HOW TO RUN A SIMPLE AQUARIUM
(Fresh-water)

by

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Rasbora cephalotaenia

Published by the Museums Department, Federation of Malaya at Kuala Lumpur and
Printed by The Standard Engravers & Art Printers, Kuala Lumpur,
1953.

Price 25 cents or 7s.
How to run a simple Aquarium

The keeping of small fresh-water domestic aquariums is a hobby so well and widely established that it supports in many countries dealers, who supply fish and apparatus, and a variety of magazines and books giving advice and information to its devotees. Most highly esteemed by aquarists in Europe and America are the little fish called, “tropicals”, which are maintained in artificially warmed aquariums, thermostatically controlled, and for which high prices are paid.

Many of these prized and vivid little fish are exported from Malaya, where they swarm in the swamps and roadside ditches. Since our climate affords them their native environment they can be kept here without any temperature control. Since no costly and hazardous oceanic journey is involved they can be purchased cheaply, or, better still, the aquarist can go out and catch them himself. There are few countries in which aquarium keeping is so easy and rewarding as in ours, but, like everything else that is worth doing, it should be done properly or not at all.

Let us consider first the aquarium itself. To understand the principle governing the choice of an aquarium it must be realised that fish breathe air just as we do, but breathe it dissolved in water instead of as a mixture of gases. Just as ours does, their respiration consumes oxygen and produces carbon dioxide which, in excess, is poisonous. Fish in an aquarium are in the situation of people shut up in a room with limited ventilation. So long as oxygen enters the room, and carbon dioxide leaves it, as fast as they are respectively consumed and produced by the inmates’ respiration, all will be well. If the former process lags behind the latter the people will, sooner or later, die of suffocation.

Since these gases pass into and out of the water through its surface, it follows that the greater the area of surface relative to the quantity of water, the faster will the oxygen be replenished and the poisonous carbon dioxide of the fishes’ breathing be diffused away. The number of fish you can keep in a vessel depends therefore not on its capacity but on the surface area of the water in it. Deep narrow vessels make bad aquariums, and so do globular bowls, filled close up to the narrow aperture, like the traditional and abominable gold-fish bowl.

By far the best aquarium is a rectangular tank with glass sides. Its proportions are a matter of taste, but most of the ones that are sold combine a more or less pleasing appearance with sufficient surface area to accommodate a reasonable number of fish. They have the great advantage that the flat glass sides enable you to see the fish without distortion. Battery jars have the attraction that, unless they are cracked, they cannot leak, but the quality of their glass generally gives very poor visibility. The tank should be placed on a table where it will receive a fair amount of light but...
no direct sun. Obtain some clean, fairly coarse sand and cover the bottom to a depth of a couple of inches. Fill the tank and plant in the sand a number of water plants, which are best purchased from an aquarium dealer unless you are botanist enough to seek them yourself. By no means all the plants found growing wild in fresh water are suitable for the aquarium. They do not need soil for their roots and this should on no account be provided for them.

The plants not only greatly improve the appearance of the tank but serve a practical purpose as well. Under the influence of light green plants reverse the process of respiration, releasing oxygen and absorbing carbon dioxide. In the course of this photosynthesis, as it is called, carbon dioxide and water are combined to form sugar and other carbohydrates, which are the basis of life upon the earth. Its immediate importance to the aquarist is that, during the day, when the fish are most active, it supplements the aerating process which would otherwise only take place by surface diffusion.

The reason for choosing a moderately lighted situation for the aquarium is as follows: With too little light the plants will not thrive or serve to aerate the water; the effect of too much is to encourage the growth of microscopic plants called algae which float in the water and will, if unchecked, turn it into a sort of green soup. The fish do not suffer but your aquarium ceases to be a thing of beauty. Direct sunlight is likely to heat the water and kill the fish.

Now for the fish themselves. The first danger to which the untaught aquarist is likely to expose them is that of overcrowding. It follows from what we have said about the diffusion of gases that a given surface area of water can support only a limited number of fish. Very small fish like the American “Guppies” (now abundant in the streams of Singapore Island) and our native Rasbora maculata need three to four square inches of surface each, so that an aquarium of one by three feet will support rather over a hundred of them. Fish of two to three inches need at least eight square inches and those over three inches, twenty or more. These are minimum requirements and they assume a good growth of plants in an adequate light. Any departure from them should be in the direction of less fish rather than more. Fortunately it is easy to tell if they are overcrowded; fish that are threatened with suffocation always spend their time skimming the surface with their mouths, only dodging down when frightened, and quickly returning. If you see your fish doing this remove some at once; it is cruel to keep them under such conditions.

Next comes the question of food. The fish must be fed regularly if they are to thrive and grow, but feed them sparingly and never give more at one time than they will immediately eat. The reason for this is that unconsumed food in an aquarium will rapidly decompose and poison the water, and the fish will die. This and overcrowding are the two most frequent causes of failure in aquarium keeping. A variety of foods can be given, but bread and boiled rice should not be among them. Bottles of
powdered fish food can be purchased. These vary widely in quality, and the better ones make a fair staple diet for most of the hardier fish. Scrambled egg is good if given very sparingly. All fish do better, however, if given more or less frequent meals of live or freshly killed food. Finely chopped earth worms are good and so are freshly swatted flies. Tangled masses of pink, thread-like living worms called Tubifex are sold by dealers as fish food and are quite satisfactory. They can be kept alive in a saucer with so little water that the worms are in contact with the surface. If they are immersed in water in a tin or cup they quickly die and smell quite appalling. The best food of all is mosquito larvae, which are easily obtained by exposing bowls of water, each with a few dead leaves in it. Mosquitoes will lay in them and larvae will be visible in a few days and can be removed as required with the aid of a glass syringe or pipette. For obvious reasons none must be allowed to come to maturity and supervision of the bowls must be carried out by the aquarist himself. The larvae are easily recognised, small almost colourless worms which swim by wriggling in a curious figure-of-eight fashion. Mosquito pupae (the stage immediately preceding the the winged adult) have the appearance of being almost all head with a tiny tail, like little swimming seeds; when these appear it is well to empty the bowl and start again. If this is done conscientiously there can be no objection to it, in fact, by luring mosquitoes to commit their offspring to certain destruction, it acts as a measure of control. All fish will thrive on the larvae, and for certain small species with delicate appetites they are a necessity.

Maintenance is less trouble than is generally supposed. So long as the fish and plants appear to be thriving the water need never be changed. The aquarium can be kept clean by siphoning out some of the water at intervals of a week or two with a three to four foot length of rubber tubing. By passing the intake end of the siphon over the sand accumulated dirt can be picked up and removed, but be very careful not to suck inquisitive small fish into the tube, for they never recover from this accident. When topping the tank up afterwards put the water in as gently as possible. The best way is to siphon it back from a vessel standing on a higher level than the tank. Domestic buckets used for this purpose must be quite clean and, in particular, free from soap.

It is impossible to prevent a certain amount of algae from growing on the inside of the glass. This can be removed by very slowly wiping the glass with a clean cloth held in a clean hand, or it can be scraped off with a razor blade.

Apparatus, in addition to the rubber tubing and buckets already mentioned, is simple. A small shallow dip-net, made of twisted wire and mosquito netting, is essential for transferring fish from one receptacle to another. It often requires a great deal of patience to catch a particular fish in the aquarium. When it is caught, cover the net quickly with the other hand or it will jump out; a fish that gets onto the floor is often fatally injured in being picked up. If you have to handle fish, see that your
hands are wet, otherwise scales will be detached, spoiling the fish's appearance and all too frequently killing it. A pair of long forceps made of split bamboo is useful for removing dead fish and other unwanted objects from the bottom of the tank, and for replanting uprooted plants.

Some fish, especially the Fighting Fish and its relatives, are inveterate jumpers. To keep these from involuntary suicide a cover of netting or perforated zinc must be put over the tank. This will also discourage too close an interest in your hobby on the part of your cat.

Mechanical circulating, filtering and aerating devices are a luxury. They enable fish to be more crowded and are necessary in marine aquariums, and for containers in which fish are to be transported long distances. The small domestic fresh-water aquarium with which we are now concerned gets on very well without them.

As in all forms of collecting, capturing your own specimens is more satisfying than buying them. To prepare for an expedition in search of fish arm yourself with a strongly made dip-net of the type of the angler's landing net. This should have a bag of fairly fine-meshed string netting not deeper than the diameter of the net, with one of mosquito netting inside it. The latter is necessary in order to retain small fish without injuring them, but mosquito netting alone is not strong enough to lift the masses of weed and mud which often get into the net. If fish are wanted in large quantities a minnow seine is very useful. This is a strip of netting about 3 feet wide and 20 feet long with floats along one edge and weights along the other. Small embayments of ponds and streams can be enclosed with it and the fish concentrated in a small area where they can easily be caught with the dip net.

A bucket will do to bring the fish home, but a large sweet jar with a string handle is better as it enables you to see what you have caught. Dress for the part: the man who comes home with a good catch is the one who spends a great part of the time waist-deep in the water. Trousers with socks pulled over them at the ankles are advisable; shorts are an invitation to the savage buffalo leeches which often infest just those waters where fish are abundant. Weedy streams and ditches are the best hunting grounds, and good catches can often be made where such watercourses cross the road under culverts and bridges. Fish can often be seen in open water away from weeds, but they are very hard to catch. When transferring the fish from net to jar remember again that your hands must be wet.

At the close of a successful day the jar is likely to be rather more crowded than is healthy. Change the water from time to time while collecting and immediately before starting for home, and during the journey too, if it is of much more than an hour's duration. A grossly overcrowded collecting jar will, of course, result in the loss of the whole day's catch.

Aquarium fish suffer from a variety of diseases, one of the most frequent of which is fungus infection. Injury, particularly loss of scales,
exposes fish to fungus attack, which first becomes apparent as a growth of white mould. This should be treated with salt water, which can be produced at the correct strength by dissolving an ounce (two heaped teaspoonfuls) of salt in a gallon of water, or (better) by mixing one part of sea water with five of fresh. If the disease is noticed in its early stages it is sufficient to remove the patient to a shallow vessel of the solution for two or three days. Though not essential it is a wise precaution to quarantine fresh catches of fish in salt solution for a couple of days before putting them in the aquarium. Some are bound to have been injured when caught, and their wounds will heal better in the antiseptic saline water.

The other common disease goes by the name of the protozoan parasite which causes it, Ichthyophthirius, often called White Spot or abbreviated to “Ichthy”. The first sign of it is the appearance of white specks on the body and fins of the fish, which are in reality cysts containing the parasite. These eventually burst, releasing eggs into the water which give rise to new parasites, and these in their turn burrow into the fishes’ skin. If untreated this disease is always fatal and not a fish in the tank will escape, as it attacks healthy and sick, wounded and whole alike. In this case the tank must be treated in such a way as to eradicate the pest. Various means to this end are employed; a simple one is to put in four drops of Mercurochrome to every gallon of water, and leave it for a week. The water is stained an alarming pink colour, but normally no harm is done to fish or plants, and the parasite is exterminated. At the end of this period siphon out all but about two inches of water, fill up, siphon out again and refill. The trace of Mercurochrome that remains is insignificant. Although it is usually as safe as it is effective, some aquarists maintain that fish suffer harmful after effects from Mercurochrome treatment. A safe alternative is the use of quinine sulphate, half a grain to the gallon of aquarium water. The required amount of the powder is put in a cup, moistened and mixed to a paste with a spoon. Then the cup is filled with warm water, the mixture stirred until all is dissolved and poured into the aquarium. Add another dose of the same amount on the third day and after three or four more days siphon off half or more of the water and replace it with new water. The aquarium should be kept in a subdued light during treatment (as the quinine is unstable in a strong light) and the powder must be accurately weighed and thoroughly dissolved before being put in. Wild fish are seldom infected with Ichthyophthirius, but some dealers are careless about it. Before making a purchase inspect their tanks for the tell-tale white specks, and if they are apparent, go elsewhere.

To find the gallon capacity of a rectangular tank multiply length, breadth and depth together, expressed in inches, and divide by 231.

Little can be said here of the actual species suited to aquarium life, which are found in our country. About forty common ones can be counted, rather over half of which belong to the family Cyprinidae, the Carps and Minnows. Most numerous and popular of these are the Rasboras, led by the well known and charming Rasbora heteromorpha, which is marked with a black triangle on each side of its small silvery and orange body. It is, in
fact, not a typical member of the genus, most of which are far more slender in build. *R. taeniota*, with a black and gold longitudinal stripe on each side, and *R. pauciperforata*, with a single coppery red lateral stripe, are representative of the genus, of which over a dozen species are found in Malaya. The illustration on the cover is of *Rasbora cephalotaenia*. The species of *Puntius* or *Barbus* range widely in size and many are big fish; half a dozen or so are small enough for the aquarium and these include the beautiful little "Tiger Barb", *Puntius partipentazona*, with its pattern of black stripes and brilliant red dorsal fin. *Danio*, *Oxygaster* and *Epalzeorhynchos* are other Cyprinid genera which include aquarium-worthy species.

The Loaches (Cobitidae) are curious rather than beautiful little fishes, but some are very popular among aquarists. The eel-like *Acanthophthalmus semicinctus*, marked with alternate black and pinkish-yellow bars, is perhaps the best known of them. More research is required before we can be sure how many species occur in this country.

The Goramy family (Anabantidae), which includes the celebrated Siamese Fighting Fish, contains a number of favourites. Two species of *Trichogaster*, locally known as Sepat, are small, pretty and hardy, and the little "Chocolate Goramy" (*Sphaerichthys osphromenoides*) is one of the most handsome of them. The Fighting Fish, *Betta splendens*, while it exists in the wild state, has achieved the status of a domestic animal; numerous artificial strains have been produced by selective breeding, by aquarists for their beauty, by the people of Thailand for their pugnacity. This species occurs in northern Malaya and oddly elsewhere as an escape. Through most of the country it is replaced by another larger and less brightly coloured species, *Betta pugnax*.

No book for the simple identification of Malayan fresh-water fishes exists at present, but some papers on the "aquarium-sized" species have been published by the Malayan Nature Society. There are regional variations in our fish fauna, the limits of which are as yet only rather vaguely known, and without doubt species new to Malaya and even new to science await discovery in this country. Aquarists who catch their own fish are in a position to make valuable contributions to our knowledge of Malayan ichthyology. Those who feel inclined to do so are advised to write to the Museums Department at Kuala Lumpur or Singapore and enquire if there is any member of the staff prepared to receive specimens for identification and to supply instructions for their preservation and despatch through the post.
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