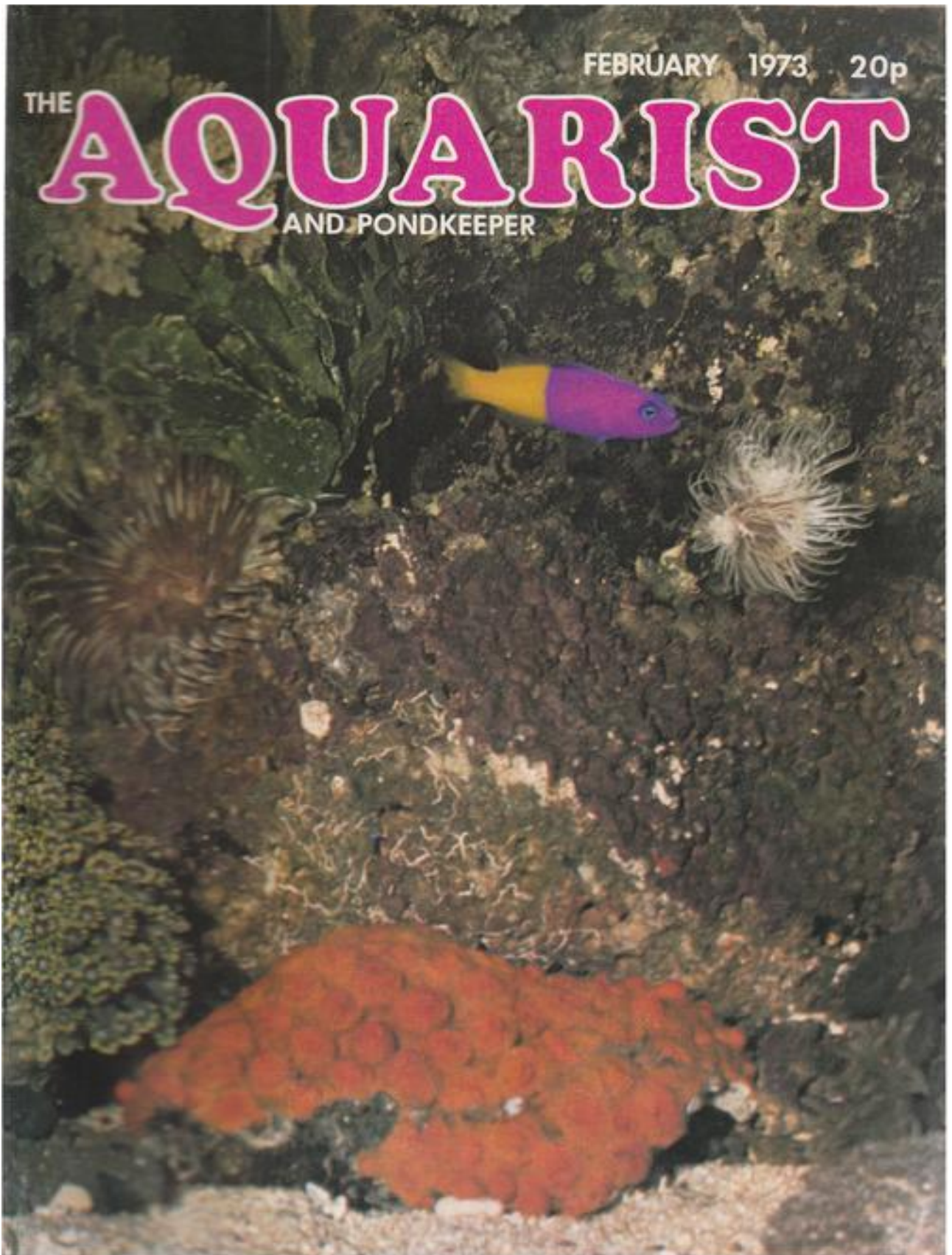


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THE **AQUARIST**  
AND PONDKEEPER





# THE AQUARIST

AND PONDKEEPER

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## Contents

|   | PAGE |
|---|------|
| The Paradise Fish   | 414  |
| <i>Apistogramma steindachneri</i>                                     | 416  |
| Book Review   | 417  |
| Our Experts Answer: Coldwater Queries                                 | 418  |
| Tropical Queries  | 420  |
| Rosy Barbs  | 421  |
| Loaches   | 422  |
| Our Readers Write   | 423  |
| An Excellent Plant Service  | 424  |
| What is Your Opinion?   | 425  |
| B.M.A.A.  | 430  |
| Miami Seaquarium  | 431  |
| Considering Goldfish Standards  | 432  |
| From a Naturalist's Notebook  | 434  |
| The Care of Baby Terrapins  | 436  |
| Product Review  | 438  |
| Junior Aquarist: The Hardy European Reptiles and Amphibians (Part 10) | 440  |
| Caddis-flies  | 442  |
| Marine Queries  | 444  |
| Breeding Goldfish   | 445  |
| Dealing with <i>Algae</i>   | 447  |
| News from Aquarists' Societies  | 449  |

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# THE PARADISE FISH

by Jorgen & Pamela Hansen

THE Paradise fish, *Macropodus opercularis*, is a labyrinth fish and bubble-nest builder from the Family Anabantidae. It comes from South-east China, Korea, Formosa and Indonesia, where it is found in flooded rice fields or other still, densely-planted waters. It was introduced into Europe in 1868 and first spawned there in 1869, and has thus been known to European aquarists for over a hundred years.

Not all labyrinth fish build bubble-nests, but are generally divided into two groups a) African and b) Asiatic, in each of which are to be found three types of spawning procedure: 1) where the eggs are spawned freely into the water 2) where the eggs are taken into the parent's mouth (mouthbrooding) and 3) where a bubble-nest is built.

The labyrinth organ, which is found directly above the gills, enables the fish to take oxygen directly from the atmosphere, and consists of a large number of fine bony plates which form tiny fans, and which are coated with a delicate layer of mucus, richly equipped with blood vessels. The organ is twisted many times around itself. When building the nest the male takes in air and then spits it out again as small bubbles, strengthened with mucus, which is produced by special glands.

One of the authors of this article kept a pair of *Macropodus opercularis* as a boy, although he didn't know at the time that that was their name. He enjoyed the mere pride of ownership, until suddenly one day there began to be somewhat more activity than usual in the tank. The male built a bubble-nest, and embraced the female with the result that a whole lot of eggs appeared and which duly hatched, but which the author dealt with completely wrongly. They all died, to the great relief of his mother who, no doubt, envisaged the necessity of another larger tank in which to breed them up.



Ever since that episode the author was determined to prove that he could, after all, breed up paradise young; so when an opportunity arose to acquire some mature, almost full-grown specimens, he bought four, two males and two females, so that there should be a reasonable chance of spawning.

We placed the fish in a tank 90 x 30 x 25 cm. in size, containing water of 12 DH and of pH 7, and a temperature of 25°C. The lighting was from a 20-watt Gro-lux tube which burned 24 hours a day. The tank was planted with *Sagittaria*, of which some reached the surface of the water, and several *Echinodorus magdalenensis* or dwarf sword plants, and was already inhabited by six red wagtail lyretail swordtails and seven albino lyretail *sphenops*. The paradise fish immediately made themselves at home in their new tank; in the course of five minutes they had killed one of the albino *sphenops*, and bitten its eyes out. It seemed obvious that they hadn't been fed well in the shop, so we accordingly fed them generously with *Cyclops*.

On the next day, 4-5-72, (we mention the dates on which the different events occurred for the sake of accuracy, and to enable one to work out such information as the period of time between the appearance of the first bubbles and the actual spawning, the period of time between spawnings, etc.) they were again fed well with *Cyclops*, and during the evening bubbles duly

appeared at one end of the tank. By the evening of 5-5-72, each male had built a small bubble-nest, 2-3 cm. in diameter and 2 mm. in height, in its respective corner of the tank. The males kept watch under their nests, now and then surfacing for a fresh mouthful of air, and thereafter spitting out a mouthful of bubbles under their nests. The females, plump with eggs, kept to the centre of the tank.

On 6-5-72 we were busy all day and so couldn't observe further events until 8 p.m., at which time the bubble-nests had increased in size to 4 cm. in diameter and 5 mm. in height. In both cases the nest was moored on the one side to a *Sagittaria* plant and on the other to the side glass. The males remained in position under their nests, except to chase away swordtails or *sphenops* which came too near. When a female eventually approached one of the males, he trembled, spread his fins, and swam sideways under the nest; the female then followed, and spawning began. The male folded his body around the female's, both fish turning round so that the female eventually lay with belly upwards. The male's body pressed so tightly that it squeezed the eggs out of the female, and they were then fertilised.

It wasn't difficult, from underneath, to see the eggs in the nest; they were yellowish to pink in colour and about 1 mm. in diameter.

On the morning of 7-5-72, we carefully transferred each nest, along with the eggs, into a plastic transparent beaker which we then placed in a 12-litre tank so that the beakers floated on the surface. The idea of the beakers was that the eggs should remain in the same water in which they were spawned, and this water should gradually take on the temperature of the water in the new tank.

In the one beaker the bubble nest almost disappeared after being moved, and the eggs floated on the surface, while in the other the nest held together. By 10.30 p.m. some of the eggs had developed tails, but there was no sign of eye pigmentation. By the morning of 8-5-72 the one brood displayed both tails and blackeye pigmentation, while in the other brood the same development had occurred by the afternoon. Both broods were poured into the tank water when the last young had developed eye pigmentation.

By the afternoon of 9-5-72 (i.e. after 5 days), some of the young swam freely, while other still hung at the surface; some hung stomach upwards, which made us suspicious at first. By 10-5-72 all the young swam freely, and were fed with egg-yolk infusion (a small portion of hard-boiled egg yolk stirred out in water, only a few drops of solution being given every few hours). A very gentle aeration was begun in the tank.

11 and 12-5-72 The young were again fed with yolk infusion; when they had eaten, their stomachs were to be seen as small white pricks. Meanwhile the adult males had again begun upon their bubble-nest building in the same corners as before.



13-5-72 We began to feed the young with brine shrimp; their stomachs now showed up as pink when they had eaten. In the parental tank there were again eggs at both ends of the tank (7 days after the 1st spawning). Both nests were removed in the same manner as before.

19-5-72 Eggs were again to be seen in the parental tank, in only one nest this time, at the right-hand side of the tank. The reason for there being no nest or eggs at the left-hand side was probably that the fish were, for the first time, being fed with dry food; as the feeding triangle was right over the corner where the nests were previously built, and the dry food tended to remain floating there, (as opposed to the movement of *Cyclops* throughout the tank) all the fish therefore swarmed to this corner at feeding-time, and it was no doubt impossible for a single individual to ward off a whole flock of hungry fish.

20-5-72 When dry food was given, the male with the nest dived over for a mouthful or two now and then but otherwise kept guard at the nest, which was occasionally improved by a few mouthfuls of bubbles.

The difference in size of the young from the two lots of broods was now apparent. As we already had all these young we could now afford to leave the next brood to be cared for by the parents.

21-5-72 The eggs hatched and the young hung around their half of the tank. The male ensured that no other fish intruded upon this territory, but didn't otherwise do anything for the young.

22-5-72 The young swam freely; the bubble-nest disappeared; and another albino *sphenops* was attacked and killed by the male. Right up to 29-5-72 the male reserved half the tank for himself and the young, and thus ensured that they weren't devoured by the other fish. Whenever a fish came too near the male torpedoed it away, turning in the same movement back to his own end.

29-5-72 As the male was making life miserable for all the fish in the tank except the young, we decided to move him away along with the other adult Paradise fish, although realising that the young would probably perish without his protection; and this was in fact what happened; within 24 hours they were all eaten up.

9-6-72 The remaining young (105 in number) from the first two broods were almost 5 weeks old, and it could be seen that the labyrinth organ was under development as the fish began to rise to the surface to collect air. The height of the water in the tank was 10 cm.

The young varied considerably in size, despite our attempt to feed them carefully and adequately; but we were unlucky to find ourselves with brine shrimp eggs which didn't hatch, which resulted in no food for 2 days; and thereafter a difference in size was immediately apparent. It was necessary to keep removing the larger fish to a neighbouring tank to prevent them eating the smaller ones. This tank was of the same water, depth, and temperature as the original tank. Transference of labyrinth fish from one tank to another

during, or directly after, the development of the labyrinth organ is often enough to kill the fish if there is a difference in temperature between the water and the air, but in this case there was no appreciable difference as the water was not artificially heated.

At the age of 2 months the largest fish had attained a length of 4 cm., at which stage blue and red stripes could be perceived on the body, and the uppermost fin rays in the tail fin could be seen to be elongated. The smallest of the fish were 1 cm. in length, and one could distinguish dark stripes across the body but no colouring.

The fish proved to mature at the age of 3 months, as at that stage the surface of their tank was covered with no less than 5 bubble nests, containing eggs which hatched normally when removed in the same manner as before.

An albino variation of the paradise fish has been produced, with pink eyes, and a pink body with red stripes. One of our baby fish has developed a caudal fin with two long even splits instead of just one split, so we will concentrate on that fish for future breeding.

## *Apistogramma steindachneri*

by David Seymour

At a local aquarists' shop recently I saw a tank containing several unusual dwarf cichlids. On enquiring I learned these fishes were *Apistogramma steindachneri* which, as I gathered from the leading books on the hobby at a later date, are not a very common species and information on these is very limited indeed. I purchased the five pairs in the tank at a price of £1.50 per pair—not cheap fishes I grant you but being a "dyed in the wool" cichlid enthusiast I could not resist them.

I will give a general description of this species and hope that the purist will bear with me as the basic colouring and markings are very variable. The body is basically a light brown suffused with a yellowish sheen. The dorsal fin is larger in the male, and in both sexes is tipped with light yellow—the first few rays are a darker shade as in *Apistogramma ramirezi*, although not as long. The caudal fin is rounded and reasonably large for a dwarf cichlid and the ventral fins are longer and more pointed in the male. There is a black line running laterally from the eye and stopping at the caudal peduncle in the form of a large spot. Another spot also breaks this line halfway which makes *steindachneri*

reminiscent of the 3-spot Gourami—the eye being the third spot. There is also a dark streak running obliquely from under the eye to the base of the gill cover. The males are up to 3 in. in length and the females 2 in., but one of my pairs is considerably smaller than this and has successfully spawned.

In due course the *steindachneri* were installed in their prospective breeding quarters—each pair had an 18 in. × 10 in. × 10 in. all-glass aquarium containing about 2 in. of fine gravel and a few plants of *Vallisneria spiralis* and Indian Fern. These tanks are in a room illuminated by two 40-watt fluorescent tubes, so no further lighting over the tanks was necessary—these lights are left burning for approximately 15 hours per day. (Incidentally, the tanks should have a close-fitting cover glass as the fishes are rather boisterous at breeding time.)

I used well matured water at 80°F for these tanks, which had a hardness reading of 15 dH (German scale) and showed a pH reading of 6.8 on the test paper kit. The spawning sites were made from 5 in. flower pots split into two and laid on the gravel to form low archways. These should not be placed in the tank so that

they face directly forward, but rather at an angle so that light from outside does not illuminate the interior. *Apistogramma steindachneri* is rather a nervous fish so alternative hideouts should be provided although the above-mentioned flower pots seem to be preferred as spawning sites.

Feeding these fishes did not present any difficulties as from the start they took four or five different brands of flaked foods as well as pieces of cooked cod and chicken, and chopped *tubifex*. I do not adhere to a regular two or three times a day feeding schedule—whenever possible I feed them little and often, and providing this is not overdone I think the fishes benefit as in the wild state they are more or less continually feeding during the daylight hours.

As the pairs approach spawning condition activity increases in the tank. The marking on both sexes becomes bolder and the female erects a pile of gravel in the entrance to the flower pot, presumably to protect the forthcoming spawn from intruders. She now becomes the dominant partner, continually chasing the male and beating him on the body with her caudal fin. At this time the fishes assume a side-on head-to-tail attitude and, as is common among their larger cousins, indulge in a bout of body-slapping antics which lasts for several seconds. Sometimes the male appears to tire of this and swims off to hide, but the female routs him out and continues the display until he responds to this behaviour and spawning commences.

The usual place for depositing the eggs is on the inner roof of the archway. The spawns are not exceptionally large, averaging about 75-100 eggs, and I have found that losses, usually in the development of the embryo stage, account for up to 40 per cent of the total number of eggs although once free-swimming the fry are reasonably easy to rear. The eggs are small with a distinct tan colour, and are attached to the spawning site by slender threads. When the spawning is com-

pleted the female takes complete charge of the eggs and becomes quite aggressive to her mate. At this time it is best to remove the male and disturb the female as little as possible.

I usually remove the spawn and hatch away from the parents—the hatching time is four days at a temperature of 80°F and the fry are swimming in a tight shoal in a further four days. Just prior to hatching the embryos are clearly visible through the egg membranes—a sure sign that the fry will appear in four to five hours.

I feed the fry on newly-hatched brine shrimp and any of the proprietary dry foods for baby fishes. I prefer to feed them a very small portion as many times a day as possible rather than a couple of heavy feedings a day. Baby *Apistogramma steindachneri* are long slender fishes—at 10 days old they are nearly  $\frac{1}{4}$  in. long. In conclusion I would say this is a very interesting species and with care and good feeding will spawn every eight or 10 days if the eggs are removed for artificial hatching.

♦ ♦ ♦

JACK HEMS writes: It is curious how seldom one sees or hears about *A. steindachneri* over here, although it has been known to serious German aquarists since 1937. At least that is the date of introduction given by the late John Paul Arnold in his *Alphabetischen Verzeichnis der bisher eingeführten fremdländischen Süßwasserfische*, published by Gustav Wenzel, of Brunswick, some thirty-four years ago. It was first described for science by C. Tate Regan in 1908. It is fairly certain that, apart from a few articles in German aquarium magazines—the first in "Wochenschrift" in 1939—little about it has appeared in print except a few words accompanying some photographs in not very striking colour to be found in American publications produced over the last decade. Arnold tells us in his useful catalogue that this fish is *Sehr heike*, (fastidious). Presumably this statement relates to its eating habits and the quality of water which suits it best.

## BOOK REVIEW

**Tropical Fish.** By Reginald Dutta. Published by Octopus Books Limited. London, £1.50.

Too many pages of this book are marred by inaccuracies of some sort or another. And not a few of the author's statements border on the ridiculous as, for example, in the section devoted to the business of setting up a home for fish. For instance, in one place readers are told to "have a pool, not sunk static in the floor, but new-type raised on a stand so that the fish are at your height, where you can talk to them, see them, make friends with them, hand feed them, tickle them . . ." Writing of *Scatophagus argus*, Mr. Dutta says: "Their short barbules (sic) and over-eager mouth indicate their greed." Of *Monodactylus sabae*,

"... many claim it to be marine."

But enough of the laughs. Egg-laying tooth carps are given the alias of "killer" fish. Whether Mr. Dutta meant this to be killie fish we cannot know for it is hard—nay, impossible—to say whether the author or the printers were responsible for the bulk of the mistakes. To add to the confusion some of the illustrations are wrongly captioned. The discus in page 114 are called callichthys and the severum in page 115 are called hypostomus. Furthermore, some of the writing has a quality about it hard to find anywhere outside the pages of Amanda M'Kittrick Ros. Describing the plant *Myriophyllum brasiliense*, the author writes: "Slimy when sulking, if you've ignored the earlier danger signal of stalkiness. Tasty, like the *Cabomba*, the fish love to peck it, as well as on it, even between its lacey thready leaves." J.H.



## OUR EXPERTS' ANSWERS TO YOUR QUERIES

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## GOLDWATER QUERIES

by Arthur Boarder

I am making a pond 5ft. by 3ft., in which I shall keep calico and scaled fantails. I wish to breed them. Should the calico ones be brought in for the winter?

Your pond is small for the purpose of breeding fancy goldfish. However, you could succeed but you are very unwise to try to breed with the two varieties together. They would cross and you would get all sorts of undesirables among the fry. It is hard enough to get many really good quality fancy goldfish today, without adding to the poor quality by breeding with two types in the same pond. It would be possible to take a true pair from the pond whilst they were chasing to spawn them elsewhere, but any eggs which were fertilised in the pond could have been done by different males and so any fry in the pond could be of questionable value. I think that it is a great mistake for fishkeepers to try to breed in their ponds with various types of fancy goldfish. It is absolutely certain that if these mixed varieties bred there would be a number of cross-bred kinds of no value at all. If only breeders would stick to one particular variety there would soon be more good quality fish available.

Nearly twenty years ago, soon after the Goldfish Society of Great Britain was formed, I suggested that the best way to keep up a good standard of fancy goldfish, was for certain breeders to specialise in one particular variety only. They would then be able to exchange opinions and fish so that they would have an excellent chance of keeping up the standard if they did not actually improve it. This idea was turned down and instead all existing varieties were scrapped in favour of four new types. It has been said that the idea was to improve the quality of the varieties, but there were as good, and in many cases, better fish then than there are now. I know as I was exhibiting and later judging at major shows then.

As for the possibility of keeping the calico types

out of doors during the winter, it is, in my opinion taking rather a chance in your district. Scaled fantails live through the winter in my own pond with no trouble, but some strains of calico fantails are not quite as hardy as the scaled types. Some are rather prone to get the well-known swim-bladder trouble during the winter.

**I have a smallish pond and am going to try to breed fancy goldfish in it. What plants should I have in it?**

I suggest that you use one plant only, but just stick to Hornwort, (*Ceratophyllum demersum*). This is a grand plant for holding the eggs when laid and forms a good shelter for any newly hatched fry if spawning is done in the pond. This plant makes no roots and bunches can be anchored with stones in the pond, or bunches can be tied near the surface at the sides of the pond. The plant dies down in very cold water in the winter and forms into rather hard horns. If you wish to get some I think it would be better if you wait until the spring before doing so.

**Can you tell me if Orandas can winter in an outside pond?**

To this question I can answer yes and no. In your district I think it would be very questionable. They have such large finnage that the chance of it becoming infected with fin congestion or fin-rot is very possible. Also many such fish have been bred at quite high temperatures for goldfish anyway; and even at tropical warmth, many are bred. One can then realise that they are not as hardy as fish which have been cold-water bred. There is always the chance that these deep-bodied fish could become prone to swim-bladder trouble. If you were in a warmer part of the country and the fish had been coldwater bred, they could survive the winter outside.

**I have three Orandas in tank, 24 by 12 by 12in. and they have spawned. The eggs are fertile but they did not hatch. Can you give me a reason for this?**

If the eggs were really fertile there is no reason I can think of for them not hatching. The temperature of the water does control the time taken to hatch, but even if it was below 60°F, there seems no reason why they should not have hatched, although it can take a fortnight when the water is very cold. Eggs which do not hatch within a reasonable period will turn white and woolly with fungus after a few days but if the eggs remained clear enough for you to see the alevins inside then I can only think that the germs were too weak to develop properly. Try the fish in a pond next year.

**I would like to keep some Carp and have a tank 48 by 18 by 18in. Shall I be successful with them in such a tank?**

There is no reason why you should not be able to keep several Carp in your tank. You must realise that they can grow to a very large size. You have probably seen the 44lb. one in the London Zoo. Six fish, four inches over all would look well and could remain in the tank for a few years, according to the growth they made. Once Carp get to this size their rate of growth is not very rapid. The fish will probably look much better in the tank than they would in a pond as their bronze sides would show up more plainly.

**I have a garden pond 16ft. by 8ft. by 2½ft., and in it I have eight Orfe, 12in. long and four Koi 4-6in. long. I have seen a nice white one which I would like but wonder if I have sufficient space as I want to grow the fish on to a good size?**

Your pond is of a sensible size and I think that you could add another fish without over-stocking. The orfe can grow to 18in. long and the Koi to 20in. long.

**I have a goldfish tank and have put plants in it. Surely I will have to change the water regularly and do I have to take the plants out when I do so?**

You do not have to move your plants and there is no need at all to change the water regularly. A well set-up tank which is kept under the proper conditions need never have the water changed completely. Some of the water is thrown out at the weekly servicing and replaced with fresh. The plants should not be disturbed but if any grow too tall or too thick that can be pruned. When doing this you should only shorten some of the stems so that there are some left of a good length. Those pruned will send out side shoots and then the others can be shortened.

**If I have an aerator does it mean that I do not have to change the water?**

An aerator in a coldwater tank is unnecessary and if it has to be used it is a sign that the tank is over-stocked with fish. Providing you stick to the limit of an inch of body length of fish to each 24 square inches of surface area, there is no need for artificial aeration. This is of course as long as there are some growing water plants and the fish are not over-fed. It is possible to keep a coldwater tank with fish in a living room for at least twenty years with no aeration or filter as long as the correct conditions are maintained.

**I have made a pool partly inside and partly outside my front porch. It does not get a great amount of light. What water plants for oxygenating do you recommend?**

Most under-water oxygenating plants are not very demanding as regards to light but the best one I know for your purpose is Hornwort, (*Ceratophyllum demersum*). Make small bunches of the stems and anchor on the bottom with stones. This plant dies down a little during very cold weather and forms into rather hard 'horns', but it grows again well in the spring.

**My goldfish have become attacked by the Fungus disease. Where does this come from please?**

Fungus disease is caused by a type of mould called *Saprolegnia*. It is said that most waters will have the spores of the disease in large numbers but that healthy fishes are not attacked at all. If a fish is damaged, either by pests or any other cause it will lose some of its mucus, or protective covering. Causes of an infection could be an after effect of White spot disease or injury by fish lice; leeches or the larvae of water beetles or dragon flies. Providing the mucus covering is intact the fishes will not get Fungus disease. In a badly run tank or pond, the fishes may become out of condition and this can cause the covering to become deranged and so the fishes are then prey to the trouble. I have not seen any signs of fungus on any of my fish in outdoor ponds for at least twenty years. Careless handling can remove some of the mucus and then the fish can be attacked by the disease. A well run pond which is neither overstocked or in which the fishes are not over-fed should never have any fish with the disease.

**I have a tank, 11 by 8 by 8in., in a rather dull part of a north room and the water plants appear to be covered with a fine woolly growth. What is the cause and cure please?**

It is probable that the plants are not getting sufficient light and that there is some decaying matter in the tank which pollutes the water. The tank is very



small and this can be part of the trouble. Even an experienced aquarist would be hard put to be able to keep goldfish healthy in such a tank. I think that the minimum size for a goldfish tank is 20 × 10 × 10in.

This should have a 40 watt lamp over it to be switched on for ten hours a day at least if the tank is not in a good light. Even a tank the size given should not have more than five fish with an overall length of 2in.

## TROPICAL QUERIES

by Jack Hems

**Please oblige me with details regarding the care, full size and natural home of the fish called *Prochilodus taeniurus*.**

This member of the family *Anostomidae* flourishes best in soft and slightly acid water maintained at a temperature in the neighbourhood of 75°F (24°C). It attains a length in excess of 8 in. and therefore needs a spacious aquarium. This should never be left uncovered, for the fish is a good jumper. *P.taeniurus* will eat dried and live foods quite freely. It is native to the middle Amazon and the river systems thereabouts.

**What do *Scatophagus spp.* live on in the natural state? My largish specimen, which I have introduced into a slightly salted community tank, will not leave the plants or the smaller fishes alone.**

Scats eat almost anything alive or green that appeals to them. Essentially they are great consumers of lowly and the more highly developed algae; so, naturally, they will soon clear a tank of the softer water plants. Scats are not predatory fishes in the accepted sense of the word, but well-grown specimens will not think twice about snapping at tiny species small enough to be swallowed. Some specimens are given to bullying; others will protect what they consider to be their territory from interlopers. Scats are really best kept by themselves or with other similar sized brackish water fish.

**Does the opaline gourami make a good community fish?**

Not really. In its larger sizes it tends to rush at smaller fishes and bruise them. And a large male can be very spiteful towards a female of its own kind. However, plenty of plants to afford retiring places is one way of protecting other fishes from the erratic and bullying behaviour of the opaline gourami.

**I have just bought a puffer fish. Does it need salt in the water?**

It all depends on the species you have in your aquarium. Some puffer fish inhabit brackish water and the sea; others appear to spend their entire lives in rivers. If you know the scientific name of your fish, then I suggest you write in again. Alternatively,

look it up in the section on *Tetraodontidae* in Professor Gunther Sterba's *Freshwater Fishes of the World*. Most of the puffer fishes commonly kept in the home aquarium are dealt with in this book.

**Please give me some information on the bony-lipped barbs.**

These finely marked cyprinids keep on the move in the middle to lower levels of the water. They will eat almost everything including the leaves and stems of plants. They live for upwards of four or five years and make good community fish if kept with other species of about their own size.

**What is the best sort of compost and temperature for the cultivation of the white worm?**

A crumb-like soil that is alkaline rather than acid suits white worms best. In the matter of temperature, a range in the fifties to middle sixties (°F) is about right. The soil should be kept just moist but not wet.

**Would the elephant nosed fish make a suitable occupant for my community tank?**

Not if there are boisterous or bullying fishes present. Elephant nosed fish like peace and quiet in a sandy bottomed tank well-planted with thickets of grass-like plants.

**I have been told that plants which root in the compost will not prosper if there are floating plants overhead. Is this true?**

If floating plants are permitted to cover the entire surface then they will blot out much of the light and rooted plants such as *Vallisneria* and *Hygrophila* will suffer. If, however, you keep open spaces at the surface to let light in, then the plants below will stay alive.

**I live in Sheffield and can get out on the moors almost any week-end. Would the black peat that I can dig there make a suitable planting medium—under a good layer of sand—in my tank?**

I do not recommend this black peat even after weeks' soaking and frequent changes of water. Chemical pollution has rained down from the skies over your area for the last hundred years. It is advisable,

therefore, to use a sedge or moss peat obtained from a non-industrial area.

**I have two oscars. One is 6 in. long and the other is about 4 in. long. The small one keeps digging pits and rushing at the larger one. Do you think I have a pair?**

In all probability you have a pair. If the 6 in. fish grows fuller in the sides and the smaller one assumes intensified colours and starts to clean an introduced slab of stone, then it would be reasonable to assume that spawning is about to take place.

**An aquarist friend put me off buying a Malayan angel fish by saying this species accepts nothing but live food. What has been your experience with this fish?**

My experience with the ordinary Malayan angel fish (*Monodactylus argenteus*) extends back some forty years. My opinion is that a healthy Malayan angel fish will eat any dried food, raw porridge oats, fragments of meat, slivers of herring, cod or fresh haddock, and all the usual and unusual live foods. Indeed, it is one of the easiest tropicals to feed.

**Please fill me in on the temperature requirements, maximum length, preferred food and breeding procedure of *Hoplosternum thoracatum*.**

This catfish is quite happy at a range of temperature in the seventies (°F). It will eat various worms, meat, fish much smaller than itself, and flake food. Little has appeared in print regarding its breeding habits, but it is believed that a bubble nest is blown at or near the surface and the eggs are placed in this.

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## ROSY BARBS

by R. E. Simmonds

SOME MONTHS AGO I decided to set up a spare 4ft. × 15in. × 12in. tank which was standing empty in my lounge. At the time I had not made up my mind as to the fish with which I would stock this tank; I had, however, agreed with my wife that I would plant and stock it with fish creating a picturesque centrepiece in the room.

I purchased two Amazon Swords, a dozen *Elodea densa*, *Cabomba* and *Hygrophila* plants, together with rockwork as a starter, from a well-known tropical fish shop in Victoria, London. The tank was then planted, etc., and filled with water straight from the tap. I have not tested the water in this area, so I am unaware of the hardness and density. The tank was then left as I had still not made up my mind regarding the type of fish required.

On the fifth day after planting my six-year old son remarked to me that he was certain something was swimming around in the tank, and stated they were, in his opinion, "tadpoles". Thinking I knew better than him I did not bother to investigate his remarks until the following day. On close examination, a number of fry were seen swimming in the centre of the tank. On closer observation about 25/30 fry were spotted. They were not possible to identify due to their size. Liquifry was then fed at regular intervals for the next 2 days, followed by feedings of brine shrimp and dried food of a well-known brand. As the fry grew it was possible, after a number of weeks, to identify them as Rosy Barbs. The total number

raised was 43. From the time of observing the fish to the present day no losses have resulted.

I related this incident to the staff of the shop where I purchased the first plants for this tank and the following conclusions were reached.

The tank which the *Elodea densa* was originally planted in had contained a number of Rosy Barbs. The Barbs in the shop's tank must have spawned. The plants were taken out when purchased by me, placed in the usual plastic bag but, due to the distance I live from London (82 miles), were not re-planted in my tank until approximately 5 hours later. The eggs then hatched some time afterwards and the fry observed as related above.

Whilst the Rosy Barb is a relatively easy fish to spawn, you will no doubt appreciate my surprise that the eggs of these fish remained intact when out of water for some hours, were submerged in another tank, and yet hatched to provide me with 43 fish; and this when my original intention was only to purchase plants.

I must add that Rosy Barbs have been kept and spawned by me, and in my opinion they are one of the most delightful and colourful varieties of fish in this hobby. They will provide their owner with many interesting hours, swimming at all levels of the tank, and constantly on the move. I have never experienced any difficulty when keeping adult specimens with the smaller tetras, etc. To anyone starting this hobby I recommend the Rosy Barb as a must in the Aquarium.



*Botia lohachata*

## LOACHES

by B. Fry

THE family of loaches (*Cobitidae*) is sandwiched between the tiny family of sucker fishes called the *Gyrinocheilidae* and the several families of catfishes comprising numerous genera and hundreds of different species. Loaches are distributed over Europe and Asia and a limited area of Africa north of the equator. In general outline they are either elongated club-shaped with flattened underparts, as in the genus *Botia*, or worm-like as in the genus *Acanthopthalmus*. They have up to four pairs of barbels around the underslung mouth, small or hardly discernible scales and, in not a few species, a movable spine situated near but below the eye.

Interestingly, some species have the capacity to use the intestine as a supplementary breathing organ as, for example, when the water becomes low in oxygen. Then, every so often, a mouthful of air is taken by the fish at the surface of the water. In its passage through the body oxygen is absorbed by the lining of the gut. The deoxygenated air is expelled as a bubble from the vent.

Essentially loaches are bottom dwellers. Occasionally though certain species will leave the lower regions and swim excitedly into the middle and upper levels of the water. The loaches known to science as *Misgurnus* spp. almost always do this when stormy weather is about. For this reason they have earned themselves the popular name of weather-fish. Again, there are species that swim after other fishes in order to suck at their protective slime. A loach from northern India—*Botia lohachata*—is very given to this practice.

All loaches that aquarists are acquainted with like to lie singly or in a group under a canopy of plants, muddy debris, stones, and the like. Therefore you will see that they spend a lot of time out of sight.

Observant aquarists will have noticed that the worm-like species are more given to hiding than the compressed-sided ones.

Occasionally loaches will adopt bizarre resting positions on the bottom. Indeed, it is not unusual to find one standing on its head or lying over on its side. Another characteristic is their habit of lording it over what they consider to be their territory and driving all intruders away.

The natural food of loaches is thread-like worms (*Tubificids*), aquatic larvae, small crustaceans (*Daphnia*), and the like, and vegetable matter. Yet most captive specimens will accept the regular dried foods and the rest.

By and large, loaches do not make ideal fishes for a community tank. Apart from their habit of burrowing into the sand and churning up the bottom, the larger species will uproot all plants. But on the credit side many of the tropical species have strong colours sometimes outlined with black.

In size loaches range from about 2 in. to a foot. Breeding in the aquarium is rare, but of the species that have produced young for their owners we may mention the well-known *Acanthopthalmus kuhli kuhli* from the Malay peninsula and the much larger *Misgurnus anguillicaudatus* from China and Japan.

There are two species of loach native to this country. The commonest is the stone loach (*Nemacheilus barbatula*), that grows to about 5 in. The spinous loach (*Cobitis taenia*) seldom exceeds a length of 4 in. Both these loaches are likely to be found under slabs of stone or the streaming tresses of algae in clear water near locks, weirs or spring-fed lakes. They are far from easy to take in a net.



#### Unavailable Chemicals

In the November 1972 issue I read with interest the article by Mr. W. McGarrity concerning the effective elimination of white spot by using a sulphodimidine bolium solution.

I contacted a close friend who is a dispenser for Messrs. Boots chemist in this town, with a view to acquiring a solution.

After investigation he informed me that sulphodimidine bolium solution was not available to me for purchase.

Apparently, as an aquarist I did not come into the category of those permitted to purchase same under Schedule 2 of the Poisons List.

I wonder has anyone else encountered this problem?

Incidentally, have you tried to purchase methylene blue, copper sulphate, etc., lately from the large chemists? It appears they don't stock such preparations any more—or I am just unlucky all round.

GRAHAM J. MACVEY,  
57 Mapperley Road,  
Nottingham, NG3 5AS.

#### To A. Boarder

On receiving a copy of *The Aquarist* I always read first your answers to the "Coldwater Queries", and any article you may have in that issue on anything to do with garden ponds. It is always instructive to compare notes, and very comforting when I find my own observations, opinions or theories confirmed by your own deep knowledge of the subject. When they don't agree I take it as very good reason to re-examine my views; even if I don't end up in full agreement with your opinion, I find your comments invariably stimulating and mentally note them as food for further thought.

Two things I admire particularly are your readiness to admit in some cases that you think but cannot be sure, and your readiness also to question some of the traditional assumptions. In the December issue I was delighted to find you taking some resounding swipes at a number of old wives' tales that have, unfortunately, become enshrined in the mythology of the garden pool, largely by uncritical repetition of theories from the very early days of water gardening through one inexpert writer after another simply copying what has been said before.

I agree with every word you say about the old pool construction diagrams, about mussels and snails, and about the dubious value of the so-called fish scavengers. I write to cheer you on and to beg you to continue the demolition of these hoary myths.

So please carry on the good work, Mr. Boarder. Your views, coming from a man who has done as much as anyone—and more than most—to promote the cause of good pondkeeping, must have an effect on public thinking, and they encourage me to persevere with my own efforts in that direction. I should add that I am not writing with any thought of publication; simply to express to you personally a word of thanks for many years of enjoyable reading, and to let you know that one reader at least hopes you will continue to question the old assumptions.

BILL HERITAGE,  
Highlands Water Gardens,  
Rickmansworth,  
Herts. WD3 2HB.

#### Fun at the Oscarnarium

First, I must say how keen I am on *Aquarist & Pondkeeper* and wished that it came out every week, of course I know how much work goes into a magazine so I guess every month will have to do.

I've been keeping fish for about twenty-five years but what I have to tell you has never happened to me before, and I could not contain myself from telling someone.

My wife and myself had just finished tea, and earlier on in the day I had been working on one of our four tanks, this one being the largest at a 100 gal. and is home for four-five oscars, two severum, two jewels, a mouth brooder and a congolese cat. From when they were quite small these Oscars have jumped like hell every time I've fed them, and whilst working on the tank I had forgotten to put back the hood—foolish, I know. Well, above this tank I have a wall-light which switches on the pumps and Gro-Lux at the same time, with one of those pull-cords with a small plastic bobble on the end. Suddenly, the whole kitcaboodle switched on as if by magic.

One of the said ozzys had jumped up, grabbed the bobble in his mouth and pulled the cords.

Sounds a bit far-fetched I know but true.

I'm now hoping he will one day bring my slippers.

Have any of the readers got one to beat this?

BIG JIM MIDGE,  
3 Moat Gardens,  
Wythenshawe,  
M/C 22.

#### Don't knock the G.S.G.B.

After reading with great interest the article on "Mr. Boarder" by Mr. M. T. Mason, I am bewildered by "Mr. Boarder" with his attitude towards the

G.S.G.B. He runs down the G.S.G.B. in many respects, i.e., the standards. "He" does not like the standards for the Fantail, I do not like the Fantail! I do not like the standards for the Oranda but as A. Boarder replies, "I have yet to watch a TV debate in which the participants end up in agreement". The Goldfish Society had to draw up new standards. A body of men formed the Standards Committee. They then set about the task of finding which points were most acceptable to the "vast majority of people". This they have done. So, Mr. Boarder, I think its high time you stopped running down the G.S.G.B. and start to co-operate with it

You said in an article about the standards, "don't let my criticisms stop you from buying the 'Standards Booklet', or something of that nature. But you have access to a vast audience of readers and your opinion will go a long way, so I think it's about high time you said something good about the G.S.G.B. for its work, and stop the attitude of, 'If you don't let me play I'll take my bat and ball in'. Use your power of opinion to help the G.S.G.B. not run it down".

Yours faithfully,  
Stephen Papista,  
G.S.G.B. Member.

It appears from the writer's letter that he does not agree with forms of criticism. If there were no critics the mass of people would be left to sort out their own ideas with no criteria from which to form an opinion. Where would public opinion be without the theatre, television and radio critics? It would be a dull world if all critics were muzzled, for there would be nothing to discuss and no debating.

My own view is that most critics thrive on criticism, and I know I do. Perhaps it is because I have a thick skin, developed during service throughout the 1914-18 war as a Sergeant Major and immediately after during 26 years in the Metropolitan Police. And if that does not encourage a thick skin I do not know what would.

I have not picked on the G.S.G.B. alone but have often criticised other subjects. My reason for writing about the Society is because I have very strong feelings about their activities over the past and that I am keenly interested in the cult of fancy goldfish breeding. I first attacked the Society for the ridiculous ruling that the existing ten kinds were to be unrecognised and that in their place there were to be four basic varieties from which all the existing varieties were to be bred. Well, if this was not worth a knock, I do not know what was. These people were just about two hundred years too late, as these very four basic varieties were just what the expert fish breeders of the East had been working on for many years to produce such varieties as were being bred and exhibited when the Goldfish Society was formed. These men from China, Korea and Japan had already started from where the Society proposed to begin, and so how

could these types be developed in a short space of a few years?

I offered suggestions which were not adopted. One was that the Society should recognise all the existing varieties and concentrate on trying to obtain more show specimens. I proposed that certain members of the society should specialise on one particular variety and then exchange experiences and fish with one another. By this means it would have been possible to get the best from the strains then in being.

I even tried an individual method to try to increase the numbers of the Comet. There were a few good ones about and I got together a number of aquarists who were interested, but when the G.S.G.B. published their ruling that they were not to be recognised, the interest fell. And where are the good Comets today?

The writer must not think that I am alone in criticising the Society. I have many good friends in the G.S. with similar opinions to mine, otherwise why did they invite me to give a talk to the Society where I gave my forthright opinions about matters from the beginning of the Society? I was not howled down or thrown out but received much applause.

I have not noticed that the quality of any of the fancy varieties has improved since the formation of the Society. Looking over all the entrants at Manchester in the Champion of Champions class I have yet to find more than about half a dozen fancy goldfish over the years the competition has been running, and some of the "winners" exhibited would not have won in a club show twenty-five years ago.

I would be only too pleased to give praise and recommendation to the Society if I could see that it was travelling along a sensible road, and I am sure that the Editor would be only too pleased to publish any matter which would be of benefit to the Society, which came from any reader.

Arthur Boarder.

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## AN EXCELLENT PLANT SERVICE

Those who attend the major fish shows must have been impressed with the quality and range of the water plants offered for sale at the stand of Mr. John Chalmers, proprietor of Hobby-Fish, an aquatics firm based at Wolverton, Bucks.

The same excellence is maintained in plants obtained from this firm through the post. Plants are sent out packed in such a clever way that their freshness is preserved for as long a time as it is reasonable to expect them to remain in transit. The number of choice species cultivated at Wolverton is considerable, and any aquarist interested in improving the appearance of his coldwater or tropical aquarium in 1973 is well-advised to write to Mr. Chalmers for one of his latest lists.

J.H.

THE AQUARIST

# WHAT IS YOUR OPINION?

by B. Whiteside

*Photographs by the Author*



EARLIER THIS WEEK, when I was finishing last month's feature, I mentioned having bought a pair of thick-lipped Gouramies, as well as the £2.50 Discus which died because of cold before I managed to get it home. Fortunately, the Gouramies have made up for the loss of my Discus. Two days after being put into their new home they built a bubble nest and spawned, and today I have, at a very rough guess, well over one hundred thick-lipped Gourami fry. As the fish spawned in the back corner of a large community tank, I'll have to make some quick arrangements for

only other fishes in the tanks were livebearers and tetras.

Mr. Pendleton could think of no causes for the Gouramies' deaths, and tried again and again with new specimens—to meet with the same results. He had an air pump operating a filter and air stone in each tank. One weekend he brought home another blue Gourami and added it to his 2ft. tank; later that day his pump broke down, and for certain reasons he was unable to get another pump until the following weekend. At the end of the week the blue Gourami



the tiny fry before they get eaten.

Appropriately, the first letter this month deals with Gouramies, and it comes from Mr. R. Pendleton, of 13 Mary Street, Tretharris, Glam., S. Wales. Mr. Pendleton has been keeping fishes for about four years now, and for two years had been unable to keep any Gourami alive for more than a fortnight. Many died within days of purchase. He tried opalines, blues, pearls and kissing types, but they all went off their food, seemed lethargic, and eventually died. A few of them showed signs of extreme emaciation, but mainly there were no signs of ill health. Most of the Gouramies were 2-2½ in. long when bought. The Gouramies were housed in either 24 in. × 12 in. × 12 in. tanks, or 20 in. × 12 in. × 18 in. tanks, and the

was in perfect health, and its owner decided against buying a new pump, or repairing the broken one. He wondered if the filter or air stone might have had any connection with the deaths of former Gouramies, as these were the only facets of the tank which had been altered. That was over two years ago. Neither filter nor air stone has been used in the tanks since, and the female blue Gourami is still going strong, being about 4 in. long now. A few months after the blue was bought, an opaline was added to the 20 in. tank—and the filter and air stone removed. The then tiny opaline Gourami is now 4 in. long, with marvellous colours. Mr. Pendleton deduced that the former cause of death must have been cold air being pumped into the tanks, as everything else remained unchanged.

He thinks that the Gouramies must have been gulping in some of the cold air bubbles, as his living room gets very cold at night. (He has recorded air temperatures of 40°F during the night.) He thinks that if there were any other cause for the Gouramies' deaths, it must have vacated the tanks at the same time as the pump broke down. Incidentally, he has never found any need to use either filters or air stones since then, although he admits that his tanks are thickly planted, and only contain about half a dozen fishes. Mr. Pendleton hopes that this information may be of use to others who may be having trouble with the keeping of Gouramies. (I must admit that I have recently become very fond of Gouramies, and at present have four different species in my tanks. Three different species have spawned with me this year, without any encouragement. The fourth species is as yet too



young to breed.)

3 Ralph Avenue, Gee Cross, Hyde, Cheshire, SK14 5RS, is the address which heads Mr. D. E. Green's letter. Mr. Green has kept a single fish of *Corydoras melanistius* for about six years now; it has lived with killies, tetras, Gouramies, etc., in acid water, and equally as happily with various livebearers in hard water. The fish is 1½ in. long, and is fed on white worms, raw chicken liver and Phillips flakes. Mr. Green has bred white clouds most successfully in a 14 in. × 8 in. × 8 in. tank, temperature 75°F, without gravel. A small nylon mop was added. Two pairs of white clouds were introduced into the tank in the evening, and spawned the following day. The parents did not touch the eggs, but he removed them when spawning was completed. Some 300 fry were raised in this manner, using a liquid fry food to start with, and moving on to micro worms and brine shrimps after about three days. The white clouds also bred in a mature tank planted with *Vallisneria* and Amazon sword plants; the parents were not removed and did

not bother with eggs or fry. When Mr. Green started keeping fishes he used rabbit and guinea-pig droppings as fertilizers for his plants. Mr. Green writes: "The droppings come in convenient shape and form for the job; however, I have found that in a well maintained aquarium, correctly lit, no fertilizer is needed."

Mr. J. Worley lives at 15 Hardin Road, Stockwood, Bristol 4, and he feels that he must reply to Mr. I. Grant's comments (December edition) in which Mr. Grant stated that he felt that Mr. Worley had fallen short in his Discus keeping venture. Mr. Worley writes: "I would like to point out that although I have been keeping Discus for over 2 years now, it did not take 2 years to raise these fish to these sizes, as it appeared to suggest in the extracts published in W.I.Y.O.? I reckon to put a ½ in. on a young Discus

in a month." Mr. Worley goes on to say that his fish house is now partially completed and contains 6 adult Discus—4 haraldi, 1 heckel and 1 brown; also 4 young blue-faced reds which he purchased at below 1 in., will raise to 3 in., and then sell or exchange. Mr. Worley continues: "I would like to point out that these fish are hormone-fed to give them these beautiful colours, and that they will not retain these colours as they mature. It has also been stated that the hormones fed to these fish make them sterile. This statement was made by a recognised Discus expert whom I will not name as if he wished to have these opinions published under his own name, he would have published them himself. I have two of these fish which have reached maturity and with which I wish to prove or disprove the sterile theory." (There's certainly food for thought here!)

Mrs. Hilda Allen is the secretary of The British Koi-Keepers' Society, and her home is at 1 Anthony Close, Peterborough, PE1 3XU. She kindly sent me two recent issues of The British Koi-Keepers' Society

Newsletter for my own interest, and for the interest of the pupils in my school aquarium club. Unfortunately I have only ever seen a few Koi in reality, but photographs of Koi which I have seen have convinced me that they must certainly be most exciting fish for coldwater enthusiasts. I was interested to read that the society was formed in July, 1970, and that it now has over 200 members nation-wide. Anyone interested in the keeping of Koi is welcome to join the society at any time. The subscription rates for '72/'73 are: member £1.00, married couple £1.25, and junior member (under 16) £0.50. The newsletters contain news, views, opinions and articles which should certainly be of interest to those who keep Koi—or are thinking of doing so. (I'll certainly pass the newsletters on to my school pupils, Mrs. Allen. Although we could not afford to buy Koi to keep at school, we recently added seven common goldfish to one of the school tanks, and each morning literally dozens of pupils of all ages have to be encouraged to move on away from the tank so that they will not be late for morning assembly.) In her letter, Mrs. Allen writes: "Thank you for your interesting features in each issue of *The Aquarist*. One might wish for more views and items on coldwater fish-keeping, now very popular indeed. Please give this some consideration in the future—if at all possible." (I'll certainly try to include more coldwater topics in W.I.Y.O., although I'm sure that you would agree that Mr. A. Boarder, the expert in this field, does provide excellent articles for the coldwater fan.)

One of my own club members, 12-year-old Robert McAleese, of 10 West Street, Ballycarry, Co. Antrim, recently gave me a letter for W.I.Y.O.? Robert's letter informs us that his parents recently got a new aquarium; they have got about 40 fishes so far but have not had much luck as they have lost about 20. The fish which catches everyone's eye is a red-finned shark. Previously the McAleese family had a black shark which was popular, but one of the bigger fishes ate it. Most of the 20 "lost" fishes have been eaten by other larger fishes. Robert hopes that his family will have more luck in the future as the loss of so many fishes is not only very disappointing but also expensive. (I hope to be able to give Robert some advice about which fishes to avoid in a community aquarium to prevent any more fishes being eaten by others.)

Stephen Clifton is 14 years old, and lives at 80 South Crescent, Featherstone, Wolverhampton, Staffs., WV10 7AU. The "boss" in his tropical community tank is a large, silver angelfish. (Photograph 1 shows two of my marble angels poised to pounce on some freeze-dried *Tubifex*.) Stephen's angel is the second largest fish in the tank, being beaten in size only by a large, brown and black spotted catfish with long, whip-like barbels. On average, Stephen spends about 80p per month on fish foods. As well as his

3ft. community tank he also has a 4ft. marine set-up containing clowns, damsels and a large sea anemone. Stephen's elder brother plans to enlarge this tank into a 10ft. marine show tank—which will end Stephen's freshwater days. Before finally going over to marines he would like to breed some species of Cichlids—and would like readers' suggestions as to which species might be easily bred.

Mr. G. Robertson's letter reached me from 88 Cornhill Road, Aberdeen, Scotland, AB2 5DH, and he has some further comments to make about marines. For beginners, Mr. Robertson would recommend any species of damsel fish—without hesitation. He says that they are hardy, colourful and cheap, but suggests that only one fish of the same species should be kept in the same tank, unless the tank is very large or an attempt is being made to breed the fish. Like many other fishes from coral reefs, says Mr. Robertson, damsels are very "territorial," and will defend their chosen area from others of their own kind. Mr. Robertson has only ever kept two types of tropical marine invertebrates: an anemone and some live *Fungia* coral; both died after about two months. However, he has had considerable success with the keeping of native marine invertebrates in tropical tanks—although many can only be kept in "temperate" tanks. Snakelocks, anemones, sea urchins, hermit crabs, squat lobsters, prawns, shrimps, etc., will all adapt to tropical temperatures and make interesting—and often colourful—inhabitants, he says. Mr. Robertson continues: "If anyone is interested in marines I would strongly urge them to join the British Marine Aquarists Association, which entered its third year of existence in November last. It produces an illustrated monthly newsletter called *Marineus* which is full of articles and information on both tropical and temperate fishes and invertebrates."

"Dear Bob, Being my second attempt at writing I hope this time some shall be edited with any luck," writes Barrie Stirk, aged 17. (I hope I got your name and age correct, Mr. Stirk. Although you did *print* your address, your signature was a little difficult to read. Unfortunately I didn't receive a previous letter from you—possibly because my name isn't Bob. Nor is it Bernard, a variation used by a young lady who wrote to me this month. All letters for this feature should be sent to B. Whiteside, "What Is Your Opinion,?" "The Aquarist," The Butts, Half Acre, Brentford, Middlesex. To ensure that I get your data correct, please *print* your name and address, and put the date on your letter; if you require a reply, a S.A.E. should be enclosed.) Mr. Stirk lives at 50 Mayflower Road, Bexley Heath, Kent, and he comments on small marine set-ups as mentioned by Mr. M. B. Rowland (November edition). Mr. Stirk kept a 24in. × 12in. × 12in. marine tank but found that it was too small for the comfort of the fishes:



only small clowns and damsels could be comfortably accommodated. He also says that the nitrite content reached a dangerous level very quickly—as he found out when he lost his complete stock overnight. Regarding the keeping of sea-horses, Mr. Stirk says that the only problem is to ensure that the creatures get enough food before the other animals in the tank consume it. This can be done by placing the food near the sea-horses. He has found that they rather like medium-sized brine shrimp and *Daphnia*. Mr. Stirk has 23 aquaria—of 24in. or 36in.—and he has found that the “boss” fish of his whole collection is a red-tailed shark. His specimen is kept with fishes of its own size and larger—including Cichlids, African barbs, a black shark, etc. Mr. Stirk has also tried photographing his fishes, and has reached the conclusions that for best results one needs a reflex camera, or a camera with a good close-up lens which focuses down to 2in.-3in. Fishes are most easily photographed in a small aquarium with a sheet of glass placed about 2in. from the front glass, and the rear of the tank planted. This arrangement gives the fishes little room in which to move. Having raised a trio of baby Discus from the size of a 1p piece, to just over the size of an old half-crown, Mr. Stirk finds that they are not very interested in flaked foods, but prefer *Tubifex* and *Daphnia*. (I recently wrote about having to clean the valves in my air-line controls.) Mr. Stirk continues his letter by suggesting that perhaps the air filter in my pump was clogged up as this can reduce an air pump's output. (Such was not the case in the instance which I quoted, but Mr. Stirk's point is a useful one.) Finally, Mr. Stirk informs us that it costs “a bomb” to feed his fishes as they get through 1 large ox heart, 1 lb. of *Tubifex* and about 50p's worth of *Daphnia* per week. He finds it difficult to calculate the cost of dried food used as he buys large tins. All in all, Mr. Stirk spends about £1.00 to £1.25 per week on feeding his fishes.

Before going on to the next letter I'd like to thank those who sent me a Christmas card but did not include their own address. Your thoughtfulness was appreciated!

Mrs. B. Harris's address is 33 Pound Lane, Marlow Bucks., and she writes about the African butterfly fish. She has kept one, and after a lot of trouble trying to catch flies for it she bought some maggots from a local fishing shop, hoping that her fish would eat them; it wouldn't; so she kept the maggots until they turned into flies, stunned them, and fed them to the fish. By buying small quantities of maggots at weekly intervals she has kept up a regular supply of fresh flies for her fish. Mrs. Harris gives two warnings: (a) keep the fish's tank well covered, and (b) make sure that no one opens the box containing the flies. She informs us that the African butterfly fish has been bred in America. She has also kept

“Rams,” golden “Rams,” *P. kribensis* and golden-eyed dwarf Cichlids, successfully in extremely hard water. She uses 1 teaspoonful of salt per gallon of water, but finds the water temperature to be critical: at temperatures under 80°F the fishes soon start to deteriorate.

Photograph 2 shows the dwarf pencilfish, *Nannostomus marginatus*, which only reaches a length of about 1½in. Over the years, few fishes have given me more pleasure than this little beauty—and I have found few which have been more difficult to photograph! I would be pleased to hear of your breeding experiences with this species—and I can thoroughly recommend it for keeping with other small fishes such as neons and cardinals.

And now on to the tips which I asked for in the December edition. I must admit that I expected to receive rather more tips than I actually have, to date; but as it's now Christmas week as I write this and as I have to have this feature posted to reach our Editor before the end of the month, and as the Christmas postal rush may have held up some of your letters, more tips may yet reach me. Should this be the case, I'll include them in a future edition. The first batch comes from Mr. J. Midgley, of 3 Moat Gardens, Benchill, M/C22. Mr. Midgley refers to my “very sporting competition,” and offers the following tips for readers' possible use. Three years ago Mr. Midgley glazed a 100 gal. aquarium which he still has. It measures 40in. × 26in. × 18in., sits on a 36in. high stand which is situated on two “four by two” planks, and weighs, Mr. Midgley reckons, well over half a ton. The set-up stands at about 6ft. from the floor. The tank was glazed in the usual manner to begin with, but after a couple of years the base glass cracked—despite it being ½in. wired glass. A few months ago a new base glass, of ½in. plate, costing nearly £4.00, was bought. Before the glass was fitted this time, Mr. Midgley made indentations in the putty, 6in. apart, all round the bottom frame. He used his wife's “stick mop” for this job. The indentations were filled up with black Dow Corning Sealer, and the glass pressed into place. The sealer set, and is now like a set of shock absorbers. The rest of the tank was then glazed, but being so large, about eight tubes of sealer, at £1.00 each, were needed. However, Mr. Midgley points out that by doing the base-glazing as he did, he was saved from having to cut wedges of wood for the job. His tank now contains 1cwt. of gravel, and ¼cwt. of Anglesey rock, and hardly any cement has squeezed out of the base. “This idea I thought out as I lay in bed all night with a packet of cigs,” says Mr. Midgley, who signs himself “Big Jim.” He then adds a number of postscripts, the first of which tells us that it wouldn't normally cost £8.00 for sealer, but his particular tank presented special problems because of its height,

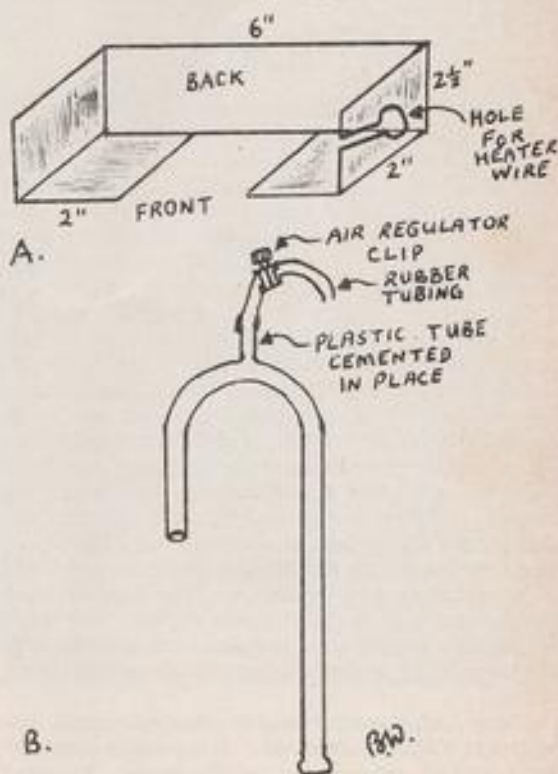
glass thickness and angle-iron frame size. Another postscript informs us that he lived near a canal where a factory which manufactured "Dolly Blue" bags was situated, and he says that the canal water and the goldfish which it contained "were great." His tip is to place a "Dolly Blue," in its bag, deep in the gravel, "for nice water, and to help kill parasites". His third P.S. tip is to push a couple of rabbit droppings under plants' roots, with a fine stick, to act as fertilizers; and his final tip: "From all those empty TetraMin Staple Diet Tablet boxes, collect the sponge linings and place them over your filter wool. They collect plenty of dirt and have no bad effects on fishes." For the empty boxes he says: "Give them to the kids to build with, or glue them all together with sealer, bore tiny holes, and make your own undergravel filter." (Quite a varied collection, you must admit!)

Mr. W. Clampitt sends his tip from 7 Newfield Drive, Moorends, Doncaster, Yorks., DN8 4RZ, and he has just returned to tropical fish-keeping after a lapse of 8 years. He recently bought some new fishes and wishing to keep them in quarantine for 48 hours, placed them in a 6in. diameter sweet jar which was floated in the tank. Within 6 hours the fishes were at the water surface gasping for air. Mr. Clampitt quickly introduced a diffuser stone which restored things to normal. He has checked several books and leaflets in shops, and although they mentioned isolating new fishes, they did not mention air requirements. Mr. Clampitt asks: "Would all beginners know this?" He ends his letter by saying: "Thank you for a good magazine, which has certainly improved since 1964."

Master Richard Kerrigan is 16 years old, lives at 56 South Eden Park Road, Beckenham, Kent, BR3 3BG, and has been keeping tropicals for 2 years. At the moment he has a 24in. x 12in. tank containing 14 fishes; it is lit by a 24in. x 20 watt Gro-Lux tube, and is filtered by an Airstream "Cascade" outside filter, operated by a Rena 100 pump. (Master Kerrigan says that the Rena 100 pump is "the best pump for any purpose.") But he has a problem! However much he cleans out the tank and uses "Acurel F," he doesn't seem to be able to get rid of a blue/green algal slime which covers everything, making the water smell putrid. He asks if any readers have an answer to this problem as he is concerned about the health of his fishes. For a tip, Richard suggests the following: collect a small amount of garden clay and make it into a small ball of about 1cm. in diameter. Make a hole in it as far as the centre and place ONE DROP of "Baby Bio" plant fertilizer—available from most gardening shops—in it. Close up the hole with more clay, and place the ball in the gravel underneath—or at the side of—a plant or group of plants. Cover it well with gravel. The "Baby

Bio" is slowly released, he says, and feeds the plants. One under a cluster of plants is plenty. Richard would like to see the News from Aquarists' Societies replaced by useful hints and breeding tips from readers. He thinks *The Aquarist* is: "just great, and very interesting to read—especially W.I.Y.O.?" He would like the magazine to remain a "monthly" as he likes to look forward to its monthly arrival. (As I don't have enough space in this feature to answer your query, Richard, I've written a short article, called "Dealing With Algae," which appears in another part of this edition. I hope that it may be of some use to you—and to other readers who may have similar problems with algae.)

The final set of tips which has so far reached me comes from Mr. J. Griffiths, of 9 Ashlea Close, Garforth, Leeds, LS25 1JX, who says that W.I.Y.O. ? has been largely responsible for his return to the hobby after an interval of about 10 years. Mr. Griffiths's tips are for a concealed heater holder (A in diagram), and a modification which can easily be made to the siphon tube of a filter to enable one to start the siphon without the usual messing about with fingers or thumbs over tube ends (B in diagram). Unfortunately, Mr. Griffiths's own excellent drawings were too large for reproduction on this page, so I have had to make condensed—and inferior—copies. The concealed



heater holder should be made from five pieces cut from a sheet of perspex, and cemented together with model aeroplane cement. The measurements given would suit a heater of about 5½ in. in length, but they can be adjusted, as appropriate, to suit any heater. When the heater is fitted into the holder via the wire hole, the holder is placed with its front tightly against the back glass of the aquarium, the base of the holder being set on the bare base glass of the tank. The heater wire is then led along the back of the tank's base, and up and out at the corner. Aquarium gravel is then piled up against the holder, retaining it in place, and gravel is also used to conceal and hold in place the heater's wire. Obviously, the depth of the gravel should be less than 2½ in. for the example given, or a holder of, say, 3 in.-3½ in. high made if the gravel at the back of the tank is deeper than 2½ in. Mr. Griffiths says that the advantages of his heater holder are: (a) the weight of the gravel keeps the container firmly in place; (b) a clear space above and below the heater is maintained; and (c) gravel cannot slowly cover the heater as with sunken heaters concealed by ill-fitting rocks. To modify one's siphon tube, a hole is bored into the top of the curve in the filter siphon tube, and a piece of narrow plastic tube is

cemented in place with "Araldite" (or balsa cement, if suitable). A short piece of rubber tubing is then pushed on, and an air regulator clip added. (The rubber tubing and clip may be replaced by a plastic air regulating screw valve—available from most dealers.) To start the filter siphon, one opens the clip, sucks out the air until the tube has filled with water, and then quickly closes the clip. The siphon should then be operating.

Well, there are the tips. Now, to whom do I award the prize? I liked Richard Kerrigan's "Baby Bio" tip, and Mr. Midgley's glazing tip, but I feel that Mr. Griffiths's tips would probably be of use to more people, so I've decided to post the prizes to him.

It's now Christmas day, so I'd better end off this month's feature before I have my Christmas dinner; I doubt if I'll be in condition for much writing afterwards! For the next time, please send me your opinions on the following: (a) What have been your experiences with the keeping and breeding of Koi? (b) Have you had any success with the breeding of neons or cardinals? (c) What have been your experiences with the keeping and breeding of toads? (d) What's your favourite brand of filter—and why? I look forward to hearing from you!

## B.M.A.A.

The British Marine Aquarists' Association was formed in November 1970 by a group of enthusiasts in the Midlands. The Association was formed to cater for the needs of the ever-increasing ranks of marine aquarists, both tropical and native.

Membership has grown steadily and now we have members from all parts of the U.K. and even a few abroad, notably in Malta, U.S.A., and Australia.

The principal means of linking together our far flung membership is through the medium of our monthly journal *Marinees*. This journal contains articles, illustrations, "Discussion Page" (where members exchange ideas and methods), letters, and group reports. A list of members is circulated to all members to enable those living in the same area to contact one another. Many new friendships have started in this way. Where a number of members live in one area it is possible to form a local group of the B.M.A.A., which meet regularly and function along the same lines as an ordinary aquarist society, i.e. The West Midland Group and the South Western Group have both organised collecting trips and also joint ventures with sub-aqua clubs to obtain otherwise unavailable specimens.

Many dealers are prepared to allow substantial discounts to B.M.A.A. members. It is possible to recoup your annual subscription in discounts. A dated

membership card is being introduced to facilitate the claiming of discounts.

Slide shows are being compiled for hire. A beginners guide is being compiled to avoid continued repetition of basic fishkeeping. The Judging and Show Standards Committee have devised a Pointing System for marine fish on the show bench. It is hoped to issue detailed standards in future. A number of marine judges are available for Judging at Open Shows, etc.

The Association has an attractive and distinctive badge depicting our sea horse emblem. The badge helps members to recognise each other, at the big aquarist shows. The journal *Marinees* is held in binders by members, to form a book.

In aquarist societies and magazines covering all aspects of aquariology it is not possible to devote the time necessary for marines, and one seldom gets beyond "setting up." By the free exchange of information and ideas the Association plays a major part in developing and strengthening the marine hobby in its many and varied facets. So why not progress with the B.M.A.A.? Get a membership form and fill it in right away.

If further information is required please do not hesitate to write to the Secretary, B.M.A.A., J. H. Vickery, 26 Rosalind Avenue, Blamford Estate, Woodsetton, Dudley, Worcs. DY1 4JW.

From:— Public Relations Officer, M. Strong, B.M.A.A. 51.

# MIAMI SEAQUARIUM

by Michael Lorant

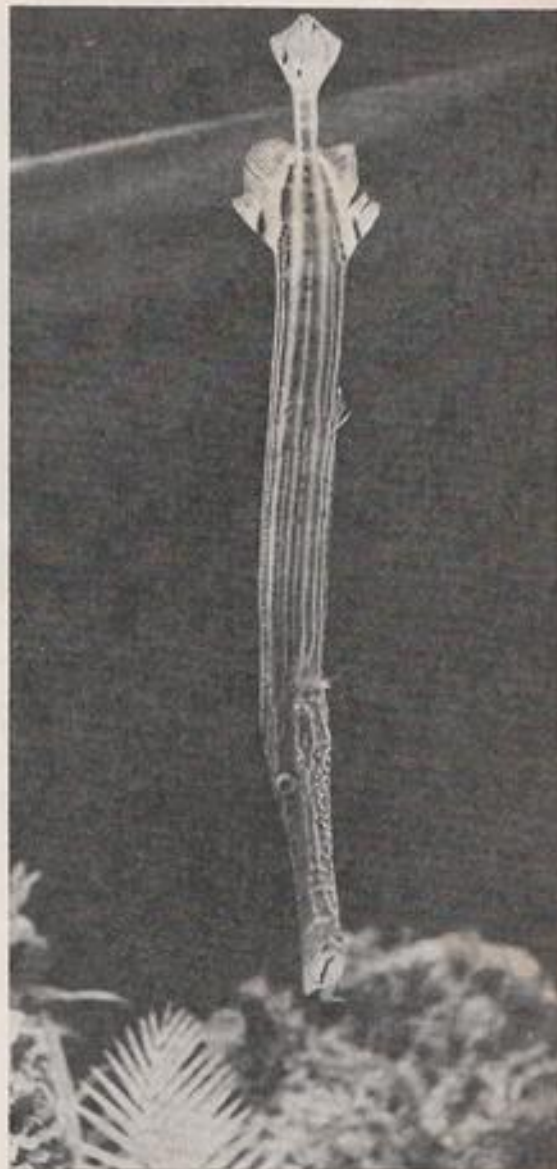
THE 55-acre Miami "Seaquarium" in Florida, is the largest and most spectacular salt water aquarium in the world. An eight bed Filtration Plant handles approximately 6,000 gallons of salt water per minute—enough water for a city of 80,000 population. The 80-foot Main Tank uses 4,000 g.p.m. and the 50-foot Reef Tank, 2,000 g.p.m. The Corridor Tank uses approximately five g.p.m. of the overflow off the two Main Tanks. The 80-foot tank holds 565,200 gallons, the 50-foot tank 220-252 gallons and both are 16½ feet deep. Twenty of the larger Corridor Tanks hold 500 gallons and the remaining six, 300 gallons. All water used is filtered salt water pumped out of Biscayne Bay.

Cowfish, toad fish, puffer fish, pipefish, sting rays, manatees, squid, Portuguese man-of-war, dwarf octopus, killer whale, and lots of other creatures—all weird and amusing children of the sea—swim nonchalantly before onlookers in the "Seaquarium" in its two huge steel and concrete tanks. In one tank 80 feet in diameter and 16 feet deep sharks and giant rays as well as the "kittens of the sea," the porpoises, mingle as freely as they do in the depths of the ocean. In the fifty foot tank coral reef shelter the highly coloured tropical specimens and the hundreds of game fishes found in the South Atlantic waters. Twenty-six smaller tanks enable the visitor to study and observe the innermost secrets of the rainbow-hued finny, funny marine animals and fishes of the strange underwater world.

A seven hundred and fifty foot circular Shark Channel contains the largest exhibit of live sharks in the world. More than one hundred manatees of the deep live in this channel. Guides tell about their habits as the onlookers watch lemon, bull and tiger sharks cruise around searching for food.

The Lost Island or "Tide Pool" area has been developed to portray the natural home of shallow water residents. Colourful parrotfish, mullet, bonefish, crabs, crayfish and other specimens inhabit this much photographed area of the grandiose aquarium.

Sea Lions, the animated speed "demons" of the ocean, and the highly trained porpoises perform their antics in the Sea Lion arena; it is an open air arena



Pipefish with vertical posture

around a special tank. Porpoise performers at the Sea Show Arena, leap through hoops, ring bells, "sing," play ball and do other feats upon command of their trainer.

Divers descend to the bottom of the big tanks to feed by hand the playful porpoises, large sea turtles, rays and the thousands of their inmates of this "man-made"

ocean under glass; also to clean the tanks and care for the sea-monsters in residence.

Continuous rows of windows encircle the tanks on two levels; through the underwater windows one can photograph oft-told dramas, but seldom witnessed stories of the stark realism of the ocean's "survival-of-the-fittest."



Toad fish

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## CONSIDERING GOLDFISH STANDARDS

by M. D. Cluse (President of G.S.G.B.)

THE review in the September issue of *The Aquarist* by Arthur Boarder about the new standards booklet published by the Goldfish Society of Great Britain, is welcomed by the Society. In his usual forthright manner, such adverse criticisms that he makes, come straight from the shoulder, but in this case have rather a blunderbuss effect. Fortunately none of the pellets are lethal and several have missed the target. However, this does allow the points raised to be examined and explained. During our efforts over some years to discover criticisms and disagreements with G.S.G.B. standard making, comments seemed nebulous and argued points of view were seldom formulated. Of

course, there were expressions of personal likes or dislikes but they were not given a national basis. G.S.G.B. has a logical system which when explained can be understood.

Fancy goldfish varieties have combinations of various genetical variations from the normal, which is the common goldfish. This is just one mutation from the wild bronze type because it is gold or silver in colour. For shape it can be considered as normal. We take the body depth to be about two-fifths of its length without the caudal fin. The lobes of the latter seem to be about one quarter of the body length. Because the goldfish has been kept by the Chinese for many

hundreds of years, several mutations in shape of body, fins and appurtenances of the head, eyes, nostrils, etc. have arisen and have been preserved. The permutations of these mutations by mongrelisation can result in an almost infinite number of varieties. Therefore G.S.G.B. decided that it had to keep recognised varieties to a reasonable number. As far as possible each genetic factor affecting shape would be recognised with the normal or extreme mutated genetic factor. This was to rationalise breeding practice. Hybrids cannot breed true. Apart from shape, two other genetic factors affect appearance: (a) pigmentation, (b) the presence, absence or partial absence of guanine crystals which cause "shine".

G.S.G.B. describe these three groups as "metallic" (bronze, gold or silver), "matt" (no shine) and "nacreous" (mother of pearl) which is a hybrid between the other two groups and has some shine. Our named "shape" varieties could each be recognised on the show bench in any of the possible colours or in any of the three groups. It was found that all mutations seen in Britain in 1948 could be covered by four basic varieties which, for G.S.G.B. usage, were called Singletail, Twintail, Globe-eye and Bramblehead. Each variety was separate and distinct and could not be obtained by interbreeding with the other varieties or be found among the young throwouts, e.g. Nymphs.

As for award points, the five twenties system was not adopted, because it was considered that the body shape was very important. The goldfish seems to be the only domesticated fish which has an obvious mutation concerning the shape of the body. Therefore 24 points were awarded for body, 19 for fins, 19 for colour, 19 for condition and deportment, and 19 for special genetic characteristics which it was desired to encourage, e.g. the "hood" on the Bramblehead (lionhead). Such briefly, was what appeared in the 1948 first edition of G.S.G.B. Standards. However in 1962, four more basic varieties were added to cover genetic mutations then available in Britain. These were Celestial, Bubble-eye, Pompon and Pearlscale. Also standards were drawn up for three popular varieties: (a) Common goldfish (and its calico corollary the London Shubunkin); (b) Oranda; (c) Fantail. At that time calico types of the Bramblehead, Celestial, Pompon and Bubble-eye had not been seen in this country, but all were catered for in the pointing system. All but the calico Celestial have now appeared as expected.

In 1968 when Federation of British Aquatic Societies adopted G.S.G.B. standards, the Comet was added, making twelve varieties in all. With the present 1972 edition, only the Broadtail Moor has been added by popular request. For ease of understanding outside of G.S.G.B. the "nacreous" and "matt" groups are classed as calico. Calico fish are deficient in guanine. Also the Twintail will again be

called the Veiltail. The Singletail we could have renamed the British Goldfish and Shubunkin, but this would have been confusing to the general hobby, as a fish of this shape is generally known as the Bristol Shubunkin (nacreous group only). Unsuccessful attempts were made to discuss standards with Bristol Aquarists Society whilst examining actual "ideal" fish.

Eventually we modified the Singletail drawing by giving the caudal fin a little more spread and obtained permission for B.A.S. to call it the Bristol Type Shubunkin and Goldfish at their suggestion. Apparently B.A.S. will continue with their own drawing and pointing system. Of course, we do not allot points for red colouring as it only appears when the blood shows through the gill plate in calico fish. If anyone doubts this let him pluck a scale from the "reddest" fish and place it on a sheet of white paper or send it to the British Colour Council for identification. Goldfish pigments are orange, yellow and black. All fish in the metallic group can be "goldfish," even Veiltails. Singletailed goldfish can have distinctly different shapes for genetical reasons. G.S.G.B. recognises three, which are the Comet (forked caudal fin up to the length of the body), the Bristol Type Goldfish (round lobed caudal fins half length of body) and the Common Goldfish (caudal fin quarter length of body). The propositions and shapes are clearly defined in the standards booklet. The markedly forked caudal fin is represented among the twintailed varieties by the Globe-eye and the Oranda. The "square-cut" tail is represented by the Veiltail and the Broadtail Moor. Points are awarded for calico Pearlscales because they are deficient in guanine. I have plenty in addition to the metallic groups. I have never seen a "scaleless" fish because they do not exist. As for the Bramblehead (lionhead), the alternative of making a standard with long caudal fins or short caudal fins was put to a ballot of G.S.G.B. members about 24 years ago and they voted for the latter. It has the advantage of making this fish very pond hardy. We have never called the Oranda, a Bramblehead. We do not provide a standard for the fantail moor, as it is often just a "throw-out" from long-tailed moor stock. As for the Fantail, we consider it of prime importance that the caudal fin should be perked up and appear spread out like a fan when viewed from the rear. Too many fish have appeared on the show bench with tails so long that they droop and could be confused with Veiltails with shortish tails. The G.S.G.B. type test allows a caudal fin length of up to half body length, but as the fish gets older, drooping will probably occur and points will be lost for carriage of caudal fin.

A great deal of thought and discussion went into the logical development of G.S.G.B. standards and we believe that we have produced a practical consistent and rational system which will help the breeder and lead to greater judging consistency.

# From a Naturalist's Notebook

by Eric Hardy

HADDOCK used to be among the seafish in the old Blackpool marine aquarium, and long before that in the former Southport marine aquarium. They are much slower swimmers than most members of the cod family, their maximum aquarium cruising speed being 2.1 times the body length per second. Most aquaria are stocked with young fish whose age for the first five years is fairly accurately read from their scales. The otolith or ear-bone is more suitable for distinguishing different fish-populations from different areas, better than the average number of vertebrae used in many fish. The length of the haddock's otolith, like that of the cod, decreases greatly as the fish's length grows longer.

Its water temperature ranges from 2 to 8°C. Though bred earlier in European aquaria, it was recently spawned for the first time in the U.S.A. in the Narragansett Laboratory of the Government fisheries, by obtaining a dozen sexually mature fish from local fishermen. Held for a fortnight in mid-February at 5°C, they then had their tank-water increased by a fraction of a degree daily. The females enlarged noticeably. Eggs were found on the 15th day after introduction to a 15,000 gallon tank, only 2 days after the increases in temperature began.

At first, only 10 per cent of the eggs were fertilized, but when water temperature reached 6°C fertilisation rose to 90 per cent and more eggs were laid. Hydrophones recorded the male's clicking sound, produced at spawning time by specially developed muscles in mature fish. It intensifies these sounds increasing the frequency to a humming in the courtship activities preceding spawning. Though a female haddock can produce up to 1,000,000 eggs, they rise to the surface of the sea and there suffer high mortality. The Narragansett Lab. intends to use its spawning success to supply biologists with fertilised eggs of known age for studying the haddock's early life stages.

I mentioned the other month, apropos the addition of a yellowfin tuna to the British fish-list, that artificially hatched larvae at Japan's Kinki University had died after 20 days, when feeding started. Japan's Pelagic Fisheries Research Lab. has subsequently called this "successful culture" of yellowfin, in raising young after collecting spawn from two mature fish, fertilizing and hatching the eggs (and likewise with bluefin tuna). The yellowfin eggs were hatched after 24 to 30 hours in about 26°C, producing 10,000 larvae from 1.2 million ripe eggs. The longest

survival was 20 days.

Sea-snakes used to be the ignorant gossip of writers and seafarers who did not have sufficient zoological background to identify brief or difficult, incomplete glimpses of North Atlantic ribbon-fish, schools of dolphins, or giant squids. In more tropical water, truly aquatic sea-snakes are well known. A recent new 259-pages treatise on *The Genera of Sea-Snakes of the Hydrophis Group (Serpentes: Elapidae)* published by S. B. McDowell of Rutgers University, U.S.A., and the Zoological Society, (£2.50) is the first key to the identification of this difficult group, which includes most of the known sea-snakes, for almost 50 years. The largest, most venomous and most widely distributed sea-snakes belong to it. Their classification is based upon head-muscles.

With regard to marine life in our home seas, the marine aquarist with limited seaside facilities, and without the luxury of private collecting boats like many of the biological stations around the coast, can usually obtain a variety of living specimens by being on the pier or quayside when small inshore bottom-dredging fishing-boats return to port. In the Isle of Man in December, I met half-a-dozen stout, wooden fishing boats returning from dredging for queens, small relatives of scallops, about 10 miles out in some 19 fathoms. Like the Welshmen in Cardigan Bay, they have developed an energetic fishery for this suddenly lucrative shellfish, for American export, and may be overfishing. One boat came in with 100 bags of queens. All had the last hauls of their twin dredges still on deck, and began to sort out the queens alongside Douglas's Victoria Pier, shovelling into the water all the general captures which had come into the chain-dredge with them—sea-urchins, whelks, hermit-crabs, some of which left their whelk-shells to scramble about the confusion of mollusca, as well as starfish, sunstars, brittlestars, dead men's fingers (*Alcyonium*), etc., by the score.

A few years ago a new British cockle was separated from our common sand-channel cockle, *Cardium edule*. It was the brackish water cockle, *Cardium* (or *Cerastoderma*) *glaucum* (or *rusticum*) which favours rather more sheltered inner estuaries and non-tidal pools. Unlike *edule* which always buries itself, this may often be found suspended in the seaweed as well as buried. It is recognized by its shell-ligament being hidden by the umbo (or bulging "beak" at the hinge end) in the more posterior view it presents when looked at

sideways, whereas the ligament is easily visible in *edulis*. Some recent studies of the brackish water cockle's distribution around Britain's coast, made by Boyden and Russell of Queen's College (London) and Hatfield Polytechnic, found it occurs chiefly on the south coast, East Anglia, south and west Eire and the Outer Hebrides, but is scarcer, or absent, from the Irish Sea coasts, the West Country and mainland Scotland, perhaps because of fewer suitable habitats.

The Council for Europe's nature conservation centre recently drew attention to the biggest losses in European plants being due to drainage and subsequent ploughing of marshes, bogs, ponds, and lake-margins. They cite British plants like greater spearwort, our smallest mint pennyroyal and the mauve-flowered marsh-pea as examples. The latter is down to some 5 stations in Britain, and Wicken Fen and the Norfolk Broads are its main haunts. Pennyroyal usually sprawls over damp, heathy places in south-eastern England, even so near London as Mitcham Common before the war.

London's fauna and flora is recorded more meticulously than that of any other city in the world. Alwyne Wheeler, of the British Museum's department of fishes, has now confirmed the addition of the white or silver bream, *Blicca bjoerkna*, to the list of Thames fish. The capture of a specimen at a Wraysbury pit in 1965 came after his 1957 list of Thames fishes which failed to find the previous records. It is in the river at Reading, Moulisford and in a Dagenham pit in the past, silver bream have been confused with young common bream and roach  $\times$  bream hybrids, often all listed as "bream". But the Wraysbury pit was probably stocked, like other haunts, with East Anglian fish, for silver bream are probably native only to waters from Yorkshire to Suffolk, just as elsewhere

in the country they were introduced to waters like Tatton Park (Cheshire) and Rainhill (Lancashire). However, when I compiled a check-list of Thames fish during a period of local residence 30 years ago there was a 5 lb 8 oz silver bream, a very big specimen, caught at Datchet, apart from heavier common bream. de Boinville wrote an article on Thames bream in *The Angler* (a long defunct magazine) p 403, Vol. VI, 1895.

The slimy, pale green silver bream has 44 to 50 branched rays in its anal fin, which keels the abdomen; not more than 21 branched rays in the tail; with a large silvery eye; 44-50 scales along the lateral line (less than common bream with 51-57); 8-11 between dorsal fin and lateral line (12-13 in common bream); and 5-6 from the lateral line to the base of the pelvic fin. Both breams are difficult to keep in aquaria, losing their usual appetite unless tempted with bloodworms, *Daphnia*, water-shrimps or small snails. They need well-oxygenated water.

The London Natural History Society inspires much of this interest in the Metropolitan area. Their recent account of the spiders and their allies on Bookham Common includes the finding of many specimens of the aquatic Oribatid mite, *Hydrozetes lacustris* on lesser duckweed in Sheepbell Pond and on this duckweed and crystalwort which is the water-liverwort, *Riccia fluitans*, in the South-East Pond on the common. This aquatic mite causes considerable damage to duckweed on American ponds, surviving the drying-up of ponds in its egg state.

They are concerned over the despoilation of Ruxley Gravel-Pit at Bromley by dumping refuse at this water reserve, and hope to buy, or rent, Orlitts Lake, near Iver, as a reserve to safeguard it against efforts to obtain water-skiing.

#### ADVANCE NOTICE

THE FEDERATION OF NORTHERN AQUARIUM SOCIETIES  
are proud to announce



### THE 22nd BRITISH AQUARISTS' FESTIVAL

will be held once again at Belle Vue Zoological Gardens, Manchester

on

SATURDAY AND SUNDAY - 13th, 14th OCTOBER, 1973

FURTHER DETAILS SHORTLY



# THE CARE OF BABY TERRAPINS

by *Stephanie J. Peaker*

I HAVE HAD several requests from readers asking me to deal with the care of baby terrapins since of the large numbers bred and shipped from the southern U.S.A. few survive for more than a few months. This is usually due to two causes. The quality of stock shipped is often poor and secondly there is often a lack of knowledge of their requirements on the part of the owner rather than a deliberate lack of care. Unfortunately, information is not easy to find. Only one book that I know of has dealt with the correct care of young terrapins and this is now many years old. Furthermore, since these animals are often purchased from a local pet shop, the prospective owner does not have the benefit of the advice of an experienced reptile dealer and the average pet-shop owner is often blissfully unaware of the type of treatment needed.

In essence, and with very few exceptions, all baby terrapins need to be treated somewhat like tropical fish with a prevailing high environmental temperature, correct housing and food. They must never be kept in the plastic "turtle-bowl" often seen in shops because these are the most effective method of ensuring that the inhabitants die that I know of. Similarly, dried ant *pupae* sold as "turtle food" are completely useless as a diet for these reptiles.

In this article I am following English usage and calling freshwater-dwelling chelonians terrapins although it should be remembered that the term "turtle" which is reserved for marine forms in England is used for all except land tortoises in America. Since the shippers use "turtle" to describe terrapins, the wholesalers and retailers have copied it and usually this term is seen advertising these species.

Undoubtedly the most important factors in rearing young terrapins are temperature and cleanliness. English outdoor or indoor temperatures are not sufficiently high for these reptiles and, therefore, the tanks used to house them must be artificially heated. Since most of the specimens imported as hatchlings are from the southern U.S.A., examination of climatic data from these regions is useful. Summer shade temperatures range from a mean minimum of about 75°F to a mean maximum of about 90°F. Since the water temperature is usually below the maximum air

temperature, I suggest a water temperature of 75-80°F is suitable. However, in the wild basking in the sun allows the body temperature to rise to a preferred optimum level. Above this temperature the animals dive back into the cooler water. During the daytime it is therefore necessary to provide a radiant source above the water under which the animals can bask. Incandescent lamps are the most convenient way of doing this. However, these should be turned off at night in order to allow the land area and air to cool since it is now firmly established that continuously high temperatures have a deleterious effect and that a nocturnal period of relief is necessary. This method of maintaining a constant water temperature and raising the land temperature during the day follows the pattern in the wild and cannot be more highly recommended.

Maintenance of water temperature is a simple matter if a submersible, combined heater-thermostat is used. These units are more convenient than two separate parts since they are more easily cleaned. A time-switch is the most reliable method of ensuring that the lamps are turned on and off regularly and a "day-length" of twelve hours or a little longer is ideal. Thermometers (I prefer the stick-on dial type) should be placed in the water and in the air space above the water. The wattage of the lamps should be determined by trial-and-error. The lamps should not be so powerful that they cause a marked change in water temperature. A thermostat to control them is undesirable because the animals would then be subjected to light and dark periods throughout the day.

An ordinary aquarium tank is suitable for housing baby terrapins. Although the 12 in. x 8 in. x 8 in. size is suitable for several specimens, a 24 in. tank provides more space, is more pleasing to look at and the water temperature will be less likely to rise significantly when the lamps are turned on. Aquarium gravel may be added but it is not necessary although again it improves the appearance of the set-up. If it is used it should be thoroughly washed each time the tank is cleaned. Large, clean, non-porous rocks should be positioned to allow the animals to leave the water easily, dry off and bask in the artificial sunlight. Flat

rocks in the bottom of the tank are also useful to vary the depth of the water. The maximum depth of water should be about four inches. Heaters, etc., should be installed and the temperature checked for at least several days before the animals are installed.

Other methods exist for housing these specimens. A small indoor pool with an enclosed land area over which can be suspended an electric lamp is fairly convenient. Heat can also be supplied to a small outdoor pool during the summer months and, although it may prove a little expensive in electricity, this method is successful especially when the terrapins have grown a little. Natural, direct sunlight is certainly beneficial although shade must be provided. A wire-mesh lid over such an enclosure may be a necessary protection against the neighbourhood cats. The electric wire to the heater may be run in conduit piping beneath the garden and the usual safety measures should be employed. I have found that a 150-watt aquarium heater controlled by a thermostat is sufficient for a very small garden pond. If a small shallow pool is used then it must be built so that the water will drain away quickly during cleaning out operations because ease of cleaning is essential. In the wild some of the terrapins hibernate but it is not safe to permit this to happen.

Young terrapins are best obtained from a specialist dealer. Only on several occasions have I found healthy stock in an ordinary pet-shop. Many I have found to be suffering from "soft-shell" due to dietary deficiencies. This can easily be detected because the shell is leathery and can easily be bent out of shape. Eye diseases are also common. On the other hand the good dealer usually has some healthy specimens during the summer months and they are best purchased as soon as possible after their arrival in Britain.

From four to six half crown size terrapins can be kept in a 24 in. tank and this will allow growth to occur without the animals becoming overcrowded. It is preferable to introduce all the specimens at one time and then watch carefully for any sign of disease. It is very unwise to add non-quarantined stock to those already established.

Correct feeding is another very important aspect of their care. In the wild, many terrapins are omnivorous, eating quantities of both plant and animal matter. I use a varied diet consisting of pieces of meat, liver, earthworms, *tubifex*, small soft-bodied mealworms, lettuce, water plants, etc., supplemented with vitamins and minerals. Water plants in the tank can therefore serve three purposes—food, shelter and decoration. An adequate supply of vitamins and minerals is essential for these animals to remain in good condition. Calcium together with vitamin D are most important in this respect. I usually prepare an emulsion consisting of cod or halibut liver oil, a few drops of a multivitamin preparation and bone meal (sterilized) or calcium

phosphate. This is then shaken and mixed with the small pieces of meat. It must be ensured that not too much oil is used or the terrapins may refuse to feed. Another excellent source of food is herring cut into very fine pieces complete with fine bones. I also provide calcium in the manner suggested by A. Loveridge (*Copeia*, page 136, 1947). Plaster of Paris is mixed with water and allowed to solidify. Lumps are placed in the tank and the animals will then nip off pieces and swallow them.

Excess food quickly fouls the tank and it is often recommended that a small feeding tank should be used in which to feed the animals and which can be cleaned out after every meal. I have never really found this method to be practicable if more than a few animals are kept. At high temperatures digestion is rapid and I am inclined to feed perhaps three times per day for six days each week. Some species are nervous and can be put off their food by moving them to a strange tank. However, it is particularly important to keep the tank clean especially if the terrapins are fed where they normally live. If faeces and excess food are siphoned off every day, cleaning will be necessary about every week. Filters of the mechanical trapping type are useful but still the water must be changed regularly since breakdown products still pollute the water, albeit invisibly. Perhaps the best filtration method is one in which the water also passes through an ultra-violet sterilizer on its way back to the tank since then the bacteria which thrive in terrapin tanks will be kept under control more easily.

In order to replace some of the beneficial effects of sunlight, the animals may be exposed to a weak source of ultra-violet light for a short period each day. From a few minutes this period can be extended to 15-20 minutes within a few weeks.

A disease which can conveniently be called rickets, or "soft-shell," must be prevented by ensuring that a good diet is given, for once in an advanced state it is almost impossible to cure. In later stages of the disease the eyelids may become thickened but sometimes an animal will be found to be suffering from an eye disease not connected with rickets. A milky exudate may even seal the eye. If the eyes are cleaned with a piece of gauze soaked in a boracic solution and then smeared with an ophthalmic antibiotic preparation (obtainable only on veterinary prescription), recovery can be very rapid. If it is not, then treatment should be repeated regularly. Eye infections of this nature usually occur in newly-obtained stock or in unsanitary conditions and should not occur at all frequently in established specimens in good environmental conditions. The precautions concerning infection with *Salmonella* organisms which are responsible for food-poisoning in humans have already been dealt with in another article (*The Aquarist*, vol. 32, p. 301, February 1968). Occasionally, an individual will be found which

ceases to feed under ideal conditions. These runts should preferably be humanely destroyed if the condition persists.

The majority of baby terrapins imported into Britain arrive from the south-eastern parts of the U.S.A. They can be identified with a fair degree of accuracy from Conant's Field Guide to the Reptiles and Amphibians of North America. If the description of a particular sub-species almost, but not quite, fits a particular specimen it should be remembered that inter-gradation occurs and that exact description is impossible. The most commonly imported type is the Red-eared or Elegant Terrapin (*Pseudemys scripta elegans*) which occurs from Ohio and Iowa to New Mexico, and which is bred on "turtle farms" in the southern states for the pet trade. In the east it is replaced by Troost's or the Cumberland Terrapin (*Pseudemys scripta troosti*). All these forms have attractive "hieroglyphics" on the plastron although it is most attractive in the Elegant sub-species. In the Florida Cooter (*Pseudemys floridana floridana*) the plastron is unmarked. Other species that are often available include Mud (*Kinosternon*), Musk (*Sternotherus*), Map (*Graptemys*) and Painted (*Chrysemys*) terrapins.

Some South American species are also sometimes available including again different sub-species in the genus *Pseudemys*. An attractive terrapin of a completely different group of chelonians, *Podocnemis unifilis*, is also commonly available. Terrapins of this group (Pelomedusidae) cannot draw their head into the shell vertically but fold their necks sideways to imperfectly hide the head. I have successfully kept this species using similar methods to those I have described except

that I provided deeper water (about six inches) and maintained the water temperature at 80°F.

Baby European terrapins (*Emys orbicularis*) require just as exacting care as their American counterparts but in this case I have kept the water at 70-74°F. From the Far East, Young Reeves's terrapins (*Chinemys reevesi*) can be recommended. Although it occurs as far south as southern China, most specimens reaching Europe are from Japan. Indian species belonging to the genus *Kachuga* are also available occasionally. These can be fed lettuce and other greenfood and it is often stated that they seem to be purely herbivorous although I doubt whether this applies to the babies.

Provided that the temperature is kept sufficiently high, a good diet is supplied and the terrapins are in good condition when they arrive, growth should be rapid. Many different species can be kept but it should be remembered that their care is not simple and a little effort in the right direction produces an adult specimen of which the owner can be justly proud.

Summary of recommended temperatures for terrapins from different localities. This does not deal with specific forms which occur at high altitudes.

| Locality                         | Temperature |       |
|----------------------------------|-------------|-------|
|                                  | Water       | Air*  |
| Northern U.S.A. . . . .          | 70          | 80-85 |
| Southern U.S.A. . . . .          | 75          | 85-90 |
| Northern South America . . . .   | 80          | 85-90 |
| Northern Europe . . . . .        | 70          | 80    |
| Southern Europe and North Africa | 75          | 80    |
| Southern Asia . . . . .          | 80          | 85-90 |
| Japan and Taiwan (Formosa) . .   | 70-75       | 80    |

\* Maximum during the light period.

## PRODUCT REVIEW

**Zoobeko Top Filter**, distributed by Hillside Aquatics, 29 Dixons Hill Road, Welham Green, Nr. Hatfield, Herts. The country of manufacture is not given on this new filter, but I assume it's Germany. I do not know the price at the time of writing.

I have seen and used a good many outside filters over the years, but the Zoobeko Top Filter is one of the largest—if not the largest—which has come my way. It is also one of the most sturdily constructed, and has a very large water turn-over rate for an air operated filter. Although I do not know the price of it, for the above reasons I should imagine that it would be quite expensive; however, as its water output is greater than a number of motor power-filters, and it has no "moving parts" which might need to be replaced at regular intervals, this filter would appear to be the answer for those aquarists who want a filter which has a

high turn-over rate, but which is not motor powered. The manufacturer's aim was to produce an outside, air-operated filter with a water turn-over which is better than some power filters, but which would not depend on an electric motor in the filter: the idea being that it is comparatively easy to have an air pump repaired or replaced.

The filter consists of a rigid, plastic container, green in colour, but transparent so that one can see when filter wool needs cleaning or changing. The filter container is cylindrical in shape, and has a diameter of approximately 5 in. at the top, and 4 in. at the bottom. Its lid is tightly secured in place by three round nuts which can be easily tightened or loosened with a finger and thumb. An air line is fitted to the base, where the air inlet is situated, and the air is broken up into smaller bubbles when it passes through the appropriate section

of the filter. (An air-stone is *not* used in this filter). The filter container is approximately 9½ in. high, and the bubbles of air travel up through a central tube in the container, and carry the filtered water with them. One packs the upper part of the container with an appropriate quantity of filter wool—and activated charcoal could also be added, in a layer, if required. The lid of the container is fitted with a water inlet and outlet.

The filter is supplied with a number of sections of rigid, green tubing which are about 6 in. in length, and about 4-5 in. in diameter; a section of about 11 in. in length, complete with strainer, is supplied to siphon water from the aquarium into the filter container. A number of other appropriate pieces of tube are supplied, as are several straight and right angled connectors in flexible tubing. Another section of tube is supplied fitted with an airline tube and valve, and a funnel is supplied with which to fill the filter with water before use.

In use, the filter is placed beside the aquarium, and appropriate lengths of tubing and connectors are fitted to suit the filter for the aquarium with which it is to be used. The filter is then filled with water, the airline valve opened, and the air sucked out of the siphon tube. (This must be done carefully or, as I found out by not keeping my eyes on what I was doing, one can get a mouthful of water). The valve is then screwed tightly shut, and the filter is ready for use. When the air pump is switched on the filter is working.

I decided to test the filter using the quiet running Zoobeko Kurier pump which I recently tested, and managed to obtain a water turn-over of approximately 60 gallons per hour—which, I consider, is very good for an air operated filter. With such a high turnover-rate, good filtration was obtained—and the water returning to the aquarium was well aerated. An interesting "aside" which I discovered was that by turning the return water tube out over the edge of the aquarium, and placing a 2 gallon bucket underneath, I had a quick and efficient method of emptying an aquarium which I wanted to move to a new site.

My only reservation about this new filter is the fact that it is relatively large, and could be difficult to conceal if used, say, with a decorative aquarium in a living room; however, its high water turn-over and good filtration compensate for this. The filter is easy to move from one tank to another, and could quickly be switched to another tank if it were to require a filter fitted at short notice. Its large capacity means that it will probably need cleaning less frequently than smaller filters; cleaning can be carried out quite quickly. Spare tubes and angle pieces, should they ever be required, may be obtained from suppliers or from the distributor.

This big filter does a big job well, and should appeal to the aquarist who requires strong filtration for large

tanks. Its robust construction would suggest that it should operate for a long time without giving any trouble.

B.W.

**Wardley's Dial-a-pH Test Kit**, distributed by T.F.H. (Great Britain) Ltd., 13 Nutley Lane, Reigate, Surrey, price £1.80.

The Dial-a-pH test kit presents an original method of testing the pH value of your aquarium water, and comes complete with full instructions as to how it should be used. The instruction sheet also gives a useful account of the meaning of pH, and of its importance to the aquarist. The main component of the kit, which distinguishes it from other pH test kits, consists of a grey, plastic "scope," looking rather like a microscope. This "scope" has an opening into which the test tube containing the test sample of water, plus indicator, is inserted. The "scope" is then positioned under any overhead light source—e.g., a room light—and the light passes through the now coloured water sample and is reflected, via a mirror, out through the lower part of the "scope" into the viewer's eyes. At the base of the "scope" is a knob which turns a wheel, which shows the colours of indicator solution at specified pH values. The scale runs from pH 6.2 to pH 7.4. The test tube with which the kit is supplied is relatively large—about 4 in. in length—and the bottom inch of glass is frosted. The indicator supplied is bromothymol blue, and it comes in a plastic "dropper bottle."

To use the outfit the test tube is rinsed out and filled with the water to be tested, up to the top of the frosted area. Two drops of indicator are then added and the mixture gently shaken. The tube is then inserted in the "scope"—which is placed under a light source. The colour of the resulting solution, when viewed via the mirror opening, is compared with the standard colours shown on the wheel; the wheel's knob is rotated until both colours shown match. The pH is then read off from the wheel's scale. The kit also contains a drum of sodium bicarbonate to increase alkalinity, and a drum of sodium biphosphate to increase acidity—if required. The outfit is attractively boxed, and the carton contains a plastic "former" with appropriate spaces into which the five components fit, and are held securely, when stored.

Wardley's Dial-a-pH test kit will interest those aquarists who need to keep an accurate check on the pH of the water in their aquaria. The technique is simple, speedy and efficient.

B.W.

#### APOLOGY

The January edition of *The Aquarist* carried a most interesting article entitled "Collecting Marine Fish" which was incorrectly attributed to R. D. Sankey and R. D. Jones. The co-authors of this piece were in fact R. D. Sankey and R. H. Lubbock. Our sincere apologies to all concerned.

## THE HARDY EUROPEAN REPTILES AND AMPHIBIANS IN CAPTIVITY (Part 10)

by *Andrew Allen*

### 18. The Common Frog (*Rana t. temporaria*)

*Description.*—This is the most familiar Ranid, of medium build, and growing to a length of 10 cms. The skin is smooth, rarely with very small warts. The male develops a nuptial pad on the first finger of each hand, but has no external vocal sacs. A well-developed skin fold passes down each side of the back. Dorsal coloration varies extensively, being in various shades of red, brown and yellow, usually with darker markings and black spots. Ventrally it is cream in colour, speckled with grey or brown.

*Distribution.*—*Rana temporaria* is the most widespread and successful of hardy frogs, with a range that extends throughout the temperate zones of Europe and Asia. This includes Britain, all West and Central Europe, Scandinavia (to well beyond the Arctic Circle), and Asia right across to farthest China and even to Japan. It favours moist locations in fields, woods and gardens, and ascends to two thousand five hundred metres in montane country.

*Breeding Habits.*—Mating commences very early in the year, from February onwards; the male produces a low, growling croak. The large masses of spawn, each containing up to four thousand eggs, are laid in shallow water. The subsequent development and metamorphosis of the tadpoles has been oft studied, and has its rightful place in every elementary textbook of biology.

*Care in Captivity.*—Thanks to its position as a classic laboratory animal the requirements of this species have been established in some detail.

Like most members of the Ranidae, the Common frog does not do well in the indoor vivarium. However, it is less nervous, and requires less space, than Marsh or Edible frogs, and hence is correspondingly easier to keep. But surely few vivarium enthusiasts will need to house this species indoors when it can be seen to much better advantage in outdoor vivarium or garden? For those who do, a vivarium of about four feet or more in



Common Frogs in amplexus

length is the first essential, and this should be placed in a quiet, shady corner. A small pool should be sunk into the loose, damp substratum, and surrounded with mosses, ferns and other dense, moisture-loving vegetation. The frogs should have access to deeper water in the breeding season, and should be hibernated rather than over-wintered.

The best idea in every respect is to liberate some of

these frogs in a garden pond that lies amidst suitable rockery and shrubs, and whose sides are not unduly abrupt. Both tadpoles and adults should be introduced, so that an appropriate succession of inhabitants is established. During the year the frogs will wander about the garden eating unwelcome pests, but will return to the pool each spring to spawn. They and the tadpoles will readily coexist with goldfish and most other coldwater fish, though not, for obvious reasons, with sticklebacks, pike or perch. For those unequipped with a garden of the necessary dimensions, a reptiliary will make an equally acceptable home. As long as it is provided with a small pond and some humid, shady

a sound basis for any diet sheet. It is equally easy to fit this frog into a wide range of communities. It may be guilty of molesting baby frogs, toads, newts and lizards, for its eyesight is not of the very best, and it should not be associated with snakes, terrapins or Marsh frogs. But otherwise it can be housed with the vast majority of medium-sized Reptiles and Amphibians, and makes an excellent community animal.

Those who keep this species should remember that its numbers have declined drastically of recent years, and that its status is still deteriorating. No herpetologist should take any action that could further imperil its parlous position. This means that no specimens should



Tadpoles at the pond's edge in the shallows

corners, the frogs should prosper for a good many years and breed regularly every spring.

Greenhouse and cold-frame are also ideal for this species, assuming that they are managed with due care and discretion. Abundant, deep shade is absolutely essential, for the Common frog detests the heat and will rapidly perish in a climate suitable for lizards, snakes or even for Marsh and Edible frogs. However, I have specimens of *Rana temporaria* in both these types of accommodation, as well as in the open air, and they have done well in each case, demonstrating their tolerance of a wide variety of conditions.

The Common frog is a hearty eater which exhibits few particular preferences, and indulges itself in no awkward habits such as hunger strikes. All the standard live-foods will be taken readily, and earthworms form

be collected in the field, nor should they be purchased from dealers who have thus obtained them. Equally, if captive animals breed, much of the spawn should be distributed around suitable ponds, or introduced to the garden pool. By so doing herpetologist and aquarist alike can play a part in ensuring the survival of this unobtrusive member of our native fauna.

*Rana temporaria* is a very tolerant and interesting animal in captivity, and the amateur should find it rewarding despite its muted colours, unspectacular appearance and quiet, nocturnal habits. It is undemanding and will cause few problems, though the limits to its brainpower should be accepted—the Common frog, though less nervous than many other members of the Ranidae, never becomes as tame as do the majority of toads.

*R. t. parvipalmata* has few markings on the body, and comes from North-West Spain.

In Southern Europe occur three separate species of frog, each occupying a different peninsula. All resemble *R. temporaria* in some measure, and all may rarely come the way of the amateur in this country.

**19. The Iberian Frog (*Rana iberica*)**

This is a small species growing to 5 cms. in length, with a bright mid-dorsal line. It may be yellow, red or brown dorsally, with large, sometimes spiral, patches in these colours. It may be found in the Pyrenees, North-West Spain and Portugal, and is a montane species that rarely wanders far from water.

**20. The Italian Frog (*Rana latastei*)**

This is an even smaller species, with a slender body, and grey or red in dorsal coloration. It is distributed in the Southern Alps of Switzerland, North and Central Italy, and may often be found in upland woods near to water.

**21. The Greek Frog (*Rana graeca*)**

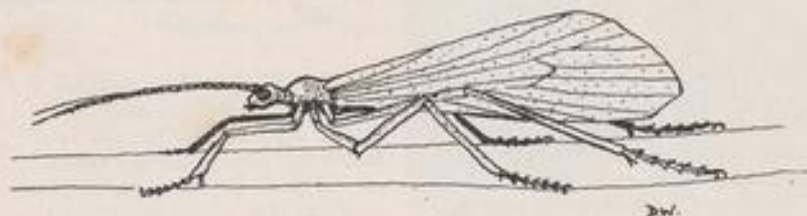
This frog grows to be rather larger than the two preceding species, with lengths of up to 7.5 cms., though it is still rather smaller than *Rana temporaria*. The legs are very long, and the feet are fully webbed. Another distinguishing feature is that males of this frog possess an external vocal sac. Dorsal coloration is usually brown, red or grey, often with paler yellow patches. It is far from being exclusively a Greek frog, and can also be found in Bulgaria, Yugoslavia and parts of Italy. Though not especially aquatic in its habits, it has often been recorded from in or near water.

All these three species require fairly similar treatment to each other, and to the Common frog. In the indoor vivarium they need a large pool surrounded by damp, mossy soil, with many shelters and thick, shady vegetation. The vivarium should be kept cool and away from the sun, but equally should not be allowed to

become cold. I would not care to comment too dogmatically upon their chances in the outdoor vivarium, for I have no practical experience of their hardiness. Comparison with other Ranids from the same zones, notably the Common and Agile frogs, would suggest that they could be successful in the garden reptiliary. But I would consider it more prudent to house these animals in a greenhouse or cold-frame, and so play for safety. These two types of accommodation provide what could be crucial extra insulation against the worst excesses of the English climate. Indoors or out these three species will thrive upon the standard invertebrate fare, having tastes typical of most of the medium-sized batrachians. However, they are rather smaller than the majority of European frogs, and this should be taken well into account when composing their diet sheet. Size must also be carefully considered when planning their inclusion in balanced communities of Reptilia and Amphibia. They will enjoy the same habitats as Common, Moor and Agile frogs, but not necessarily the same companions. The above three frogs, Green and Natterjack toads, all the newts and salamanders, Common, Wall and Sand lizards are all suitable co-inhabitants, but Slow-worms, Green lizards, Edible frogs and Common toads are all to be avoided, along with the regular villains.

These three unfamiliar frogs pose interesting challenges for the amateur. Little enough is known about their behaviour and habits, so the herpetologist who attempts their care will in some small measure have to venture into the unknown. But they should create no insoluble problems, and in essence are as tolerant and undemanding in captivity as Common or Moor frogs.

The next article will deal with the remaining European members of the Ranidae, the Moor and Agile frogs.



## CADDIS-FLIES

by David C. Wareham

CADDIS-FLIES, of the order Trichoptera, form an interesting group of insects which are found living in the vicinity of ponds and streams. They occur through-

out the world, and altogether there are about 3,000 species, with some 190 occurring in Britain.

In its adult form the caddis-fly resembles at first

glance a narrow-winged moth. On closer inspection, however, one finds there are many differences. The wings are membranous and covered with hairs instead of scales. The *antennae* are comparatively long and bristly and, when the insect is at rest, are held straight out in front of the body. The mouthparts are either absent or vestigial, and are not adapted for sucking, although some species can lap up fluids.

During the day the caddis-fly rests quietly, its wings folded roof-like over its body, on reed stems or tree-trunks, taking flight at dusk. Quite often caddis-flies come into the home at night where they are attracted to the light. On the whole, their flight is quite weak and erratic, and they do not take to travelling great distances.

The caddis-fly *larvae*, or caddis-worms as they are sometimes called, are aquatic and breathe with gills. The body is mostly tubular and somewhat flattened. The head and first three segments are hard and horny while the rest of the body is soft. In order to protect its vulnerable abdomen, the caddis-worm constructs for itself a case or "caddis" out of pieces of water-plant, stones or shells. The objects used differ, depending on the species. The *larvae's* legs are long and active and used for walking. They have strong jaws, and although most of the *larvae* are vegetarian and feed on water plants and *algae*, etc., there are also one or two carnivorous species.

The largest of our native caddis-flies is *Phryganea grandis* with a wing span of just over two inches. The forewings are brown with lighter blotches and the hindwings are a uniform smoky colour. The small green eggs are laid in batches of up to 700 and attached in a loop to the underside of a floating leaf. The tiny *larvae* hatch some ten days later and immediately set about covering their soft hind quarters with cases built of silk, and to which is secured pieces cut from the stems of water-plants. Each piece is of the same length and the end result forms a spiral pattern. The cases are constantly being added to as the *larvae* grow and the case of a fully grown *larva* can measure over an inch in length.

Fully grown, the *larvae* measure one and a half inches, and are covered with tufts of gill filaments down the whole of their bodies. At the end of their abdomen are two strong hooks which are used to grip their cases. To pupate they burrow into the soft mud along the water's edge. The opening of the case is then sealed up, leaving just a small hole to allow for a constant flow of fresh water to circulate the body. As the time draws near for the adult caddis-fly to emerge, the *pupa*, or nymph, bites its way out of the case and swims to some suitable reed or water plant and climbs up to the surface. After a short while the skin of the *pupa* splits and the caddis-fly is finally liberated.

Caddis-flies are rather unspectacular in their mark-



Larva and case shown separately

ings and coloration, and identification is therefore somewhat difficult. By far the simplest method of identifying them is to look for the *larvae* and examine the cases which differ so much in shape and construction. *Limnophilus flavicornis* constructs a case from small snail-shells whilst *L. rhombicus* uses living water lentils and other flora. The cases of the genus *Odontocerum*, on the other hand, resemble small curved horns, and are made out of tiny particles of sand and small stones.

Finding the *larvae* presents no difficulties as they are common in most ponds and streams. They can often be found in quite large numbers by examining submerged logs and other debris, but if one studies the bottom of a pond for a few minutes, several will be seen wandering about in their search for food. Providing conditions similar to those of their natural habitat are given, caddis-fly *larvae* do well in the aquarium. Several can be kept together and in so doing one can discover which materials are used by which species.

An interesting experiment is to introduce artificial objects into the aquarium, such as small coloured beads, or small screws and nuts, etc. The *larvae* will then very often use these "new" materials, and unusual and unique cases will result.

It is almost impossible to pull a caddis *larva* from its case without causing it some damage, and to try this is quite inadvisable. The best, and probably only safe way, of removing a *larva* is to slit the case carefully with a razor blade. A "naked" caddis *larva* will quickly make itself a new case, using any material which may be around at the time.

A further point worth noting is that the empty cases can be saved and used to form a permanent and fascinating collection.



# MARINE QUERIES

by Graham F. Cox

I own a 40in. x 12in. x 15in., 25-gallon aquarium fitted with a total-area-coverage under-gravel filter, which gives a turnover rate of about 100 gallons per hour. The filtrant medium is a 50/50 mixture of coral sand and silica gravel. The specific gravity of the synthetic seawater is 1.020 measured at 75°F.

At the moment we have one Saffron-Blue damsel and one Domino damsel. My questions are:—

- (1) In your opinion are these two fishes sufficient to get the undergravel filter working properly?
- (2) When would it be possible to add more fishes, i.e. Butterflies, Angels and Surgeons, etc.?
- (3) What fishes would make up an ideal community tank?

(1) Certainly these two Damsel fishes will excrete enough ammonia and other nitrogenous wastes to generate the nitrifying bacteria which are needed in the filtrant gravel. Eventually, at some date in the future, sufficient colonies of nitrifying bacteria will be present in your gravel to ensure that as fast as the creatures in the marine biotope excrete nitrogenous wastes, these same poisonous wastes are rapidly oxidised to harmless nitrate salts dissolved in the seawater. In time growths of algae will appear which will absorb the nitrate salts from the water for use in the synthesis of plant proteins for their own (i.e. the algae) growth.

Since it is implicit in your letter that, in the first place, this is your first marine aquarium, and, in the second place, this marine aquarium has not been established for long, may I offer you the following advice:

- (a) One of the intermediate products in the bacterial breakdown of aquatic animal excrement is "nitrite" (salts). Whereas testing for ammonia, creatine, urea, T.M.O., etc. (i.e. some of the components of fish wastes) is very difficult and (in salt water) expensive, nitrite salts are easily detected in salt water. The *BRITISH NITRITE TEST KIT*, sold just for this purpose, is sufficiently sensitive to detect the presence of nitrites in sea water at levels down to as low as 0.5 p.p.m.

You should therefore be carrying out daily nitrite tests. It is only when the nitrite content of your seawater falls to zero, and remains at zero for several days, that you will know that your filter-bed is fully matured bacteriologically, and able to support marine show fish.

- (b) Nitrites, and other nitrogenous wastes are all toxic to marine creatures in varying degrees. These toxins (or poisons) weaken the fishes and lower their resistance to disease, whilst at the same time *strengthening and feeding* certain pathogens (disease-causing organisms) such as the dinoflagellate protozoans of the genus *Oodinium*. For both these reasons, whilst ever the nitrite reading persists in your aquarium water you should carry out a prophylactic dosage with a marine oodinium cure every other day.

(c) Do not add to your nitrite level by feeding heavily or sloppily. As much flake food as would *lightly* cover a six-penny piece is more than enough food per day for the two fishes.

- (d) Aid the more rapid maturation of your filtrant gravel by turning the undergravel filter airlift to maximum turnover, achieve fierce aeration through a wooden diffuser (nitrifying bacteria are gram-negative *aerobic* bacteria), regulate the temperature at a steady 75°F (this is the optimum temperature for the growth of nitrifying bacteria) and keep your specific gravity at its present level of 1.020 at 75°F.

- (2) As stated above, you should not add any of the more delicate coral fishes to your aquarium *until* the nitrite reading falls to zero and stays there for a week.

- (3) It is almost impossible to give a fair answer to this question. In addition to the objective question of "Which fishes will live harmoniously together?" it implies the highly subjective, value-judging question of "What is a beautiful coralfish?" I can only answer it from a very personal viewpoint as follows:—

*Maximum stocking level.* You are well within my *1in. of fish to 4 gallons of seawater* rule for an unmatured biotope at the moment so there is no problem here. However, your question obviously means, "What fishes should I have when I have

no nitrite reading?" The above stocking ratio may then be doubled to *1 in. of fish to 2 gallons of water*. Please remember that although as you correctly calculate, the nominal gallonage of your tank is nearly 25 gallons, the *actual gallonage of available territory*, i.e. deducting the space occupied by gravel, shells, rocks and corals, etc., is probably nearer to 20 gallons. This means that your final community of fishes should amount to 10 in. of fish in total. Since you will already have two 1 in. Damselfish this leaves 8 in. of stocking space.

The following would be a good 10 in. beginner's selection:—

One 1½ in. Picasso Trigger (or Royal-blue Trigger).  
One 2 in. Regal Tang.

One 2 in. Coral Beauty Angel (or Potters Angel of the same size).

One 2½ in. Clown Wrasse (or Moon Wrasse, or Banana Wrasse).

One 2 in. Sunburst Butterfly (only if the two Damselfish are removed).

I have made the above selection for several reasons. First, all the above are very tough beginner's showfish. Secondly, they are representative of the five most popular families of show fish. Then again they collectively portray all the colours of the spectrum, and are all slow growers. Last, but not least, none of the species in the list above is especially aggressive *normally* (exceptions do occur) at the sizes stated.

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## BREEDING GOLDFISH

by A. Boarder

IN previous articles on breeding goldfish I described the method up to the collection of the eggs and their placing in separate containers for hatching. Now the question arises as to whether to use any artificial warmth and aeration or not. It is quite possible to hatch and rear successfully without using either. It was only after many years of breeding fancy goldfish under natural conditions, that is with no extra warmth or aeration, that I experimented with the method I am using now. I try to maintain a temperature of about 70°F., for hatching and for the first few weeks of rearing. I also use some aeration and find that by this method I get a good hatching. The tanks I use are ones I made with concrete and I find them very efficient. They hold the warmth very well and as they are only nine inches deep are quite adequate for the purpose.

Any rather shallow tank or container will do for the hatching. The plastic bowls and baby baths on sale at many stores are ideal for the job. If anyone wants to make concrete tanks similar to those I use, I will give a brief description as to their construction. Make an outside former with stout ply wood, the four pieces to be the size of the two sides and ends. I made the bases half an inch less at each end so that the finished article would be rather wider at the top than at the base. The two ends can be joined to one side

and the other side left free. Two bands of stout wire are used to keep the former together whilst constructing.

The inside formers are made about half an inch less at each end and shaped as for the outer, also half an inch less in depth. These insides must be left unjoined. The whole can be painted with bitumastic paint. When dry they are ready for use. Get some sharp sand and sift it so that no stones over about a quarter of an inch are left. The mixture must be carefully measured at one part of fresh cement to three parts sand. Before mixing, lightly paint the parts of the formers which will come in contact with the concrete with old car-engine oil. This must not be more than a smear. Place a sheet of glass on a level surface such as a bench and cover with a sheet of paper. No reinforcement is necessary.

Now mix the concrete, three times dry and three times wet. Do not make the first part very wet, so that you can spread about a half an inch on the bottom. A small trowel is useful for this. Now take a trowel full of compost and press it against one side. One inside former is pressed against this and the same procedure is carried out on the other side. Now deal with the ends in the same way. The end bits should be just the size to hold the sides in position so that about a half an inch is left for receiving the

can be started with something larger after about a week of free swimming. Tiny *Daphnia* can be used as long as they are free from any injurious pests. *Daphnia* caught from the wild can contain all kinds of pests and so the aquarist would be well advised to breed his own from a clean stock.

Some mashed white worm can now be given. This is first mashed up and then strained through a nylon net or something fine. That which does not pass through the sieve can be given to larger fish. After three weeks or so the fry should be able to take mashed garden worms, as long as only the smaller ones are used. Some dried foods can also be given now. The flaked food is quite good as long as it is well crushed first. This can be done with a bottle and then sieved through a fine tea strainer. If one is the fortunate possessor of one of the old-fashioned coffee grinders the bringing down of dried food to a powder will be very easy. I have one which I can alter so that varied sizes of food can be produced and I find this very useful indeed.

Once the fry are just over a week old, some of the water must be changed. This is best done by lowering a nylon net into the fry tank and dipping out some water from inside it. No fry are likely to be picked

up by this means. I consider that it is most important to change part of the water fairly frequently. If this is not done the water can soon become foul and the fry not only go off their food but could die. There is no need to worry if the water added is colder than that in the tank. As long as not more than about a quarter of the water has been removed the fresh cold water will not harm the fry at all, and so the necessity of warming up the added water is obviated. I think that more fry are lost by aquarists who fail to change some of the water fairly frequently than from any other cause.

After the fry are a month old they can be fed on any of the usual goldfish foods as long as none is offered which is larger than all the fry can take. Sometimes one or two of the youngsters grow faster than the others and then if pieces of food are given which only the larger ones can take, it is certain that they will grow on and get large enough to eat their brothers and sisters. If any are seen to be much larger than the others then they can be placed in a separate container. Providing the warmth is kept up and sufficient food is given the young fish will grow apace and should give no more trouble as long as they are not allowed to become over-crowded.

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## DEALING WITH ALGAE

by B. Whiteside

A READER of W.I.Y.O.? recently asked how he could deal with an excessive growth of *algae* in his aquarium, a problem with which most aquarists have to contend at some time. It would be virtually impossible to find a decorative aquarium which did not contain a number of genera and species of *algae*—and in fact a number of fishes which we keep in our aquaria require a vegetable element in their diet, and *algae* often supply this element. However, it is only when growths of *algae* become excessive that they need concern the aquarist—except for aesthetic reasons.

If an aquarium does become infested with excessive growths of an *alga*, or of *algae*, what can be done? There are a number of steps which can be taken to either control the growth of *algae*, or attempt to kill them. The former is the safer method as it can usually be effected by modifying the environment in the aquarium without the use of chemicals; while the

latter method usually entails the use of chemicals which actually kill the *algae* plants.

If an aquarium contains an appropriate number of healthy forms of higher plant life, it is probable that these plants will keep *algae* under control by using up the plant "foods," in the water, which are necessary for the *algae* to thrive. Higher forms of plant life—including floating plants such as duckweed and floating Indian fern—will help to shade the aquarium from excessive light; and most forms of *algae* require a reasonable amount of light if they are to thrive. Tall plants and floating plants will cut down the amount of light which enters the tank from above, while thickets of plants along the sides and back of the tank will cut down on light which enters the tank from the sides and back. Sheets of thick paper, or light cardboard, can also be stuck on the outside glasses of the tank to cut down excessive light. If you

supply your higher forms of plant life with artificial plant fertilizers in any form, and are also bothered with excessive *algae*, cut out the fertilizers. Make sure that you do not over-feed your fishes either, as uneaten food can be broken down by bacteria to provide extra plant "foods." An air operated aquarium "vacuum cleaner" can also be used to remove excess fish foods, and fishes' droppings, which could encourage algal growths.

If the temperature of the water in your tank is kept well over 75°F, it can sometimes help control growths of *algae* if it is lowered to about 75°F. (This should be done gradually so that the fishes are not subjected to a sudden temperature drop.) You could also try reducing the amount of light which you supply to your tank. This can be done by cutting down on the number of hours for which the tank's electric lights are on each day, or by reducing the wattage of the bulbs or tubes fitted in the tank's hood. The former is usually the better of the two methods. Also, if some or all of the light supplied is from fluorescent tubes—such as "warm white" or Gro-Lux—it can often improve matters if these are replaced with ordinary tungsten bulbs until the *algae* has been brought under control.

A large proportion of *algae* usually grow better in water that has a reaction on the alkaline side of neutral, so if you can lower the pH of the water so that it is slightly acidic this can help inhibit the growth of *algae*. (This needs to be done with great care as, naturally, it can also affect the fishes in the tank.) Some writers recommend that part of the water in the tank should be changed to help control *algae*; I would only agree with this if the growths of *algae* were very excessive and were releasing substances, into the water, which were toxic to the fishes. Some kinds of snails will also eat small amounts of *algae*, but they do little good in this context and I certainly would not introduce snails especially to try to control *algae*.

Certain species of fishes—such as mollies—eat *algae* as part of their diet, and can help keep them under control; but two particular fishes do a good job in keeping *algae* under control: the Siamese or Indian *algae*-eating *Gyrinocheilus aymonieri* and *Plecostomus plecostomus*, a catfish which is very fond of *algae*. Either of these fishes could help to solve the problem.

If all else fails what can one do? Some writers suggest emptying the tank completely; throwing out rocks, gravel and higher plants, retaining only the fishes; and thoroughly cleaning the tank, heater, thermostat and thermometer, before starting again. As this method involves a lot of work, and is quite expensive, it is not one which I would personally use; I would rather attempt a "cure" using chemicals. As many chemicals are lethal to fishes, it is essential that quantities used are measured exactly—and that

the volume of water in any given tank is correctly calculated, remembering that, for example, a 24in. × 12in. × 12in. tank which contains rocks and gravel, etc., will NOT contain about 12 gallons of water, but less, depending upon the volume of rocks and gravel in it.

One chemical which can be used to help deal with algal problems is Potassium Permanganate, which, when dissolved in water, produces a deep purple coloured solution. It can be tried at a rate of ONE GRAIN per fifteen gallons of water. (Please note: one GRAIN, and NOT one gram. I once heard of an aquarist who used a gram instead of a grain. It certainly killed his *algae*—and his fishes and plants as well!) One grain equals 0.0648 grammes, and you should have it weighed out by your local chemist. The crystals should be dissolved in water, and the solution gradually added to the infected aquarium. The purple colour should gradually disappear in a few days.

A more potent alternative is to use one of the chemical algicides available from most dealers. These need to be used with great care, and the directions supplied with the product followed to the letter. I have tried a number of such products over the years, and have found them to be reasonably satisfactory—although there are some species of higher plants which may be affected. (I have found that hornwort is sometimes killed by such products; and they may "burn" the growing tips of some higher plant species; however, if the growth of *algae* is bad enough, most aquarists would be prepared to lose some higher plants if the *algae* were also brought under control at the same time.)

One such product which you might care to use is "ALGO-stop," a German preparation distributed by Hillside Aquatics. It consists of a liquid for immediate effect, and tablets for long-term control. It is claimed to destroy *algae* in fresh water, and should not harm fishes or higher plants if the directions supplied are carefully followed.

If you are having trouble with *algae* in one of your tanks, you might care to try some of the methods of control which I have suggested, reserving the chemical forms of control as a last resort. Once you have managed to gain a hold over the *algae* in your tank, make sure that things stay that way by adjusting the aquarium's environment in a manner such that *algae* will be kept in their correct place; better still, adjust conditions before the *algae* get out of control, and then the problem should not arise. A planted aquarium is rather like a garden: few gardens are without weeds, but the good gardener ensures that he keeps his weeds under control. Few aquaria are without *algae*, but the good aquarist ensures that he keeps his *algae* under control.



## from AQUARISTS' SOCIETIES

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

The Editor regrets that owing to extreme pressure on space a section of the Club Notes has had to be held over until the March issue.

AT the **Mixenden T.F.S.** annual general meeting the retiring committee were re-elected, to the committee is as follows: Chairman, R. Elstob; treasurer, G. Poole; secretary, S. Leedham P.R.O.; B. Turner.

A NEW committee was elected at the annual general meeting of the **Kidderminster and District A.S.** Chairman, R. MacKenzie; secretary, P. R. Allen, Flat 2, Fernside, Park Lane, Bewdley, Worcs.; treasurer, G. Duce; show secretary, W. Nixon; committee members, Mrs. J. Nixon, R. James.

OFFICERS elected at the well-attended annual general meeting of the **Stevenson A.S.** were as follows: Chairman, G. Ward; vice-chairman, Mr. Cook; secretary, P. Ansell, 82 Wildwood Lane, Stevenage, Herts.; assistant secretary, B. Hancock; treasurer, M. Cunworth; show secretary, P. Dovesne; assistant show secretary, B. Higgins; publicity officer, Mrs. R. McAuley; fund-raising secretary, Mrs. Cook; F.B.A.S. delegate, Mr. Rasmussen. New members are welcome at the meeting at Bedwell Community Centre at 8 p.m. on the first Wednesday of the month.

OWING to the increase in the number of members, the Table Show of the **Banbury and District A.S.** on A.V. Catfish was divided into Junior and Senior sections for the first time, and more fish were entered. Results were: Juniors: 1, N. Smith; 2, M. Dearnley. Seniors: 1, 3 and 5, L. Poole; 2, S. Plumb; 4, E. Holmes. Over eighty members and guests attended the first buffet-dance which both young and old enjoyed. In view of the success of this it is hoped that further dances can be arranged during the year.

AT the annual general meeting of the **York and District A.S.**, the following officers were elected: Chairman, M. Richardson; vice-chairman, P. Carey; secretary, G. B. Hawkey, 71 Milner Street, Acomb, York; treasurer, Mrs. E. Taylor; open show secretary, P. Kees, 30 Don Avenue, Dringhouses, York; meeting show secretary, J. Snowden; editor, Mrs. A. Turner; librarian, Mrs. L. Overall; P.R.O., Mrs. H. Snowden. Meetings are held on the second Tuesday of the month at the Railway Working Men's Club, Blossom Street, York. New members welcome.

THE **Manchester Grammar School A.S.**, now affiliated to the Federation of British Aquatic Societies, heard several interesting talks given by some of its members. A. J. Tescioba, in November, gave a most stimulating talk on Aquatic Turtles, and also in November R. E. Sassoon gave a detailed account of keeping and breeding livebearers. This term the Society is to hear from some outside speakers. The first of these is Mick Sperry from Holyhead, North Wales, who will explain how he set up and maintains his ten fish tanks.

Also the secretary of the Manchester Group of the British Killifish Association, Terry Thorne, will give an introduction to killifish on 12th February.

OFFICIALS of the **Havant and District A.S.** this year are: Chairman, H. Armitage; vice-chairman, N. Davis; secretary, Keith G. Forster, 280 Middle Park Way, Leigh Park, Havant, Hants, PO9 4NL; telephone Havant 77007; treasurer, G. Lillycrap.

AT the monthly meeting of the **Gloucester Fishkeeping and Social Club**, the club chairman, R. E. H. Moulder, welcomed two new members to the club. The well-attended Christmas dance had been held the previous week and was a great success, and children of the members had been to a pantomime, taken by the ladies' social committee. A demonstration of glass-cutting and the making of all-glass aquariums was given by T. Collier; this proved how easy it could be with a little practice. He also gave members a packet of ready-cut glass so that they could have a try at making a tank for themselves. Despite the absence of some members due to 'flu, there was an extremely good entry for the Table Show, which reflects the members' interest in this side of the hobby. One of the new lady members had a very successful first visit to the club meeting. She entered the Table Show, and, besides winning a prize card, she was complimented by the judge on the condition of her fish. The show as judged by Dave Brinson, of the Horseshoe Aquaria. When he announced the results, three entries all finished with equal points. Mr. Brinson then gave a short talk on some of the fish on show, detailing the best points of the winners, and also gave members some useful hints on showing fish and how to choose them. The winners of the Table Show were: 1, T. Collier; 2, C. Dyke; 3, B. Loveridge; equal 4th were Mrs. E. Adams, Mrs. M. Mitchell and C. Dyke.

THE November meeting of the **Bristol Tropical Fish Club** marked the end of an extremely successful year for the club and the annual general meeting took place, when the following officers were elected: Life president, L. Littleton; chairman, W. Holland; vice-chairman, R. Toocoe; secretary, M. Ellick; assistant secretary, C. Mawn; treasurer, R. Lawrence; reporting secretary, G. Furber; programme officer, R. Chapman; programme committee, Messrs. Probin and Dawnes; librarian, Mrs. P. Chapman; auditors, Messrs. Dick and R. Toocoe; show committee members elected for the 1973 Open Show were as follows: Show manager, G. Stone; show secretary, Mr. Dick; show committee, Messrs. R. Giles, G. Furber, Dooby and Little. The Club Cup and Medal for the most points gained in the monthly Table Shows, Open and Novice were won by Nigel Gray, one of the Junior members. Main item of the December meeting was a lecture given by the Rev. R. Sutton, who for many years was a missionary in South America. His topic was "Behind the Jungle Curtain in Amazonia," illustrated by slides, about the people and habitat of many of the aquarium fish. This proved to be very interesting and highly recommended to other fish enthusiasts. The new reporting secretary is G. Furber. Will members and visitors please note the meeting

place is now the Black Horse, Old Market, Bristol, on the third Thursday in the month.

AT the Christmas social of **Amersham and District A.S.**, the winner of the home furnished aquaria competition was announced. The winner was K. North with a freshwater tank. He was presented with the Thompson Perpetual Trophy by Mrs. W. Thompson. Second was J. Miles with his marine tank, just 1½ points behind, and third was J. Berridge with another freshwater tank. Recently the club had a very interesting talk on how to photograph fish, by A. Copit, and are also expecting in the very near future a talk on barbs by P. Ginger.

TABLE Show results at the last meeting of the **West of Scotland Exotic Fish Club** were as follows: Sharks: 1 and 3, I. Cameron; 2, I. Young. Danios: 1, W. Leitch; 2, W. Quinney; 3, P. Geedon. Minnows: 1, A. Munnoch; 2 and 3, J. Fyfe. The club had also decided to have a show of the Best Pate of Guppies and the result was as follows: 1 and 3, J. Campbell; 2, J. Fyfe.

AT their December meeting, the **Barnsley T.F.S.** entertained the newly-formed Darfield and District A.S. A Table Show was held for A.V. Novice, this being won by Master D. Rippon; 2, D. Corker; 3, Master D. Rippon. The entertainment of the evening was a slide show on Cichlids, with M. Horsefield (show secretary), explaining each slide in turn.

OFFICERS elected at the annual general meeting of the **Harwich and District A.S.** were as follows: Chairman, J. Baker; secretary, A. Green, 31 The Ridgeway, Dovercourt, Essex, CO12 4AU; treasurer, M. Bird; committee, M. Moulder, T. Franklin; junior committee member, P. Smy. The meetings are held at the Alma Inn, Harwich, on the first Monday and third Tuesday of each month, at 8 p.m. The club caters for tropical, coldwater and marine keepers' interests and new members are always welcome.

AT the annual general meeting of the **Chelmsford A.S.**, the following members were elected: Chairman, K. Turner; secretary, Mrs. B. Turner; treasurer, J. Henderson; show secretary, R. Horne; committee, R. Machin, J. Smith, J. Newiss, C. French, S. Palmer; junior committee, K. Machin, C. Sumner; resident judge, D. Bird; reserve judge, D. Bannerman. The Table Show results were: Mollies: 1, D. Bannerman; 2, J. Newiss; 3, G. Bannerman; 4, P. Meadows. Barbs: 1, 3 and 4, J. Henderson; 2, R. Machin.

FOLLOWING the annual general meeting of the **Sheffield and District A.S.**, the following members were elected to serve as officers on the committee for this year: Chairman, H. Buxton; vice-chairman, H. Smith; secretary, Mrs. S. Blizard, 62 Alwrick Road, Sheffield, S12 2GE; treasurer, E. Stanton; show secretary, T. Smith; social secretary, M. Keightley; editor, J. Blizard; committee, D. Sanderson and R. Wilburn; president, K. Colton.

AT the **Bournemouth A.S.** annual meeting, the treasurer reported that the Society had maintained a steady financial balance, but appealed for more entries in the Society's Table Shows each month. Membership, he said, was still at the level of 1969, averaging 45 members. After the election of officers and committee, the following will represent the Society this year: President, J. Scott-Morgan; chairman, B. Coombes; secretary, R. Matley; treasurer, R. L. James; show secretary, J. V. Jeffrey; committee, H. Earl, N. Walker, I. V. Jeffrey, H. Greenhalgh. The Aquarium at the Royal Victoria Hospital will in future be maintained by Mr. Haskins. The 1972 annual points trophy was won by H. Greenhalgh with 26 pts., Mr. Watkins being second with 21 pts. and Mr. Walker third with 10 pts. In the Table Show for Plastics, all the cards were taken by Mr. Chatfield. Anyone interested in fishkeeping is cordially invited to attend one of the meetings, held at 7.30 p.m. on the first Monday of each month at Kinross Community Centre, Pelhams Park, Kinross.

IT was decided at the December meeting of the G.K.N. Pond and A.S. to combine the presentation of awards with a social evening. This began with several games of Bingo and various competitions compiled by some of the members. The presentation was then made for the various winners of trophies over the year, followed by the timely entrance of Father Christmas, much to the delight of the children present.

**RESULTS** at the December meeting of the **Grimsby and Cleethorpes A.S.** were: Louches: 1 and 2, T. P. Walker; 3, J. Dawson. Large Barbs: 1, Mrs. J. Kirk; 2, J. Dawson; 3, B. Palford. Junior: 1, N. Pilly; 2, G. Wilson; 3, P. Metcalf. At this meeting the secretary, M. Robinson, resigned due to his work and was thanked for his services by the chairman, Mrs. O. Jennings. The new secretary is Eric Holmes, 4 Sussex Street, Grimsby.

#### SECRETARY CHANGES

**Grimsby and Cleethorpes A.S.:** Eric Holmes, 4 Sussex Street, Grimsby.

**OFFICERS** elected at the **Rochampton A.S.** annual general meeting were as follows: Chairman, J. Waller; secretary, Mrs. Pat Lambourne; 7 Wheeler Court, Plough Road, London, SW11 2AX; treasurer, F. Furnham; show secretary, D. Lambourne; assistant show secretary, S. Mason; committee member, W. Mason; social secretary, Joan Mason. Meetings are held on alternate Wednesdays at the Minstead Gardens Old People's Club, Minstead Gardens, Rochampton, S.W.15.

The Birmingham Section of the **Fancy Guppy Association** meet at Glebe Farm Community Centre on the fourth Sunday afternoon of each month and recently M. Delingpole of Alvechurch was presented with the Best Exhibit Medal for a team of Grade One females. E. Morgan of Birmingham received his fifth silver card, winning him his silver Guppy Badge.

A MOST informative talk on Swordtails and Platys was given by L. Lindleton of the **Knowle and District A.S.** at the January meeting. A Table Show was held for Angel fish and this was judged by E. Newman and the results were: Open Class, 1 and 3, Nigel Gray; 2, Kevin Gray. Novice Class, 1, 2, and 3, Kevin Gray.

**OPEN Show results of the Leicester A.S.:** Barbs: 1, Miss S. Hartwell; 2 and 3, K. Bates. Cichlids: 1, M. Thomas; 2, J. Short; 3, K. Bates. A.V. Characins: 1, B. and F. Hirst; 2 and 3, D. Barnett. Catfish and Louches: 1, J. Short; 2, G. Limbey; 3, M. Delaney. A.V. Livebearers: 1, C. Pratt; 2, J. Salisbury; 3, B. and F. Hirst. A.V. Rasboras: 1, H. Richardson; 2 and 3, Mr. Bitchener. A.V. Anabantids: 1, C. Pratt; 2, Mr. and Mrs. Hutt; 3, Mr. and Mrs. Geary. Killifish: 1 and 3, B. and F. Hirst; 2, B. Faulkner. A.V. Tropical: 1, T. Parry; 2, M. Delaney; 3, Mr. Bitchener. Breeders: Livebearers: 1, B. and F. Hirst; 2, G. Lindsey; 3, D. Freeman. Breeders: Egglayers: 1, B. and F. Hirst; 2, G. C. Brockhouse; 3, C. Pratt. A.V. Junior: 1, C. G. Brockhouse; 2, C. Pratt. Furnished Aquaria: 1, D. Harding. Coldwater: 1, Aquaria: 1, D. Harding. Coldwater: 17: C. Pratt; (1): 18: C. Marriott; 19: 1 and 2, J. Salisbury; 3, C. Pratt. Best Fish in Show: C. Pratt. Best Livebearers: C. Pratt. Best Cichlid: M. Thomas. Visiting Club with most entries: Hinkley and District.

THERE was a reshuffle of officers at the **Tottenham and District A.S.** annual general meeting and they now stand as follows: President, D. Nutt; Chairman, R. Eldon; Secretary, L. F. Clements, 47 Winchelsea Road, Tottenham, N17 6XJ (01-808 1220); Treasurer, K. Massey; Show Secretary, K. Nutt. Meetings are still held on the second and fourth Thursdays of each month, at the T. L. & R. Club, High Road, Tottenham, N17, which is between Bruce Grove and Scotland Green.

AT their first meeting in December, the **Brentwood A.S.** had a general discussion

and exchange of ideas among its members. The table show at this meeting was for Miniature Furnished Aquaria. At the second meeting this month we had Mr. M. Pearson, of East London A.S., who gave a most interesting lecture on various methods and set-ups for breeding a number of species. Also at this meeting the trophies for the Home Furnished Aquaria and Aquarist of the Year contests were awarded. The results were as follows: Miniature Furnished Aquaria: 1, Denis Green; 2, L. Dwight; 3 and 4, I. and K. Quarmby. Home Furnished Aquaria: Seniors: 1, L. Dwight; 2, G. Green; 3, P. White. Juniors: 1, I. Quarmby; 2, K. Quarmby; 3, D. Green. Aquarist of the Year: Senior: 1, L. Dwight; 2, G. Green; 3, R. Taylor. Junior: 1, K. Claffain; 2, D. Green; 3, I. Quarmby. New members are welcome. Please phone: Upminster 27555 for details.

AT the last meeting of the **Brighton & Southern A.S.**, Mr. Jack Stillwell (F.B.A.S.) judged the Fish of the Year table show and awarded Mrs. Janet Dawes first prize with a Blind Cave Tetra. The club took the opportunity of having an informal discussion and many problems on fishkeeping were sorted out.

THE new 1973 committee for the **Dudley & D.A.S.** is as follows: Chairman: J. Vickery; Vice-Chairman: T. Dawes; Secretary: C. James, 11 Holcroft Road, Grange Estate, Southbridge, Woots; Treasurer: C. Hodgson; Show Secretary: W. Hickman; Asstn. Show Secretary: E. Simpson; Magazine Editor: D. Harris; Librarian: E. Hodgson; Social Secretary: Y. Humstone. Committee members: L. Hatfield, R. Edwards, B. Land, B. Fleetwood, P. Vickery, R. Humstone.

RECENT results from **Stockton A.S.** are as follows: Catfish: 1, A. Saunders; 2, D. Connelly; 3, K. Greenley; 4, J. Waller. Guppies: 1, D. Connelly; 2, 3 and 4, A. Saunders. Champion of Champions and highest number of points for the last six months. Champion of Champions: 1 and 3, A. Saunders; 2, H. Peacock; 4, G. Lee. Highest number of points: 1, K. Greenley, 52 points; 2, G. Lee, 48 points; 3, A. Saunders, 42 points; 4, D. Keithley, 33 points.

THE following officers were elected at the **Hounslow and District A.S.** annual meeting. Chairman: R. Alban; Secretary: H. Parish; Treasurer: Mrs. S. Parish; Social Secretary: B. Nelham; Press Secretary: Mrs. R. Brewer; Show Secretary: B. Pratt; Librarian: A. Constantine; Public Relation officer: M. Collins; News Letter Editor: R. Scoury; Floor members: M. Alexander and F. Hoppen Brouwers. The newly elected chairman, Mr. Ron Alban, thanked the members for their confidence in electing him to his chair and expressed a hope that the future year would have the same success as the previous one. Visitors are always welcome at the fortnightly meetings which are held at 8 p.m. on alternate Wednesdays at St. Stephen's Church Hall, Whitten Road, Hounslow. All enquiries should be made to the Secretary, Mr. Hugh Parish, 18 The Barrons, Twickenham.

RESULT of the recent table show of the **British Marine Aquarists Association, West-Midland Group** were 1 and 2, D. Highfield; 3, R. Edwards. A film show was given by member T. Carroll on Life under the Sea and Monsters of the Sea. A new member, Brian Curton gave members present a run-down on the Marine fish that he had.

THE recently formed **North-Western Section of The British Koi Keepers' Society** held its inaugural meeting in December, which was very well attended. The next meeting will be held on Sunday, 4th March, 1973, in Manchester. All are welcome. Full details of venue, membership, etc., may be obtained (S.A.E. please), from: The Section Secretary, Mr. W. R. Seal, 7 Highlands Road, Offerton,

Stockport, Cheshire, or the Society General Secretary, Mrs. H. M. Allen, 1 Anthony Close, Peterborough, PE11 3XU. The British Koi Keepers' Society presently has more than 230 members and it is anticipated that further regional activities will develop.

NEW committee members elected by members of the **Newcastle Guppy & Livebearer Society** are as follows: President, W. Cummings; Chairman, W. McFarlane; Vice-Chairman, J. Gallon; Secretary, Mrs. J. Renton; Treasurer, D. Renton; Minutes Secretary, Mrs. Cawton; Librarian, Mrs. J. Fenwick; Ordinary member, G. Fenwick.

METHODS of keeping coldwater fish through the winter formed the basis of a discussion evening for the **Bristol A.S.** monthly meeting. The new chart on which records are to be kept of temperatures and feeding at weekly periods were also explained. One member described how by means of a metal bucket filled with hot water he made a window in the ice of his pond and by then removing some pond water he made an ice roof over the water. Meetings are held on the second Monday of the month at the Bishopston Parish Hall.

A SOCIAL evening was held at the December meeting of the **Chelmsford A.S.** when the annual trophies were presented by Mr. R. Horne. The Gee cup for Home Aquaria was won by J. Newis, second J. Henderson, and joint third, R. Machin and R. Knight. The De Val shield for highest points in table show league was won by J. Henderson; 2, P. Meadows; 3, C. French; 4, J. Newis. The Horne shield for highest points in table show league for juniors was won by Kevin Machin; 2, Neil Murfin; 3, Charles Sumner; 4, Paul Gibson. Table show for December in the Livebearers class was 1 and 3, P. Meadows; 2, G. Sutton.

ANNUAL general meeting election for officials at the **Torbay A.S.** were as follows: Chairman, R. King; vice-chairman, Mr. Orsman; secretary, J. Denning; treasurer, C. Tischer; show secretary, Mrs. Griffiths; Magazine and newsletter, M. Matthews; librarian and cup secretary, Mrs. M. Matthews; social secretary and P.R.O., Mrs. P. Brown. Committee members: J. Sparks, Mr. Michelmoor, Mrs. Ham representative for Junior section. Auditors: J. Davis and G. Thompson. The Club meetings are now held in new premises at St. Andrew's School Hall, Shipway, every second and fourth Tuesday. Champion of Champions table show was won by Mrs. Griffiths.

THE December meeting of the **Kaighley A.S.** was arranged and organized by the Junior members who held an auction of surplus fish and equipment. Free supper was provided. The results of the table show were: Fish of the month (A.O.V.): 1, Mrs. Heap; 2 and 3, Mr. Heap. A.O.V.: 1, D. Mosley; 2, Mr. Lydon; 3, Mrs. Heap. Novice A.O.V.: 1, D. Mosley; 2, Mr. Price; 3, Mr. Sagar. Junior A.V.: 1 and 2, Master Barton; 3, Master Cook.

LAST year finished in grand style for the **Uxbridge and District A.S.**, 170 attending the Christmas social and dance, and all agreeing that it was a very enjoyable evening. Previous to this members enjoyed an evening coach outing to Queensborough Fisheries. Two slide lectures on man-made fishes by P. Ginger proved most interesting. An inter-club quiz with Hendon A.S. ended in a draw, both sides scoring 29 points. It should have been a three-sided match, but owing to 'Bu East London Pondkeepers were unable to come. A full programme has been planned for 1973 comprising lectures, table shows and inter-club shows. Date for the open show is Sunday, 8th April. Full details for this event will be obtainable from show secretary, Mrs. S. Whitehead, 31 Berberis Walk, West Drayton, Middlesex.