

# The AQUARIST AND PONDKEEPER

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## Editorial

TO add to the list of modern advances in methods of catching fishes comes news of an "electronic eye." This device has been in use on a trawler in the Arctic fishing grounds, where, lowered into the sea, it has been sending electronic messages to the skipper on the bridge that tell him of the whereabouts and size of fish shoals. It is said that this technique might "revolutionise" fishing results, and the vision comes to mind of some future era with the electronic eye available for amateur fishermen. Gone will be the necessity for the angler to possess infinite patience, and undone will be those fabulous wily giants that lurk in the depths of ponds and quiet backwaters, as the all-seeing eye locates these prizes from the end of the line on the fisherman's rod. But the equal of the electronic eye is surely met in the prey-finding feat of the Berlin pike in the news story told the other month.

This 15-pounds specimen was exhibited at a West Berlin agricultural show. After visitors had left, it was reported in *The Times*, "he leapt from his little artificial pond on to the concrete floor and squirmed purposefully with strong movements of his tail towards a stuffed hare which was part of the forestry exhibit." Unfortunately for the naturalist's interest, in this report it says that two attendants, after "a rough time," returned the pike to its pond. How carefully, we wonder, had this fish assessed its chances of making its way home after capturing its prey? Or did its appetite, provoked by the sight of that complacent-looking hare, brook no reasoning at all? The difficulties the pike caused its attendants can be presumed to be nothing to what would have happened if it had gone so far only to discover that the hare was not real.

"First catch your hare—"; this story shows that there may be many a disappointment between the finding and the catching, and that this is true for fish as well as man. It is to be hoped that electronic eyes will at least discriminate between, as it were, the stuffed and the unstuffed.

## Contents

	Page
Editorial .. .. .	1
Starting a Tropical Aquarium—4 ..	2
Tropical Catfishes .. .. .	3
Notes on Some South American Fishes ..	4
Temperature and Fancy Goldfish ..	5
Breeding the Comb-tail .. .. .	6
Enamel Fin .. .. .	7
Water Wistaria .. .. .	8
Aquarist's Notebook .. .. .	9
Microscopy for the Aquarist .. .. .	11
White-Spot Disease .. .. .	12
In the Water Garden .. .. .	14
Readers' Queries Answered .. .. .	15
Our Readers Write .. .. .	17
News from Aquarists' Societies .. .. .	19

Also, four pages taken issue for March, 1956.

# Starting a Tropical Aquarium—4 by AQUARIUS

**Y**OUR tropical tank should now be in good working order with the plants and fishes getting established. Before I deal with the feeding problem the weekly servicing will be described so that everything can run along in safety with as little trouble as possible. There is no need to spend a lot of time looking after the tank if it was set up correctly in the first place, and just half an hour once a week will be sufficient to ensure that all goes well. It is a good idea to do this task on the same day each week, whichever one is most convenient. By sticking to one day the task is less likely to be forgotten.

To service the tank the following will be necessary: one or two pails or large water cans, a scraper holder long enough to reach the bottom of the tank to hold a safety-razor blade, a glass tube about half-inch bore attached to a length of rubber tubing so that when the glass tube is being operated in the tank the end of the rubber tubing is well down into the can or pail on the floor. A couple of sheets of paper on the floor is a good idea to catch any drips, especially if the tank is in a living room.

First remove your cover glass and clean it well. Then remove the feeding ring. Next scrape the inside of the front glass, starting at the top and working all over it carefully so that none is missed. This will remove the algae which is almost sure to form, and this must be done thoroughly, as otherwise a nasty patch will show up when you have finished. Do not touch the back or ends; just allow these to green up naturally and so shut out excess light and give the tank a more natural appearance. The scraper must be used carefully, especially when working near the bottom of the tank, to prevent much of the mulm from being disturbed. Try to keep the water as clear as possible when using the scraper.

Now look over the plants. If any have grown too long and are winding about at the top of the water, they should be shortened. The scraper blade will soon sever the stem if the top of the plant is held. Any plants which may have been uprooted should be carefully re-set. When the water has settled down you can use your tube as a siphon. Hold the glass tube well down into the water but above the sand and give a quick suck at the other end of the rubber tube attached. Lower this quickly into the pail and the water should run out fairly quickly. Now place a thumb and finger across the rubber tube so that if a fish gets near the glass-tube end, slight pressure on the rubber will stop the flow of water and not cause the fish to be drawn into the tube. Now swing the end of the glass tube over the sand in a circular motion not more than half-an-inch from the sand. This will raise the mulm slightly which will then be sucked away into the pail. Continue to sweep the front base of the tank until all the mulm has been cleared away. There is no need to try to remove all the mulm that has been washed back to the rear of the tank and behind the rocks. It is always necessary to leave some in the tank for the benefit of the plants. Whilst siphoning keep a watch on the pail and if nearly full up stop the flow by pressure on the tube and transfer it into the other bucket. I find that to clean a tank properly it is necessary to remove nearly two pails-full of water each week.

Now get a can of water of the same temperature as the tank water, to fill up. There is no need to try to cleanse the water you have taken from the tank to use it again. Fresh water is better. Place a thin board on the water and gently pour the fresh water in. See that the water rises to just above the lower edge of the top of the frame. The actual top of the water should not be seen when looking straight at the tank from the front. Once the water is replaced make sure that there are no floating bits in the

water, and if a film appears to be covering the water draw a sheet of paper quickly across the top from end to end. This will remove the film and any dust which may have collected there. Now replace feeding ring and cover glass. The outside front glass must now be cleaned thoroughly and the cover replaced. This is all that is necessary for the weekly servicing but very occasionally a little fresh sand can be added to the tank. It is almost certain that a little sand may be drawn up with the mulm and this can be replaced to brighten the base of the tank, say, once every two months.

It should rarely be necessary to remove any of the rocks when cleaning. After some months they will probably become covered with a growth of algae or flannel weed. This need not be removed, unless it becomes so thick that it covers the rock completely. It will be noticed that this weed appears to attract some of the mulm in the tank and this can be removed by waving the tube through the weed when using the siphon. If the rocks get too densely covered they can be removed and scrubbed under a running tap. When taking the rocks out do this with great care so that as little as possible of the mulm is disturbed.

Once the tank is going along well it may be noticed that one or more of the plants do not seem to be growing well and may need replacing. Remember that once most of the plants have made plenty of fresh roots in the mulm any new introduction will meet this competition, and can hardly be expected to be able to get going well in a short time. When planting any new subject into an established tank it is necessary to make sure that the new plant is well rooted, otherwise it cannot be hoped that it will make headway against the others. Instead of trying to plant an unrooted cutting directly into the tank it is better to root it first in a small jar or pot, and then when new roots have been formed all can be planted in the tank together with some of the soil in which the cutting has been rooted.

Make sure that your cover glass does not lie directly on the top frame of the tank as it will be sure to start rust forming there before long. Four tiny mounds of putty, one at each corner of the frame to support the glass, will ensure that not only will the risk of rusting be lessened but some fresh air can also reach the tank. You can fix the glass, if preferred, so that the back rests in a strong wire hook and the front edge rests on supports on the front-frame top. This allows any condensation to run back into the tank.

Make occasional tests of the temperature of the water to see that the thermostat is working properly. It is also a good plan to disconnect all electrical wiring from the tank whilst you are servicing the tank. Failure to do this may result in a short or the heater may get too hot if some of it is not covered by water. In the next article the important question of feeding will receive attention.

## THE AQUARIST & PONDKEEPER

PREPARATION of this issue has been affected and publication delayed by the recent cessation of work in London printing houses. It was unfortunately found impossible to produce a normal issue for March, but four token pages to complete volume xx, which ended last month, are included at the centre of this issue for readers who bind their volumes. The publishers of *The Aquarist* express regret for the inconvenience suffered by readers and advertisers and announce to subscribers that current subscriptions will be extended by one month in compensation for the deficient issue.

# TROPICAL Catfishes

by RODNEY YORKE

THE charming little catfishes known as *Corydoras* have endeared themselves to all who have kept them by their quaint ways, peaceful and pleasant manners and their long life in captivity. They can exist in almost any conditions and are not choosy when it comes to feeding. They seem immune from most diseases, white spot in particular, and seem to be absolutely fearless with larger fishes, probably because their armour plating gives them confidence.

A temperature of 70° to 80° F. serves them well but they can stand much wider extremes. They are sensitive to salt, however, and they should be removed from any tank undergoing salt treatment. They will also die if kept long in a tank where the bottom has gone really foul, e.g. where there is an excess of Infusoria culture medium, where the sand is black with bacteria or where there is a strong concentration of sulphuretted hydrogen. They do well in acid water (low pH) but prefer alkaline conditions. Active after dark, they soon learn to get a livelihood in daylight, but sight plays no part in locating food. This they do by touching with their "whiskers," but they learn fast, and if you drop a *Tubifex* worm on the back of a *Corydoras* it knows immediately that food is about and quickly finds it. Sexing is difficult and uncertain; some suggest that more pointed pectoral and ventral fins indicate the male, which is usually smaller than the female. The latter may show a pinkish tinge round the abdomen.

The most popular *Corydoras* species are *C. aeneus*, *C. paleatus* and *C. melanistius*, merely because these three are usually obtainable at most dealers. As the majority of aquarists are familiar by now with these I propose to devote what space I have to discussing the lesser-known but equally interesting *C. punctatus*, *arcuatus*, *myersi* and *julii*. The reason why these latter are not so well known is because they are not easy to breed, and some are not easy to find or catch. Many very young fish do not ship well, and often die off within a fortnight of arrival. Often these fish are native fish and take time to acclimatise themselves to aquarium life. If, therefore, you are keen on trying out these other members of the group, buy them when you see them offered for sale; you may not see any more for a long time.

## *Corydoras punctatus* and *arcuatus*

*Corydoras punctatus* is rather rare and comes from British Guiana. Dr. Ladiges mentions having caught a single specimen in the Demarara river, in very muddy water. This is interesting, because this *Corydoras*, although only about 2½ inches when full grown, does tend to stir up the mud more than most members of this family. Axelrod and Schultz omit this fish from their recent book *Handbook of Tropical Aquarium Fishes* because it is insufficiently described to be identifiable. However, it is generally considered to be a light brown flesh colour, heavily spotted with black dots. From the middle of the head a black bar descends through the eye and there is a black blotch on the back which runs into the dorsal. The fins are not



Photo: Laurence E. Perkins

*Corydoras punctatus* is the species of catfish pictured above and on the front cover of this issue

marked, apart from the tail which is dotted with several dark dot lines. In some ways this fish resembles *C. agassizi* (another rare specimen), but without the dark lines.

*Corydoras arcuatus* is quite different. This fish has no dots but has, instead, a wonderful black bow which extends from the eye to the tail, right over the back. This is the more enhanced because the body colour is light, between ivory and light golden according to whether the fish is viewed in daylight or electric light, and depending upon the composition of the bottom ballast. The gill plates show two golden spots. A feature of *C. arcuatus* is the way it sits proudly on the bottom with the head well clear of the sand and the dorsal carried erect, a truly regal carriage.

## *Corydoras myersi* and *julii*

*Corydoras myersi* is probably the one most available, and this bears some resemblance to *C. arcuatus* insofar as it also has a dark line (not a bow) running from the front of the dorsal to the tail. This line is not so heavy or distinct as in *C. arcuatus*. There are no dots or spotted effects but the whole fish glows with a wonderful golden hue which just cannot be put into mere words. The nearest colour is that of *C. melanistius*, but this lacks the glow. *C. myersi* also comes from the region of the upper Amazon, and reaches about 2½ inches when full grown. Like other *Corydoras* it is long lived as tropicals go and, in good conditions, should live over seven years.

The leopard catfish is a good name for *C. julii*, which is so well spotted that it is leopard-like. The colour is grey to olive with heavily flecked dark spots and three heavy lines formed of spots running from the tail to the gill plates. The dorsal has a large black blob on the upper portion, and there are numerous rows of dots on the tail. This fish is most attractive but specimens on sale are usually very tiny little fellows. There are several unidentified *Corydoras* almost, but not quite, identical with *C. julii*, and these are occasionally caught and offered for sale as "leopards" or "unidentified cats." They are grand fish but tender when first obtained. When in the aquarium all the

fish mentioned are hard to catch because they can swim with lightning speed and are adepts at avoiding your net.

None of these *Corydoras* which I have mentioned is easy to breed. Some successes have been reported in U.S.A. and Germany, and an odd one or two in Britain, but we have much to learn about this fascinating group. Ideas about the breeding habits of *Corydoras* in general can be found in the major books on the hobby but a great deal is conjecture, as yet. Many who have spawned these fish find that the young fish die off within a fortnight of hatching. Aquarists agree that most spawnings take place at lower temperatures (65° to 73° F.) and that hatching takes four days or longer. Hatching is delayed by lower temperatures.

For breeding, a well planted tank should be shaded at one end, and rockwork hiding places provided. Old water should be used, but the bottom is siphoned regularly until spawning has taken place, and new water is used for topping up. This stimulates spawning keenness. The large eggs produce quite sizeable youngsters which disappear in the mulm. Fine fry food can be used for them but care has to be taken not to foul the water. Brine shrimp feedings are suggested by some, twice daily. Mashed *Tubifex* can be given three days after hatching, when the fry should be about 6 mm. long. If well fed, and with ample room, the young should be about four-fifths of an inch in length by the time they are six weeks old. Try out these newer *Corydoras* when you get the chance—you will not regret it.

## Notes on Some South American Fishes

I T was as an angler, rather than as an aquarist, that I was chiefly interested in fishes during my stay of some years in South America. Nevertheless, the following observations on the behaviour of some of the species may be of interest to readers.

I was once fishing for dorado, a lovely fish best described as a golden edition of a salmon, as far as shape is concerned but with crimson fins. I was surprised to find on that particular day that having played my fish to the bank, other fish had accompanied the hooked fish. This occurred many times—sometimes there was a single fish, sometimes two or three, their heads all lying closely together, making it almost impossible to decide which fish to net.

This little episode puzzled me for years, for I could find no explanation. But eventually, long after, I believe I found the solution. It was whilst feeding my goldfish in a tank which was also occupied by a coldwater catfish. The latter had been dormant all day, apparently asleep amongst the weeds. One single shred of meat fell into the tank, and within seconds the catfish was rushing around searching for food. My theory is that the unhooked dorados were merely following the smell of the bait (meat), with the possible hope, perhaps, that it might be ejected for a moment by the hooked fish. But, of course, there may be another explanation.

Referring to catfishes, I must mention one variety that I caught in a tributary of the River Plate, and that, so far, I have not seen illustrated or mentioned in any book on the subject. This fish was white, with a black, wandering striped pattern running over it, and was about five inches in length. Out of many hundreds of catfishes that I caught, this was the only one of this type. As another matter of interest, the croak of a large catfish, when hooked, can be heard through many feet of water.

Catfishes remind me of an incident that I witnessed in Entre Rios in the Argentine Chaco. The land was pitted with small mudholes, perhaps six feet wide, left by flood water. Believing that I saw a snake enter one of these ponds, and noticing movement in the water, I tried every means at my disposal to find the reason for the disturbance, but without success. As a last resort, I poured a little disinfectant into the hole. Within a minute, six catfishes four inches in size, came out of the water and, all going in the same direction, hobbled across the ground to another mud hole some 20 feet away. Judging from illustrations, I would say that they were *Callichthys callichthys*, or a species very similar. It was interesting to note that although they left the pond from various sides, they all went to the nearest hole, ignoring others only a little more distant.

One other fish came to the surface, which I caught. This

again was a fish that I have not yet seen illustrated. Its colour was "goldfish red," length about four inches, depth approximately three-quarters of an inch, and a body like that of an eel, although far less slender, as the dimensions indicate. Its scales were about the size of a four inch goldfish and, as far as I remember, it had pectoral, anal and ventral fins. Its tail had no waist, being like that of an eel.

In comparison with British fish, a large proportion of South American fishes seem to be armed with teeth. These vary in shape and sharpness from grinding teeth (similar to Indian corn), to thin saw-edged teeth, as found in the piranha, and long tintack or catlike teeth. One fish that I caught (name unknown) in a tributary of the River Plate, and which fell off my hook at my feet, had teeth of the last category. It was about 4-5 lbs. in weight, silver-grey in colour, and roundish in section, and almost as active on the ground as in the water. It jumped and shook, and snapped its jaws so vigorously as it quickly made its way back to the water some ten feet away, that I was glad to get away from it!

The piranha has the worst reputation, as every fisherman knows. It is said by the natives that a swarm of piranhas will attack even an ox, and strip it to the bones. It is presumed that the blood attracts the fish over a large area. Teeth of the piranha are saw-shaped and intermeshing, very thin in section, and as sharp as a razor blade. To give an idea of their sharpness I must quote my effort to catch some on rod and line. As I had no meat as bait I shot a hawk, and baited the hook with a piece of a leg. This was so tough that I had difficulty in getting it on to the hook. But time after time the bait disappeared without the slightest movement of the float. I then tried again, this time jerking the line continuously and paying no attention to the float. I immediately caught as many fish as I required.

In a river near Buenos Aires I once found a fish floating in the water; it had only recently died. There was nothing distinctive about it, as it roughly resembled a nine-inch haddock. But the top edge of its tail resembled a rat's tail, and continued for about 20 inches beyond its body. The end was obviously broken off abruptly, and would no doubt have extended to a greater length. Perhaps some reader may be able to identify this fish from my description, and possibly suggest a functional reason for this whip-like extension.

I shall always regret that my activities were directed solely to the capture of large fishes, without a passing thought of the little gems which might have been revealed had I only paid attention to some of the small tributaries and pools.

Stewart G. Knock

THE AQUARIST

# Temperature and Fancy Goldfish

by N. E. PERKINS

(Photographs by LAURENCE E. PERKINS)

OF recent years a fair quantity of the more rare types of goldfish have arrived in Britain from China, and it has been my good fortune to secure either the actual specimens or the immediate offspring of some of the most interesting. I can say without any hesitation that they are in every way hardier and more robust than goldfish stock which has been in the country for a long period. It would appear from this that our methods of handling the goldfish are a long way from satisfactory, and it would be of interest to delve into the possible causes.

## Mistaken Coddling

In most written matter on this subject it will be found that all varieties other than single-tailed types and metallic varieties are listed as sub-tropical, and it is even specifically stated by some that their water must not be allowed to fall below 60° F. Now, in my opinion, this is one of the root causes of our failure, since not only do people not allow their fish to reach this temperature but, to be on the safe side (as they think), they maintain them at 60° F. and above. Indeed, I know of one case where, winter or summer, the fish are kept always around 70° F. Quite apart from the difficulty that this creates in getting the fish into breeding condition, there are many other evils which arise—probably because the normal period of hibernation which this species should undergo has been prevented.

Of course, since most of these specimens are expensive it is quite understandable that people should hesitate to expose them to possible risk and the coddling which arises in an endeavour to ensure safety finally leads to weak and decrepit stock. The answer to all this is pretty clear. First, let us suppose that you have but one pair of fancy goldfish—veiltails, shall we say, since they appear more fragile than most types. Well now, having bred from this pair, spare no pains during the summer months to put



A microscope-eyed lionhead goldfish, 18 months old, kept at 38-45°F. with nine others. One fish of the group showed signs of "heaviness"



Two veiltail goldfish under a thick layer of ice (top right). The darker fish has developed dropsy, a complaint which may develop at low temperatures but one to which not more than 5 per cent. of exposed fish succumb

weight on the most likely specimens and toward the end of the summer divide this number in two, retaining one half in aquaria and transferring the other to an outdoor pond. Of course, you must do this while the pond water is still at a reasonable temperature, which during the middle weeks of August should be around 65° F. This pond, by the way, should be at least 30 ins. in depth and preferably more, since it is in this depth that security lies should we experience really hard weather.

## Veiltails under Ice

These fish should be fed regularly until it is apparent that they are too sluggish to consider food; in fact, if at any time when food is put in the fish do not immediately dash for it, then withhold it and continue to do so unless there is some considerable change in the weather and the fish appear to be active again. At last conditions will be such that the fish will huddle at the bottom, shuffling themselves half into the mud, and here we can safely leave them providing we do not allow the water to become foul with the dying and dead remnants of plants. I have had veiltails under many inches of ice, and have never had one actually die under these conditions although one or two have subsequently developed dropsy; this complaint appears to be associated with temperature change (not necessarily, remember, with very low temperatures, for dropsy can be seen amongst fish which are continuously kept at high temperatures; indeed, smaller variations will prove sufficient to cause this complaint under such conditions).

When, in the spring of the following year, the two lots of young are examined it will be found that the indoor set are considerably larger than their outdoor brothers, as, of course, must be the case since they have been feeding continuously and growth has not been arrested. This, however, is but a temporary set-back, for if during the

summer the two lots are kept in the pond the smaller youngsters will rapidly overhaul the larger specimens and will in every way (especially so far as breeding is concerned) show that they are stronger and more virile than the others. Of course, as with all things, there are bound to be weaklings, and these must be weeded out and destroyed, for although it might be possible to nurse them into final breeding condition, this can only spell disaster for future stock.

I have suggested this method since it ensures that all one's eggs are not in the same basket, and furthermore, when autumn again arrives, those fish that were formerly kept indoors may now be allowed to adjust themselves to outdoor winter conditions.

So much for the hardiness of the fish; what about

retaining and, if possible, improving their characteristics. Here again, because of the rarity, expense, etc., unfavourable crosses amongst the varieties have been and are being made. This eventually results in mediocre specimens of indiscriminate types which are virtually valueless. Moreover, such as do closely resemble some known variety may be unwittingly used by some enthusiastic beginner only to cause him disappointment and trouble. It is to be hoped that in the future greater care may be exercised in keeping the varieties separate, and if for scientific purposes or general research any unorthodox crosses are made, then the offspring should be subsequently destroyed or at least retained by the experimenter and not allowed to fall into the hands of the dealer.

## Breeding the Comb-tail (*Belontia signata*)

by JACK HEMS

**A**LTHOUGH the comb-tail (*Belontia signata*) from Ceylon is a member of the family Anabantidae, it differs in its breeding habits from the majority of air-breathing species known to the tropical aquarist in that it does not blow the usual frothy mass of bubbles, or gather together at great pains small fragments of vegetation and form them into a mound-shaped nest. All the fish does is to scatter the eggs loosely at the surface of the water, and then guard them until they hatch out.

If you have a pair of comb-tails in a tank well set-up with plant life, you will soon know when they are about ready to raise a family by the increased coloration of both sexes. The well-developed fins of the male become a richer red, and a distinctive pattern of creamy-yellow or light stone and brownish-red vertical markings appears on the sides. Normally, these vertical markings show as mere darkish shadows in this position. Apart from her improved colours, the female at this time grows fuller in the body, and spends a lot of time lying coily in the underwater vegetation, usually close to the floor of the aquarium.

Writing from my own two years' experience with the comb-tail, the species does not appear to go in for the elaborate courtship which normally takes place among, say, paradise fish, or gouramies. Now and then the male will puff out an occasional bubble at the top of the water, or spread his fins before the female lurking in the plant life; but that is about all. There is no question that the courtship is very discreet. Egg-laying usually takes place when the aquarist least expects it. There is a momentary embrace midway, or in the upper levels, of the water, and a few buoyant eggs are extruded by the female.

If spawning takes place close to surface-matting vegetation, the eggs will be restricted by the leaves and stems to one small area; but if, on the other hand, the surface of the water is devoid of plant life, the eggs will float haphazardly over the entire surface of the aquarium. Egg-laying may extend over a period of several hours. After spawning is over, the male may turn very aggressive towards his mate; so, unless the couple are occupying a tank measuring at least 30 inches in length, and well furnished with rockwork and plants among which a bullied fish may find plenty of hiding places, it is advisable to transfer the female to another tank.

But if the tank is a large one, the parent fish may be left where they are, for they will not harm either the eggs or the fry. But they will certainly not tolerate the presence of other fishes in the breeding tank. So if other fishes have been sharing the tank with the comb-tails, do remove

them to fresh quarters as quickly as possible or else they will be badly mauled, if not killed outright, by the over-anxious male.

With the water temperature at 78° F. the eggs should hatch out within 50 hours. The fry stay at the surface of the water until they become free-swimming, which stage of their development is reached about three days after hatching out of the eggs. Then they swim about freely in all levels of the water, and snap up greedily all the microscopic live food (Infusoria) they can find. After a week or so on Infusoria, the baby fish may be given micro worms, screened *Daphnia* and the like. If small live food is not obtainable, dust-fine dried food may be used as a substitute. As the baby fish visit the surface of the water every now and then for a mouthful of air, it is important that the top is kept well covered to prevent cold air blowing across it and all dust and oily scum is cleared away by the simple operation of drawing a sheet of newspaper across the water from one end of the aquarium to the other end, and *vice versa*.

Very young fry are dark-coloured, but as they grow they become paler in colour, almost silverish, with a distinct black marking in the base of the dorsal fin. When they reach a length of about an inch, they might easily be taken for young two-spot gouramies. But the practised eye would quickly notice the absence of two dark spots on the side, and long, filament-like pectoral fins.

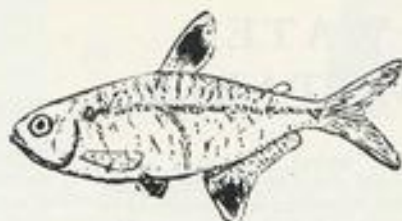
Comb-tail fry are active little creatures and swim quickly about the aquarium. They are alert to the slightest disturbance in the water, and swarm at the surface the moment the aquarist drops food into the aquarium.

Full-size comb-tails, that is, fish averaging about four inches in length, will spawn several times during the summer months. The species is one which is not over-particular about its breeding or living conditions. It will spawn just as readily in a shaded tank as it will in one situated in bright light, natural or artificial.

I believe that the species is one which should do very well between the months of June and September in an outdoor pond, for adult fish seem capable of withstanding wide range of temperature (65° to 90° F.)—and grow apart when they can eat their fill of such things as earthworm woodlice, flies and similar tasty morsels which invariably fall into a garden pond, especially if part of it is overhauled by shrubs or small trees.

# Enamel Fin

(*Pristella riddlei*)



**Genus:**—Ostariophysi, from Greek *ostarion*—a little bone, and Greek *physis*—a bladder.

**Family:**—Characidae, from Greek *charax*—a sea fish.

**Species:**—*Pristella*, from Greek *pristes*—a file or saw, and *riddlei* (pronounced riddle-eye) after the collector Oscar Riddle.

**P**RISTELLA RIDDLEI is another of the smaller characins, it seldom if ever exceeds one-and-three-quarters of an inch overall, whose delicate, translucent beauty merits keeping it on its own, unshaded by more solid-coloured fishes. The almost complete transparency of its trunk is offset by solid yellow, black, and white markings on its dorsal and anal fins, from which it derives the popular name of "enamel fin."

The fish school well, and a small shoal in a brightly (overhead) illuminated aquarium, against a background of mid-green leaves, is well worth striving for. Obviously, the cheapest and most satisfactory way of obtaining a number of fish is to breed them from selected stock.

*Pristella* are happiest in a temperature range of between 70° and 78° F. and fittest when well fed on small live foods—new-hatched gnat larvae, newly released baby *Daphnia*, *Cyclops* nauplii, and the like. They have tiny throats, and cannot swallow large pieces of food, even though they might take them into their mouths.

Prepare an aquarium for the reception of a pair or trio of adult fishes. The female will swell with roe and be slightly deeper in body than the male. Males sometimes tend to mock battle and this might confuse the tyro, who may believe he is witnessing courtship when he is not.

Baled peat, spread over the bottom of the breeding tank under a layer of fine compost, will help to acidify the water, which should be less than neutral (below pH 7). A buffer solution is more reliable to test this than are "pH papers."

A few clumps of finely leaved plants—*Myriophyllum*, *Indian fern*, *Cabomba*, *Ambulia*, are all suitable—should be strategically placed about the aquarium, care being taken to leave several open spaces, for *Pristella*, although small, likes plenty of room to stretch its fins. Raise the temperature of the water to 79° or 80° F., float the trio in a jam jar in this, and let them swim out when the temperature of jar water and tank water is the same. Then keep your fingers crossed!

Spawning may start immediately, or it may not. But if conditions are right, it will not be many hours before spawning begins. Courtship takes the typical form shown by many characins. The male and female circle each other, fins quivering, and the male makes sudden swift dashes towards the female. She turns and dives into a thicket of plants, and there in the centre, body presses closely to body, a number of eggs is extruded and these fall among the leaves or on to the bottom of the aquarium. With periodic runs the courtship continues, until the female is spent, having ejected two or three hundred eggs by this time.

Remove the parent fishes, leaving the eggs where they are. It does not follow that the eggs which have fallen to the bottom of the tank will not hatch—they frequently do.

Hatching usually occurs in from 24 to 36 hours. In several days the fry are free-swimming, and must be frequently fed with the smallest-possible live foods. Even small dry food, when swollen with water, is too large. In fact, swelling of fine dry food after swallowing may well cause many deaths among the fry.

Feed the small foods until the fry slow down their rate of growth. This is an indication that they need a change to slightly larger, or different foods. New-hatched brine shrimp, *Cyclops* nauplii, micro worm, all are good, nutritious foods, readily taken and assimilated.

Overcrowding is often a contributory cause of stunting or growth cessation. Decide upon the number of fry you wish to rear, and dispose of the remainder at the earliest opportunity. Then, indeed, you can hope to have that school of *Pristella* I mentioned above, and I guarantee it will excite the admiration and envy of your friends.

*Pristella* are usually disappointing in fish exhibitions, for they fade out to a silvery, almost colourless fish. The remedies are to use a planted tank, strong overhead lighting, and, if possible, water from the aquarium in which they showed to such advantage at home. You will then no longer hear the remark: "Fancy showing them! Why, I've got better fishes than those in my aquarium."

## What's New?

### Flexible Aquarium Heater

**A**QUARISTS have become accustomed to the Pyrex tube type of heater complete with nichrome wire, former and rubber bung, some deficiencies of which I discussed at length in *The Aquarist* (January) under the heading "Common Faults in Aquarium Apparatus." A completely revolutionary type of heater has now been produced by the London firm of Singleton Bros., whose "Es-Es" products are well known in the hobby.

This new heater is almost six feet long and completely flexible, so that it can be sent through the post in a box measuring no more than 4 ins. by 3 ins., and is in no way fragile. As might be expected, there is no glass in this heater, which looks rather like a large loop of thin, green waxed-clothes line attached to a plug socket. The heating element is covered by a silicone rubber covering which shows no sign of deterioration (after 20-months' testing) and which will withstand temperatures of up to 300° C. Its resistance to acids, alkalies, water and heat make it virtually indestructible and, although the makers guarantee it for two years, there seems no reason why it should not outlast the much more vulnerable glass-cased heaters many times over.

The main advantage of this type of heater is that heat distribution can be considerably increased as the five-foot

(Continued at foot of next page)

Introducing . . .

## WATER WISTARIA

**A**FTER arrival here as a single cutting about 18 months ago, the plant illustrated is now offered to aquarists for the first time. Mr. Colin D. Roe, of Shirley Aquatics Ltd., who has propagated over 1,000 plants from the original cutting, has named it "water wistaria" because of its vine-like habit. At first sight it resembles the Indian fern, but its attractive bright-green leaves grow laterally from ascending stalks. Lateral shoots which run along the sand a short distance before ascending (one is seen at the left of the plant illustrated) arise when the main stem is about 10 inches high. Earliest leaves are less serrated than later ones, and these have a maximum length of four to five inches. Water wistaria grows well in fairly old, slightly acid water with only moderate light and will grow as a bog plant, when leaves and stem become hairy and change their form, also developing a pungent aroma. The plant has not yet flowered under cultivation so its exact identity is unknown; from its habit it has been suggested to be a member of the family Acanthaceae, to which *Hygophila* belongs. Shirley Aquatics Ltd. are reserving 750 plants for export but a limited number is available for the home market. As it becomes more plentiful water wistaria promises to be a popular tropical aquarium subject.



### What's New ?

(Continued from the preceding page)

loop can be spread out around the tank, either on the compost or submerged in the compost. The heat concentration is reduced to between two and three watts per inch of the heater, and the actual element consists of a heavy gauge wire which operates at "black heat." The heater loop may be covered by up to four inches of gravel without affecting the efficiency of the heater. Above-compost heaters give out heat which travels upwards and fails to penetrate the compost. During cold spells the tank compost can register 30 degrees less than the tank water (try this with a thermometer), with an adverse effect on rooting plants, which become dormant to some extent. In the event of a power failure the heat reserve in the compost allows a very slow "fall-off" in tank temperature, depending upon the depth of the compost and the room temperature. This tendency to slow temperature fluctuations means that the work of the governing thermostat is reduced by half, and its life is correspondingly prolonged.

It is inadvisable to have any portion of the element out of water when switched on. For a distance of five inches from the plug the twin leads are held together by a red

sleeve. This portion contains a stout copper conductor which enables this portion to be bent permanently into shape for anchoring to the aquarium angle-iron rim. When setting the loop into position do not force it into the gravel as the covering may become slightly pitted. Ease it in carefully and if you are setting up a new tank lay  $\frac{1}{2}$  inch of compost first, arrange the heater and add the remaining compost. The looping should be so arranged that no part of the loop comes nearer to the tank sides than three inches, if maximum heat spread is to be obtained. With care a rectangular loop measuring 18 ins. by 6 ins. can be set out, which leaves a sufficiently long lead-out from the base loop and ensures that no part of the compost is more than three inches from the heater in a 24 ins. by 12 ins. by 12 ins. sized tank. Where the loop is not buried in the gravel it must be weighted to overcome buoyancy.

I should mention that plant roots are not burnt owing to the very low heat rating per inch, and there is no adverse effect on Malayan snails or on bottom feeders such as *Corydoras*. This up-to-date heater is slightly more expensive than the glass tube types, but it has so many obvious advantages that it should prove very popular with hobbyists, and with all those who enter furnished tanks at shows.

Raymond Yates



# AQUARIST'S Notebook



by

RAYMOND YATES

BEFORE going out one afternoon for several hours I decided to put on the aerator on a tank in a bedroom. As things turned out, however, I had to return home within a little over an hour and it was a good thing I did. Water was dripping from the ceiling of the dining room, and four rivulets, quite widely spaced, were running down the walls in the lounge. I dashed upstairs to find the 25-gallon tank half empty but no sign of where the water had gone. In the event it seems that the 12 gallons or so which escaped seeped under the floorboards and vanished; all the water which we collected or mopped up wouldn't have filled a pint milk bottle! The dining room ceiling was panned and on this three blobs appeared which were duly mopped and from which a few drops of water oozed. Everything dried out perfectly and little remains to remind us of what might have been.

Tanks upstairs are a risk, a risk not really worth taking because, apart from other considerations, the weight of filled aquaria is not for bedroom floors. What had happened in this case was a chance in a million. Long ago an airline diffuser had dropped off and instead of removing the rubber tubing I had merely put a fresh tube and diffuser on the tank and left the old pipeline hanging half in, half out of the tank. When I put on the aerator I suppose some bubbles from the diffuser found their way into the spare tubing lying alongside and started a siphon action. I would have said it wasn't possible if I hadn't seen the consequences. There is always a chance of flooding where you have rubber piping, particularly if it is left to rot. The greatest risk with old tubing is where you have an outside filter. Replace all piping which is looking even a little bit worn—it is cheap enough.

"Running back" when an aerator is turned off is possible if the pump is below the tank-water level. Apart from flooding risks, the water can ruin the pump, although it cannot usually get into the electrical portion of piston-type pumps. Bottoms can fall out of tanks, so never move them when full, not even an inch or two. Glass can fracture through the heater coming in contact with it, so it is wise to make sure that there is always plenty of gravel covering the glass bottom or, alternatively, that the heater cannot touch the glass sides. The heater can usually be held in position by rock-work effects, which thus serve a double purpose. Covers which are slightly askew can make unpleasant puddles of condensation water on your floor or furniture, so care should be taken to see that they always fit flat on the tank top. Leaks can be very troublesome. I shall have to give them a separate write-up. However, a good book on glazing for the handymen in the family is *Glass and Glazing* by D. J. Davison, published at 5s. by Crosby Lockwood & Son, Ltd.

One of our German contemporaries is *Aquaristik*, which is published monthly in Mainz. This rather diminutive magazine measures 5½ ins. by 8 ins. and runs to some 20 pages, with a minimum of advertising matter. Now in its second year, it is full of well-written informative articles on interesting topics. Here are a few, picked at random . . . "Effects of Osmosis," "Hobby in Yugoslavia," "Tubifex Technique," "Marine Excursion," and articles on *Apistogramma ramirezi*, the black widow, *Barbus oligolepis*, European catfish, etc. A recent article deals at length with the toxic effects of certain poisons, with details of the varying effects on differing species such as perch, carp, cichlids, livebearers, toothed carps, salmon and European catfish. An exact translation of this six-page article would prove interesting to English readers. Toxic quantities in parts

per million are quoted for rotenone (0.025), phenol (5.0), heptachlorocyclohexan (HCH) (100 to 500), nicotine (10 to 100). Other poisonous substances discussed are arsenic, D.D.T., pyrethrum, etc. This entertaining magazine would benefit by the inclusion of more photographs, drawings and diagrams but no doubt these will come in time. An occasional colour photo already appears and these are very good indeed.

Imitation fish or fittings for aquaria are not popular in Britain and rightly so, but a recent importation from France must be an exception. This is a small sea horse about two inches in total length, which looks quite the real thing, so much so that it will deceive many experienced aquarists at first sight. The tail can be attached round the stem of any suitable plant, or alternatively a nylon thread is secured from the tail to a lead weight hidden in the gravel. The sea horse keeps an upright position and moves slightly with the currents set up by passing fish or an aerator. The eyes are striking, being a vivid green like that of the neon stripe or the eye of *Aplocheilichthys lineatus*. The cost is very small and there is no doubt this is one novelty which will prove popular.

Some time ago I mentioned the piranha at Belle Vue Aquarium, Manchester. Unfortunately, this is no longer with us. It was taken down to London to appear on the children's T.V. programme, and this seemed to be too much for it because it became ill on its return, lay on its side and died in a day or so. There is now a new one in the aquarium, recently obtained from Holland for about £16, which seems quite at home. These fish often arrive covered with white spot, but it clears up with quinine.

Franz Eichhorn, in his recent book *The Lost World of the Amazon* gives some interesting and exciting accounts of some of the fishes found in that area. He and his colleagues constructed a flimsy diving bell of canvas to enable them to take underwater photographs of the piranha feeding. They had many anxious moments but all ended well. Tests made by the author on numerous occasions showed that it never took the local piranhas longer than 50 seconds to reduce a 500 pounds peccary (wild pig) to a bare skeleton. I can well recommend this book to aquarists, who then will the better appreciate the dangers and difficulties encountered by collectors in this dangerous area.

We are all used by now to reports of divers using the aqualung, but it is only recently that any report has appeared on diving with this apparatus in fresh water. The main difficulties seem to be the chilly water and the fact that fresh water is rarely clear enough for photography, apart perhaps from chalk streams and the like. Fishes are afraid of anyone on the bank, but a diver coming up underneath perch and pike attracted little interest. A point raised was, do the silver sides of fish help to make them invisible? Reports from those who have seen them in their own element in fresh water support this view.

It is a well known fact that aqualung diving results in time in all the fishes leaving that area, and for this reason it is frowned upon by some coastal authorities in Europe

and even in Britain. A new angle on this aspect is seen from a report where two men were fined recently after having been seen by a water bailiff in the River Lune in Lancashire. It seems they were wearing frogmen's outfits, one carrying a harpoon gun whilst the other was seen swimming under water and slashing at a salmon with a dagger. They were each fined £5 and ordered to pay £4 4s. advocate's fees.

Curators of public aquaria have much to contend with quite apart from the everyday trials and tribulations caused by their finny associates, and the difficulties of food supplies, heating, lighting, aeration and filtration troubles. We all know the shocking types who knock on the glass to the dismay of the fishes but far the worst of all these nuisances are those who knock on the door of the curator's room. With a bland smile they introduce themselves as belonging to the XYZ club (of which the curator has probably never heard), and proceed to ask if they could possibly have just a little white worm, *Tubifex*, *Daphnia* or even green water for a sick mollie they have at home.

Sometimes they ask outright can they buy such and such a fish, and are disappointed and hurt when they find the answer is in the negative. Others hint darkly that they know or are personal friends of the powers that be, connected with that aquarium. Others just ask if they could borrow a male or a female so-and-so for two or three days to get a spawning. Some merely ask if they could look behind the scenes for two minutes, but others come to offer advice and comment on how to run the aquarium (their way). The curator has to be kind but firm with all of these without giving offence. How he would like to hang a card on the door marked "Gone Fishing"; but no doubt they would sit on the step and wait for his return. If you have any reasonable point to take up with a curator drop him a line, enclosing a stamped addressed envelope. If and when you get a reply you'll know where you stand because it is easier to be blunt in a letter than when one is face to face.

If asked to name the toughest fish of all few would immediately think of the goldfish, but this fish really is tough. It can endure extremes of temperature, cramped quarters, insanitary housing, can go without food for months, live many hours out of water, enjoys relative freedom from disease, and if introduced to new waters soon dominates those waters to the exclusion of all other fishes. It is the only fish that man has really managed to breed into odd and peculiar shapes as he has done with dogs in the four-legged world, but the goldfish gets its revenge by its quick reversion to type. Yes, goldfish are the toughest of all fishes—ever tried eating one?

Although common in U.S.A. the outside-fitting filter is fairly new in Britain. Why this should be so is hard to understand unless it is due to our dislike of change. Actually this form of filter is far the best and has few disadvantages. A popular form consists of two plastic cylinders which fit on the tank, the first being the intake and the second the outlet cylinder. The intake is started by siphon action and is filled with glass wool, cotton wool or other medium to a depth of eight inches or more. The water soaks its way through this and then passes along a 15 inch pipe to the bottom of the outlet cylinder, which it proceeds to fill. This cylinder is attached to the air pump and this lifts the filtered water back into the tank through two tubes. The rate of action is fast and many gallons are filtered in several hours. Care must be taken to see the filter is fixed properly on the tank sides and top, and it must be realised that the water level in the tank must be high (to the top of the glass) or you will have difficulty in starting the siphon. If the

level of the water in the tank falls the filter continues working but at a slower rate.

This type of filter is almost foolproof as the water cannot overflow, because the siphon stops once the water level reaches the same as the tank (as it would if the pump stopped working), and the only possible risk is if the pipe connecting the bases of the two cylinders is damaged or comes off, a remote possibility. Even a very filthy tank is made crystal clear in a few hours with one of these filters, the reason being the high rate of flow. Peat can be put in the second cylinder if it is desired to make the water more acid. Some aquarists even keep *Tubifex* in this cylinder, but I think this unwise owing to the temperature of the tank water. The only wearable parts are the rubber tubing connections so these filters just about last for ever.

At a certain club there was a lot of argument recently because some members who had had a great deal of success as exhibitors wanted to be judges. The view was taken that this was quite in order so long as they did not carry on showing. Showers are in competition with others judges compete with nobody. To be showing one week and judging the next lends itself to criticism, and even the best-intentioned aquarist would, in time, find himself the centre of controversy. If you want to judge, be a judge but don't continue exhibiting if you value your reputation.

In my article in the September issue last year on a new treatment for fin rot and fungus I forgot to lay stress on the importance of emptying the chemical (Liquitox) into about half a pint of water in a bottle and shaking up well until all the Liquitox is dissolved completely. Cases have come to my notice of aquarists adding it direct to the tanks as it is—the result is numerous globules of oil in the tank and nothing else. Always follow instructions given by manufacturers to the letter; after all, they know best. Many hobbyists are careless with chemicals. Almost all are best made up on the side before adding to the tank. This applies to quinine, mercurochrome, methylene blue, acriflavine, mepacrine, permanganate and most other less popular medicinal drugs.

If too many young fishes are kept in a small tank they will not grow and after a time they will never grow any larger. This is a disadvantage in most cases, particularly when breeding is concerned. On the other hand this can be done deliberately with some fishes which are pretty when small and safe in a community tank but dangerous when large. These then make fine "dwarf" specimens. Many fish keepers would be glad of the chance to buy stunted fish like this for show tanks. In the case of cichlids many of these are more showy when small than when full grown.

Long ago I remember asking a dealer why his Malayan snails were so dear. His reply was to the effect that once anybody bought any they had them for life and never came back for more. This is true of most snails if you take the precaution of having a spare tank with no fishes in for use as a snail nursery. Of course, there are people who would banish all snails, but for myself I like them, and snail populations never get too large if fishes are present. Malayan snails will multiply but losses are heavy in the vicinity of the heater, and the use of chemicals in the tank (against diseases) reduces their numbers in time.

Plants should never be thrown away. Anything over-thinned out can be thrown into a spare tank which gets good light, and left to float. In a short time new shoots will have appeared and new cuttings can soon be taken. *Hygrophila* and *Cabomba* are particularly good in this way if left to themselves.

# Microscopy for the Aquarist—17 by C. E. C. COLE

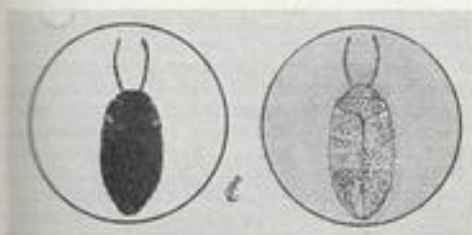
THE lighting arrangements we have so far discussed are eminently suited to the detailed examination of transparent or partly transparent aquatic objects. There are, however, as we shall discover soon enough, a large number of creatures that are absolutely opaque. Water beetles comprise but one group, and there are hundreds of different species within this group, ranging in size from barely an eighth of an inch to almost an inch and a half.

Placed on the stage in a shallow vessel, with light directed from beneath the stage in the usual way, such an object is seen only as a silhouette, with sometimes a very faint indication of transparency in one or other parts of its anatomy. We can make out nothing of the detailed structure or pattern on either the dorsal or ventral surfaces. If an attempt is made to examine a specimen which has been preserved without special treatment the legs will have folded themselves beneath the body, and an attempt to spread them will result in them breaking away from the beetle altogether. The same applies to *Corixa*, *Notonecta*, *Psephenus*, and similar insects.

## Overhead Lighting

Some people get by by taking such creatures to the window and examining them with a hand lens in good, strong daylight, and it is true that this method enables one to make out some details fairly well. At the best, however, such a method is merely a substitute, and with the proper use of such apparatus as we now possess, we can be comfortable and see much more with less effort.

Place the creature on the stage, get out your microscope lamp, and slide the lamphouse to the top of its pillar. Tilt it so that the light shines directly into the vessel in which the specimen lies. Now look through the eyepiece and focus the object. Assuming you are again using the 4 in. objective and X5 eyepiece you will see the specimen entire, or almost entire. At first attempt you may make out details only vaguely, but this indicates you have not inclined

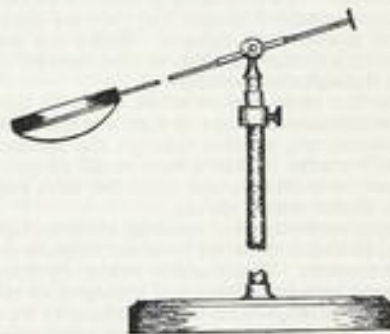


Small water beetle ( $\frac{1}{8}$  in. long) viewed from above (top drawings), and the side, with a 2 in. objective. Top left and bottom right—with transmitted light (sub-stage lighting); top right and bottom left—with overhead lighting, which reveals pattern of tiny pits and patches of "hairs"



the lamp at the correct angle. Slowly changing the angle will eventually give you one in which the details uppermost to the objective will show startlingly clearly. With the greater depth of focus of the 4 in. objective, much more detail can be seen at the same time than with the higher-power object glasses.

Now you will be able to appreciate for the first time, the complex nature of many of our commonest aquatic organisms—the door is opening upon a whole new world for you



The bullseye condenser—a useful accessory for concentrating light where it is most needed

to explore. Reference to text books on microscopy or water life will reveal that there are huge gaps in our knowledge of things aquatic, and you may be able to fill in some of these for yourselves. Reference to such text books, too, may submerge you in a sea of technical terms and data which will leave you gasping for breath and, in many cases, hopelessly bewildered. With persistent application and great concentration some of you no doubt will master the technicalities, but the majority—well, I just wonder!

This is not intended to discourage anybody—it is a mere statement of fact. Nevertheless, everyone can derive immense enjoyment and great benefit from the practical use of his microscope, by following such simple directions as given above, and experimenting in an endeavour to improve matters or discover some fresh knowledge.

## Bullseye Condenser

It will be found that a large amount of the light emerging from the lamp will never enter the front lens of the objective unless some means is adopted to concentrate it within the area of the field of view. The commonest, and indeed the best, method of doing this is to use what is known as a bullseye condenser. This consists of a lens, one side straight, the other much curved, mounted on an arm, which in turn is secured to a telescopic stand. Such a combination of mountings enables the condenser to be placed in any position at any height (subject to limitation by the height of the stand).

The lens can be used to concentrate, or make parallel, the shaft of light emerging from the lamp. Adjustment of the distance of the condenser from the lamp will, if the curved surface is nearest the stage, spread or contract the area lighted. Obviously, the smaller the area illuminated, the greater the intensity of light within that area.

For maximum usefulness the diameter of the condenser should exceed that of the lamp aperture, because the light

rays diverge outside the aperture, and even if only a short distance from the opening, the condenser, unless large, fails to trap a proportion of them.

Secondhand bullseye condensers can frequently be found at knockout prices among the heterogeneous collection of accessories accumulated by dealers in secondhand instruments. New ones are comparatively expensive, and hard to obtain, as most manufacturers seem to have abandoned their manufacture. If you are unable to obtain one at a reasonable price a reading glass makes quite an efficient substitute when mounted so that it can be focused easily upon the creature being examined.

I have repeatedly been asked why it is that when used to illumine prepared slides of water beetles overhead lighting is ineffectual. This is because prepared slides are made from specimens rendered so thin that they are quite transparent, even if they look opaque. Slides are made for illumination by substage lighting, so that the vast majority of rays pass through the specimen.

Obviously, the same applies when overhead lighting is used, but in this case the rays of light are travelling away from the microscope, so pass through the specimen and continue their course. Only a very small proportion are reflected into the objective, and these few have practically no power to render details visible.

There are other methods of securing adequate light from above stage, but with these we need not concern ourselves—at least at present. With our low-power objectives there is ample space between object and objective to enable us to direct a concentrated beam of light wherever we need it. It is when working distance is short that recourse must be had to special lighting apparatus. As far as this goes, the same applies to substage lighting, but we can discuss advanced methods when we reach advanced work.

Meanwhile, start to examine as many opaque creatures as you can find. It is unnecessary to confine your attentions to aquatic organisms. Many other objects worthy of examination will suggest themselves to you as you look around.

Next month I will give you some idea of how to translate what you see into a true impression of the creature being examined.

## Cacti in the Fish House

**D**URING the early spring most cactus plants will show signs of fresh growth. All the globular types grow from the top centre; they do not increase their height from the base of the plant but the new growth opens out from the usually depressed top of the cactus. This new growth is to be encouraged, as unless fresh growth is made each year it is possible that the plants will not flower very well. Many cactus plants flower from an areole, or between it, and once this spot has produced a flower no more are likely from that place. Many plants have rings of flowers but no more flowers will appear below that ring. Therefore, unless more new growth is made above this flowering ring lack of bloom will be the result. New growth can be encouraged by re-potting the plants each year. With small or young plants they should be re-potted more than once a year if they make good growth. Older and more mature plants need not be re-potted quite so often, but a lot depends on the type of plant and its rate of growth. It is reasonable to assume that by the end of a year the soil in a comparatively small pot must have been exhausted of all the nourishment, and if the plant is expected to grow this old worn-out soil must be changed. When re-potting it is essential to remove all old soil and to use a good porous soil for the fresh clean pot.

## White-Spot Disease

by Dr. F. N. GHADIALLY

**I**N the two previous articles the natural history of white-spot disease and its preventive and curative treatments were discussed. Two further treatments are considered in this concluding article.

### Treatment with Methylene Blue

The most noteworthy difference between this and all the other drugs so far mentioned is its almost complete lack of toxicity to fishes even at doses far above the effective dosage sufficient to kill the parasites. Indeed, it would be no great exaggeration to say that fishes are as happy in solutions of this dye as in plain water! They swim about merrily, feed well, and I have actually had a spawning and reared youngsters from tiger barbs that have been moved from methylene blue straight to the spawning tank. Live-bearers have been known to drop their young when under treatment for white spot with this drug, and neither the mother nor the babies have come to any immediate or ultimate harm. It will also be remembered that when breeding the angel fish this dye is used to protect the eggs from fungus.

If more proof were needed to show how harmless this drug is to higher forms of life let me state that fair quantities of this drug can and have been injected into the bloodstream of man and laboratory animals without producing any untoward results. Nevertheless, this drug is very lethal indeed to the white-spot parasite. Unfortunately however, even in fairly weak concentrations it kills or at least seriously damages most plants. Its use in a furnished aquarium, in my opinion, is therefore unjustifiable.

In a dose weak enough not to hurt the plants seriously it constitutes a somewhat unreliable remedy for white spot. Failure to appreciate this has unfortunately given this first class drug a bad reputation. This drug is readily adsorbed and removed from the water during the course of treatment but this is of no practical importance as we can easily use a dose grossly in excess of that needed to kill the parasite without any fear of harming the fishes. Contrast this with quinine and mercurochrome where even a modest excess may injure or kill the fishes. The recommended dose (other authors) is two drops of a 5 per cent. solution of methylene blue per gallon of water (approximately 6.6 mg. per gallon). This is probably adequate but for years now I have used a much larger dose administered in divided doses during the course of treatment, without ever losing anything more than an odd fish now and again which probably would have died anyway. I should like to describe in detail this treatment which has been so completely successful in my experience.

As soon as white spot is detected in a planted tank, the fishes are moved to a bare tank and 1.5 ml. of a 1 per cent. solution of methylene blue per gallon is added to the water (this is equivalent to 15 mg. of methylene blue per gallon or approximately 22 to 23 drops of a 1 per cent. solution or four to five drops of a 5 per cent. solution). On a third day a further 0.5 ml. of the 1 per cent. solution per gallon is added to restore the fading colour, and sometimes a further similar dose is added on about the fifth day if the colour has again faded noticeably. This brings the total up to 20 to 25 mg. per gallon during the course of treatment, i.e. roughly three to four times the commonly recommended dose. For the first few days, of course,

fresh spots will keep on appearing on the fishes but by about the fifth or sixth day if the temperature has been maintained at 80° F. all spots will have disappeared.

I have little doubt that a mere fraction of this dose would be adequate. The philosophy behind these massive doses is just simply that the drug is cheap and harmless so why not add an excess to make doubly sure? On about the eighth to the tenth day I usually return the fishes from the methylene blue to their original tank. I have left fishes in methylene blue for 20 days just to see if it would hurt them in any way but it did not.

The planted tank in which the outbreak of disease occurred is not touched in any way, but the temperature is raised to 82° to 85° F. as soon as the fishes have been removed and is kept at that level until a few hours before the end of treatment, when the temperature is lowered to the usual 75° to 78° F. A recurrence of the disease because of this is so far unknown in my experience.

Methylene blue can be obtained in two forms, one for commercial use and the other for medicinal use. Do not, under any circumstances, use the former; it is likely to contain all sorts of impurities and I have heard reports that some aquarists have actually lost fishes by using it. Let me repeat, it is the medicinal methylene blue which you must obtain. Incidentally, it is very cheap, much cheaper than any of the other drugs mentioned.

One may thus conclude that while mercurochrome constitutes the ideal form of treatment for the man with one tank, methylene blue offers a much more attractive and equally reliable form of therapy to the serious aquarist with many tanks who is not willing to take chances with a poisonous drug.

#### Treatment with Heat

Whatever drug is chosen for the treatment of white spot it is a good plan to raise the temperature to 80° to 82° F. at the same time, for increased temperature acts in two ways. Firstly, it hastens up the life cycle of the parasite

so that the period of treatment is appreciably cut down, and secondly, as water holds less oxygen at higher temperatures and as the parasite is peculiarly susceptible to oxygen lack, its life processes are adversely affected and hence it falls a more ready victim to whatever drug is employed. But it must be borne in mind that at higher temperatures drugs disintegrate more rapidly, and if a very high temperature such as 90° F. is employed, fishes (except most labyrinths) will also suffer. If aeration is used the benefits will be felt by both fishes and parasite.

It has been claimed that heat on its own can cure white spot. If the temperature is maintained at 85° to 90° F. with no aeration, it is possible to kill the parasite on many, but not all, occasions. Many fishes, however, will not tolerate a temperature of 90° F. for such a prolonged period. I have tried 85° to 87° F. alone without any drug on one occasion and failed hopelessly to eradicate the disease from the tank, and hence I cannot recommend this form of treatment. In spite of what has been written by some aquarists heat alone is not a reliable treatment for white spot.

With any of the other treatments, aeration may be employed but not filtration, as most of the drugs will be partially removed by the filter, particularly if charcoal is employed as a filter medium. As aeration helps to maintain an even temperature all over the tank by preventing stratification of colder layers of water at the bottom, with it we can carry out treatment confident that the entire tank contents are 80° F. or above and that no cold pockets exist where a cyst may lie dormant.

This then is, in some detail, the complicated story of white spot. I have tried to tell it in as simple a way as possible without omitting any important, known facts. If in some way this article helps to stop even a few of the many enthusiastic beginners who leave the hobby every year because of the disappointment caused through loss of fishes by this menace, the effort involved in writing it will have been more than amply repaid.

## FRIENDS & FOES No. 44

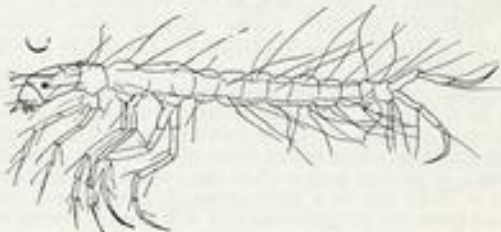
### TRICHOPTERA (Continued)

A NEWLY hatched larva of one of the carnivorous species of *Caddis* is illustrated this month. This particular species wastes no time once it is hatched, starting immediately to weave threads with its spinneret (located in or near the mouth) until it has constructed an underwater cobweb which is both its home and larder. Unsuspecting live creatures such as *Daphnia* or *Cyclops* blunder against the threads, a warning signal is conveyed to the larva and out it rushes, attacking and devouring its catch, or weaving restraining threads round and over it until it is helpless to defend itself. The threads may well be sticky, but I am not certain about this point as the victims may become entangled by hairs, spines, or setae upon their own bodies.

With adequate food the larvae grow well, and in three or four weeks are ready to pupate. By this time, the "cobwebs" have assumed noticeable proportions, and the pupae get right inside and form the surrounding threads into silken cocoons. They then become pupae, quiet except for an occasional undulating movement to create a current of water through the cocoon.

In the Rhyacophilidae, another carnivorous family,

## Caddis Flies



A newly hatched, completely transparent larva of a carnivorous web-spinning Caddis. Actual size about  $\frac{1}{10}$  in.

the eggs are found in masses on the undersides of stones in streams. Some species within the family have bunched gills on each side of each segment of the abdomen, but in other species the gills are absent. After a period of free roaming, unprotected by cases of any kind, the larvae return underneath stones, construct pupal shelters by cementing a number of small stones to the large one, and retire within.

C. E. C. Cole

## In the Water Garden in APRIL by ASTILBES

**A**FTER the winter's rest many pond plants will be starting to send up fresh leaves and shoots, and it is now that any transplanting and dividing should be done. Do not leave this work too late in the season, as you will be sure to disturb the pond somewhat, and at this time of year it appears to take a shorter time to settle down again. Any moving now means that the plants will soon recover and their rapid growth will soon hide all traces of disturbance.

If the water plants had been planted in large pots in the first place it will be a fairly simple task to remove these from the pond for re-potting or division. Where plants were set directly into the compost at the base of the pond it will be a far more difficult task to deal adequately with them. Once the pots have been removed from the water the plants can be slipped out of the pots and the roots examined. If they have been planted for three years at least it is almost certain that it will be found that all the soil from the pots has disappeared. Many roots may have strayed from the pots, either over the top or through the drainage holes. Where this has happened the plant has been able to obtain a fair amount of nourishment from the mulm and silt in the pond. For this reason the type of flower pot with the drainage holes at the sides instead of at the base is best, as this does allow some of the roots to wander about outside the pot and clear up waste matter there.

If a water plant does not appear to have grown too large it can just be potted into a larger pot and need not be divided. It will be found though that if any plant remains in the same pot for more than three years without a change of potting soil it will not thrive and may even fail to flower. This is true not only of water lilies, but most subjects in the water garden, even such hardy plants as the rushes and reeds. Should the plant appear to have several heads then it is well to divide the plant before potting. When the plant has been removed from the pot it may be found that the roots are badly entangled into a ball. It is essential that these are unravelled as carefully as possible. It may then be possible to separate the heads with the fingers. With tougher plants a sharp knife must be used. Take great care with such plants as water lilies, as it is possible to see the flower buds at this early stage. Should these tender structures be broken the flower stems will rot and no flower will come from there.

When the root stock has been divided the older part should be discarded. This is probably worn out, and the outer newer growths are to be preferred. For a potting medium for most water plants some old turf is as good as anything. If potting soils such as the John Innes ones are used, it is likely that in a short space of time the soil will disappear from the pot, whereas turf will remain, owing to its fibrous nature. I do not believe in over-feeding water plants which are in the pond to assist in keeping the water pure for fishes as well as providing a floral display. The more you feed lilies and other plants the less will they be inclined to send roots outside the pot to work in the mulm.

Once the plant has been safely potted it is essential to secure it in the pot. I find the best thing to use for securing a plant in the pot is plastic electric cable (the kind used for aquarium heater connections is fine for this purpose). Run a length under the rim of the pot and then take it across the top twice, tying it under the first wire to make sure that the whole plant is secured in the pot. Care taken over this matter in the first instance is well worth while. Any surplus pieces of root stock not needed at the moment can be sunk in a shallow part of the pond and anchored by a piece of paving slab or similar object so that the plant can be

removed easily to give to a friend. Do not allow the plants to dry out whilst they are being attended to, as harm may be done when this happens.

Ponds with plants growing directly into a base compost out of pots will require a major operation to deal with them. It is almost certain that the pond will have to be emptied before the roots can be got at and attended to. It is amazing how water lilies can increase in size if left for a few years in such conditions. The whole base compost can become riddled with roots and their extraction is a very difficult job. If the pond is a very large one it may be impossible to drain it and divide the plants. It is well to remember this when a fresh pond is constructed and planted.

Once the pond has been emptied cut through any stocks which have become too large. It will be found no easy task to remove the severed portion, but this must be done to ensure that the plants will again flourish and not get too crowded in the pond. If the job of thinning out plants in such a pond is neglected it will be found that in a few years



Photo:

Laurence E. Perkins

Water lilies can be divided this month. This is the flower of the James Brydon lily

the centre of the plant will become so crowded with leaves that they fail to find any space on the surface of the water, and so grow up into the air, with the result that the whole appearance of the lily is spoiled. Then you will find that the plant gradually flowers less and does not look anything like it did when all the leaves could lie out on the surface.

For small pots containing fresh subjects to be planted in the pond it is an advantage to anchor the base with some concrete to prevent it from toppling over when in the water. A shovel-full of concrete can be placed on some sheets of newspaper and the base of the pot pressed into it. After the concrete has set it will be found that a good weighty base has been added to the pot and will prevent any movement.

Some water plants can become too rampant for small ponds, and so it is a wise plan to ask your supplier whether the plants desired are suitable for the size and depth of the pond. Any well-established water plant grower will be only too pleased to advise you when you order.

## OUR EXPERTS' ANSWERS TO TROPICAL AQUARIUM QUERIES

I am thinking of glazing the back of an aquarium with mirror glass. Would a mirror background worry the fish?

We do not think a mirror background worries fish, but a clean mirror glass certainly attracts some species and keeps them swimming up and down its surface rather than in the middle of the water or along the front panel of glass. After a few weeks, however, a mirror glass will become coated with algae, and the fish will no longer be able to see themselves or be attracted by reflected lights or images of plants. If algae is slow in forming on the back, it is a good idea to plant a double row of *Vallisneria* just in front of the glass to act as a screen.

I have purchased from an advertiser in the local press a large steel-framed tank complete with sand, plants, electrical equipment and fishes. I intend to empty most of the water away and risk leaving the plants and fishes in the tank as they are, in order to get them home. I shall use my car to transport the collection. Will it be all right to leave the fishes in about four inches of water until I re-fill the tank at home, and will ordinary water from the domestic hot water supply be safe to empty into the tank?

The fishes should stand up to the journey very well, but try and avoid sudden stops and starts, for a violent jolting might dash and injure some of the fishes against the sides of the aquarium. We do not advise the use of water from the hot water system to fill the aquarium. This heated water is usually carried by copper pipes, and stored in a copper tank, and copper is poisonous to fish life. The wisest thing to do is to use matured tap water; that is, water left to stand for several days in glass or china vessels. It may be adjusted to the same temperature as the aquarium by the addition of boiling water from the kettle.

About a fortnight ago I purchased two young marbled cichlids (*Aequidens acellatus*). One seems to be flourishing very well on a diet of white worms, *Tubifex* and scraps of meat, but the other one does not show much interest in food and keeps close to the surface of the water as though suffering from lack of oxygen. Can you give me some information about the care and habits of this fish?

The marbled cichlid is often rather delicate as a youngster. The species needs plenty of space in well-oxygenated water, and a meaty diet; that is, chopped earthworms, *Tubifex*, washed minced liver, raw steak and the like. The species does have the habit of spending a lot of time hugging the top of the water. In a thickly-planted aquarium, it will get right up into the surface foliage and bask under electric light or direct sunlight. Young fish which have become accustomed to one sort of food often need some coaxing before they will accept another sort. We suggest that you drop live food into the aquarium so that it falls just in front of the fish. Once the fish starts eating, its appetite should soon return to normal.

A few days ago I took the temperature of the water at the bottom of my aquarium. I was surprised to find that it was about 10 degrees cooler than the temperature at the surface. Will this difference harm the fishes? At the time of writing, every fish looks in perfect health.

As heat rises, the bottom of a tank is usually cooler than the top. Then again, if a tank is illuminated by electric lamp light, the surface gets warmed up by several degrees when the light is on. The fishes do not seem to mind this variation, which, after all, is no different from the variation in temperature in an outdoor pond. For it must be remembered that the water along the edges of a pond soon becomes warmed up by strong summer sun. The fishes instinctively learn to avoid the conditions inimical to their well-being. Trouble comes to them only when they are living in a small body of water, which heats up too quickly, and as quickly cools down. But in an outdoor pond, or large aquarium, they can always seek a cooler or

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

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warmer layer of water and so find the conditions which suit them best.

I have bought a pair of *Brachyopobis xanthozona*, but confess to knowing nothing about their requirements in the way of food and temperature. Please will you tell me something about these fish?

*B. xanthozona*, better known as the bumble-bee fish, haunts the bottom of the water, and likes to take up positions on slabs of stone or rockwork. It is a carnivorous species and should be given tiny earthworms, white worms and other small live food. If placed in a community tank with sluggish fishes, it may become rather a nuisance after dark, for then it often indulges in the annoying habit of fin-nipping. A temperature of about 75° F. suits it.

I have a large aquarium, and intended to use base-heating, but a friend has told me that the water plants will not grow very well if their roots are kept warm, and there is a danger of the glass bottom of the aquarium developing cracks if it becomes overheated. What is your opinion, please?

For many years we used base-heated tanks and grew lovely plants. We do not think the majority of aquarium plants mind a bit of heat at the roots. But we do advise you to fix a metal screen or baffle between the source of heat and the bottom of the aquarium. We used thin iron sheeting, and suspended it on wires about an inch from the glass bottom of the aquarium.

I am new to the fascinating hobby of tropical fishkeeping, and would like to know how to set about breeding the rosy barb.

Give the fish a tank measuring at least 18 ins. by 10 ins. by 10 ins. Plant it thickly in the middle and at both ends with bushy-growing water plants. Set the aquarium in a place where it will get a bright light, or illuminate it by electric top light. The water should be clear, and have a temperature of about 75° F. The male fish will develop lovely coppery-red colours and black-tipped dorsal fin, and chase the female in and out of the water plants. The eggs are scattered as the female dashes through the plants. After spawning is over, transfer the parent fish to another tank. In about two days the eggs should hatch out, and two days later the fry will become free-swimming, and need Infusoria. Rosy barbs will spawn several times during the spring and summer months.

I have just taken up the hobby of tropical fishkeeping and one of my fishes keeps wagging its body from side to side in the water as though it is doing the shimmy. What is the matter with it, please?

There is a complaint known as "shimmies." This often attacks a fish which has caught a chill, or has been living for sometime in very polluted water, or water with a high mineral content. Treatment consists of keeping the fish warmer than usual, feeding it on meaty food or live food; if no improvement is seen within a few days, siphon away about a third of the aquarium water, replacing it gradually with clean, nylon-strained water from covered rain-butt or garden pond. If such water is not available, use boiled water allowed to cool and stand for a day or two, or matured tap water.

## COLDWATER FISH-KEEPING QUERIES *answered by* A. BOARDER

I have some *Tubifex* which I keep under running water. What should I feed them on?

*Tubifex* worms are placed under running water to purify them to make them safe for feeding to fishes. You are not likely to be able to keep them alive for very long by this method. They feed in mud, usually near the edges of a pond or slow-running river. You could keep some alive in the mulm at the bottom of an old-established fish tank where there is a quantity of mulm. You would then have to dip out a quantity of the mulm and wash it under the tap to clean the worms from the mud. They live in mud with their heads down, waving their tail end about in the water as a means of procuring oxygen.

I have a tank, 18 ins. by 10 ins. by 10 ins. and find I cannot keep the water sparkling clear for any length of time. I have to empty it and wash the plants and sand every week. The sand goes black and the water turns a bad colour. What can I do to remedy this?

It appears to me that you have been using too much dried food. This decomposes in the tank and can cause the sand to turn black and also pollutes the water. Go easy with the dried food and you may find that the trouble disappears. A tank should not have to be emptied once a year let alone once a week. Provided that the tank gets a weekly servicing this should be sufficient.

I am in charge of a school-biology pond which poses some problems. The school is a new one and the pool is designed as an architectural feature. It is 10 yards by six with an overall depth of one foot. It is in a corner of a paved quadrangle. As you can imagine, all the paper and dust blows into the pool. Are there any water lilies which would survive the winter? What fish could I keep and how can I prevent surface water draining into the pond?

I sympathise with you, for you have a problem indeed. This is the result of a building architect designing a pool when he knows little or nothing about fish requirements. If only such people would get some advice in the right quarters in the first place it would save a lot of trouble later on. I know the sort of pond, as there is one classical example in the west country where a new massive town hall was built with large pools in front. There is no protecting wall around, and so most of the discarded newspaper, etc., finds its way into the water in a short space of time. The pool, like yours, is too shallow to be of much use. It needs a protecting wall built around it to stop rubbish from blowing in, and to prevent water draining into it. I suggest a wall of curved stone or concrete, about a foot high and curving outwards slightly. The pond is too shallow to be safe for fish during the winter but you may be able to get some through with care. A pond needs to be two feet deep at least at one point. There are one or two water lilies which would do well in the pond. They are the pygmy types, such as *Nymphaea alba pygmaea*, *N. aurora*, *N. brakleyi candida*, *N. chrysantha*, and *N. laydekeri fulgens*. You can grow some oxygenating plants such as *Lagarosiphon major*, *Egeria densa* and *Ceratophyllum demersum*. There are a few other types of pond plants which would grow there, such as *Pontederia cordata* and *Sagittaria japonica flor pleno*. If you could possibly make a deeper part of the pond it would be a great advantage. I do not advise placing any compost, sand or gravel for the bottom as it is too shallow for this. Plants can be planted in suitable pots so that they can be removed for cleaning the pond when necessary. You can try a few goldfish and one or two green tench. If you have a few fishes to begin with you will be able to see how they progress before stocking the pond with any more.

My plants in a coldwater tank do not appear to be growing well and are covered with a blue-green alga; why is this?

Coldwater plants do not grow well in the winter; in their

natural habitat most of them die down almost out of sight until the spring. It is only because it is possible to keep them a little warmer in an aquarium that they can be kept at least alive and green during their resting periods. By giving more artificial light, which means more warmth as a rule, they can be kept growing, although more slowly than in the summer. Once the plants start resting it is then that algae can get a strong hold on the plants. The blue-green alga is often encouraged to form when rather foul conditions are in the tank. This can have been caused by over-feeding, especially with dried foods. Many aquarists fail to realise that once the water turns colder the appetites of the fishes lessen considerably, and if the same amount of food is given the fish are not able to eat it and so it is left to pollute the water. If artificial feeding is stopped it is surprising how even goldfish will suck off most of the algae from the leaves of water plants. They are not so likely to do this if they are fed by you. There is another point where some aquarists fail, and that is they remove too much mulm from the back of the tank each week when servicing, so that there is insufficient nourishment left for the plants. If the tank was set up with no soil at all under the sand this may be the trouble. The removal of some of the sand at the back of the tank and then placing a piece of turf there will help the plants. The turf should be covered by sharp sand to save any discoloration of the water.

I have two fairly large tanks which have been in use for some years, and they have given no trouble at all. Recently I had to move them and since they have both leaked badly. Is there anything I can do to stop this?

Many tanks leak when they are emptied and moved. The pressure of water on the glass is removed and then if the slightest pressure is put on the glass from the outside a leak may develop when the tank is refilled. If the leaks are very bad it may be necessary to re-glaze completely. The old compost will have hardened and lost its pliability, or fine sand may have got between the glass and compost. You can try a patching-up job by completely drying the inside of the tank. Then paint down the joints with Gander-bak or a similar bitumastic solution. Force this well into the corners, and this may stop the leak. If slight leaks occur even after this do not worry, as all may be well after a day or so. I had a tank which leaked very slightly when first filled but this stopped after a day, and the tank has been quite all right for many years since. One thing I have rarely found to do any good, and that is to try to stop a leak by applying fresh compost to the outside of a tank. The only chance of doing the repair is from the inside.

Since I re-glazed my tank with a branded compound I have lost some fish and there appears to be a film on the top of the water which reappears after being cleared away. Do you think the compound is to blame?

I do not think the named compound would be the cause of the trouble. In a properly glazed tank there should be very little of the actual compound in contact with the water, just a little at the joints. If the tank was well washed out after glazing it should be safe. There are other reasons for a film on the top of the water besides that which you mention. Foul conditions will soon cause a film to form, and over-feeding can bring on this condition quicker than anything. Your tanks are small and if you try to keep too many fishes in them you are asking for trouble. Even an experienced aquarist will not be able to keep more fishes in a tank than it will comfortably hold. Reduce the number of fishes and be careful to see that all the food is cleared up quickly before you think of giving any more.



## our readers

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

### Rocks and Compost

In his article "Starting a Tropical Aquarium—2" (*The Aquarist*, January) "Aquarius" states: "So many otherwise fine tanks are spoiled by using totally different coloured and varying compost from the rocks."

I would like to point out to "Aquarius" that this phenomena freely occurs in nature. I have seen blue-black slate protruding from a dazzling silver sand (N. Wales) and white granite from a black peaty mud (Scotland). These are but two of many examples. Anyone walking along a seashore must have noticed similar contrasts. The rock protruding from the river bed is either part and parcel of the bed-rock strata or has been deposited there (as by a melting glacier) or has fallen in from the banks. The sand, gravel, etc., that surrounds it are the eroded particles of perhaps an entirely different type of rock, probably many miles away.

"Aquarius" also suggests that smaller pieces of the same rock be arranged "as if they had fallen from the larger rocks." The main agent responsible for the splitting off of rock fragments is frost. Water particles in the cracks and crevices expand, breaking off the face. This is hardly likely to occur at the bottom of a tropical stream or pool.

I sincerely hope that show judges are not in habit of deducting marks if furnished tanks display a different coloured, graded compost from the rockwork. If they do, then even more marks should be deducted if the tank were planted with say *Sagittaria natans* and, for a centrepiece, *Amnemon crispum*, for they never grow naturally together. Similarly, for the fish. Do they deduct marks if tiger barbs (E. Indies) and neon tetras (Amazon) share the tank?

In conclusion, I wish to make it clear that I am not advocating that "anything goes" for rocks and compost, since it is the finished aqua-scene that counts; but merely emphasising that a contrast in colour, texture or grade between rock and compost is quite permissible. (Black and yellow, I agree, are one of the strongest colour contrasts and should be used with extreme caution).

ROBERT C. GALTRESS, Harrow, Middlesex.

### Apparatus Faults

We refer to the article which appeared in your January issue, entitled "Common faults in Aquarium Equipment," and feel we must register a very strong protest at the inclusion of certain statements, which must by implication be regarded to some extent as damaging to the sale of certain of our products as well as those of other manufacturers. The offending portions, followed by our comments, are as follows:



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

(1) "Many instruments are covered by a guarantee by the makers for a period, but once this has expired, only a very few makers take on the repair of even their own damaged equipment." Excluding a number of spare-time heater makers, there are very few makers. Since collectively the products of the spare-time heater makers can represent only a small portion of all instruments produced, the statement reflects on the integrity of the few well-known makers. We are daily accepting for repair, articles of our own electrical equipment produced as long ago as 1948, and we believe this to be true of other well-known makers. That such items are "guarantee expired" affects only the question of free repair. As it is not considered necessary for well-known manufacturers to advertise that their products are backed by an efficient repair service this statement can give rise to doubt in the mind of the aquarist and, in the case of our equipment at least, lead to his paying more than need be for the repair. Our charges are based on the degree of repair required and average 2s. 6d. per heater. Our maximum charge for a heater repair would not exceed 4s. and is seldom necessary. Often 1s. 6d. will cover the necessary work.

(2) Referring to air pumps: "The small plastic models are very prone to casing damage and are far too small for the work required for them." We do not agree that small pumps with plastic cases are prone to casing damage. During the past 18 months, we have sold over 20,000 of our "Fairy" air pumps and have had no single complaint of damage to casing. Furthermore, we should have registered extreme surprise had such a complaint been made, as much research was made in the choice of plastic (not all are brittle), thickness to be employed and strength of design; as regards their being too small for the work required of them, we suggest that this depends entirely on whether or not the aquarist expects more of a pump than is claimed for it by the makers. Naturally the small (cheap) pump will not suit every requirement. We know, however, that there is a demand for a pump sufficient to operate up to three or four diffuser stones, and the "Fairy" pump will suit such a demand. Doubtless, also will small pumps of other makes.

(3) Referring to thermostats: "Few popular models are able to handle much more than 200 watts safely on A.C." There is vast difference between a thermostat being able to handle a certain wattage and one designed to handle that wattage. Our "Major" thermostat is one of the "few popular models." It is claimed to, and will, handle 500 watts safely on A.C. supply. We have another (cheaper) model for which the claim is 150 watts A.C., and this model would not therefore be able to carry safely, a loading of 200

watts A.C. An implication of the quoted portion of the article can be that there are popular models which do not handle the capacity claimed for them; surely unreliable apparatus could never become popular?

(4) "Still other faults are where the heater is huge and cumbersome or too tiny for the power output. Mr. Warburton considers the ideal size to be 6 ins. by 1 in. diameter." This is not only contradictory but also misleading. A heater can be either too tiny or *unnecessarily* big for the power output. Should, for instance, the above-mentioned size be ideal for 150 watts, then it would be unnecessarily long for lower wattages. Even a 6 ins. heater would become relatively cumbersome and less easy of concealment in a small aquarium, and there is no reason why the length should not be related to the wattage, thereby giving the user a heater of small size and power for his small aquarium. There is, we know, a tendency among manufacturers to use one size of glass tube and porcelain former to avoid carrying stocks of more than one size, with the attendant headaches of either carrying excessive stocks of all sizes or of often being without a particular size. Nevertheless, it is my Company's policy to produce heaters in lengths related to wattage rather than, for reasons of internal economy, oblige the aquarist to accept as large a heater for his two gallons tank as for his 10 gallons tank.

V. J. SINGLETON,  
Singleton Bros. (Instruments) Ltd.,  
London, S.W.1.

#### Toxicity "Experiments"

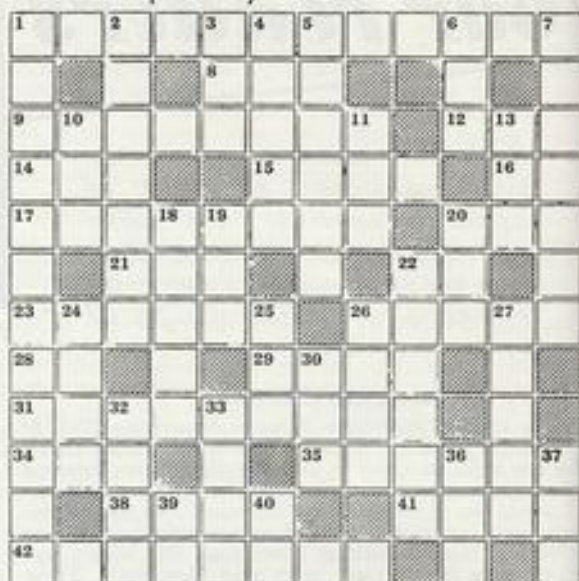
MR. R. YATES, as a reporter of news and activities in the hobby, and a transmitting medium for humorous anecdotes, is in a class by himself, but his recent dabbings with drugs and diseases leaves much to be desired. In the January, 1956, issue of *The Aquarist*, he describes "experiments" which one cannot condemn too strongly. Living animals have been subjected to needless pain and death with nothing to show for it. That copper and copper salts, such as copper sulphate, are poisonous to fishes, plants and various other forms of life, is common knowledge; the concentrations at which these are toxic have been worked out and these have been mentioned on various occasions in *The Aquarist*. What extra information does Mr. Yates hope to discover by his poorly planned, badly executed efforts?

The complete lack of a scientific approach or a serious thought behind these experiments, and the happy-go-lucky manner in which they are performed is shown clearly when he states: "A lump of copper sulphate was put in five fluid ounces of water and well shaken for two minutes or so, then removed. Five drops of this resulting liquid in five fluid ounces of tank water . . ." etc. This does not give even a vague notion of the final concentration attained. Further numerous other variables have not even been considered. For instance, we are not told whether the experiment was performed in a furnished aquarium or in a bare tank. In the former case a substantial part of the copper sulphate would be removed rapidly from solution by combination with organic matter, in the latter case almost all would remain in solution. As for the test subjects, we are vaguely informed that they were livebearers, without any mention of size, age, numbers involved, nutritional status or the exact species. Each of these could markedly affect the results obtained. Similar criticism can be raised against each and every test performed, and as a matter of fact such experiments do not add to our knowledge of the subject and, in fact, do a lot of harm, for the less knowledgeable or critical may be duped into believing that this sort of nonsense constitutes scientific research.

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## The AQUARIST Crossword

Compiled by J. LAUGHLAND



#### CLUES ACROSS

- 1 Heavenly exotic fish apparently, but rather fierce (8, 4)
- 8 Craft of the dart (3)
- 9 Bloody harpoon tip, perhaps, or *Barbus conchotus* (4, 4)
- 12 Notably slippery fish (3)
- 14 Fisherman's Arms, for instance (3)
- 15 This in your net may cause you to shed one (4)
- 16 First class and heart of bait read another way (1, 1)
- 17 I held on a confused fancy goldfish (8)
- 20 But it can be turned into a pond of sorts (3)
- 21 Tetra from — (a river) (3)
- 22 A hybrid begins to exclaim (2)
- 23 Warmer in a way, and essential for tropical tanks (6)
- 26 *Salmo trutta* (5)
- 28 Royal cypher (1, 1)
- 29 Notoriously smart fellow draws exclamation from a leech (4)
- 31 Scallare (5, 4)
- 34 — gratia (3)
- 35 Alate organs (Peter's all confused, too!) (6)
- 38 Another name for pike (4)
- 41 Rear in confusion if you hope to get this kind of fish (4)
- 42 Hold pins (anagram) (8)

#### CLUES DOWN

- 1 Descriptive name of the barb *Barbus nigrofasciatus* (6, 6)
- 2 — heteromorpha (7)
- 3 Common flatfish. Take it back, it is bad! (3)
- 4 Angry, I scold (5)
- 5 Mazers are upset in this water (6)
- 6 Orle (3)
- 7 I am on the upturned tub, and Henry on me for this fish (7)
- 10 The answer is in the affirmative in France (3)
- 11 Not so good when a dab turns up (3)
- 13 What the French aquarist puts in his tank (3)
- 18 Saltpetre (5)
- 19 Garden tool (3)
- 20 Though abbreviated it could be hot (3)
- 22 A fish which shoots flies, etc. (6)
- 24 Eagle (4)
- 25 A service is far up (1, 1, 1)
- 26 River famous amongst anglers, but could be a trial (4)
- 27 Foul water may give your fish such a sore. Cure is mixed with a pound (5)
- 30 Feature of *Colias labiosa* (3)
- 32 Breathing organ of fish (4)
- 33 Scottish lake or arm of the sea (4)
- 36 —fish turns for —worm, sea fisher's bait (3)
- 37 The distinction between male and female (3)
- 39 If you read down you find the reverse (2)
- 40 London postal district (1, 1)

#### PICK YOUR ANSWER

1. Which is the largest of the following species? (a) *Nannostomus zanzibaricus*. (b) *Nannostomus beckfordi*. (c) *Nannostomus marginatus*. (d) *Nannostomus trifasciatus*.
  2. *Chriopops zoster* (the blue fin) was named by: (a) Fowler. (b) Hubbs. (c) Jordan. (d) Myers.
  3. *Limia ornata* is native to: (a) Cuba. (b) Haiti. (c) Jamaica. (d) Trinidad.
  4. Leeches (Hirudinae) are represented in British fresh waters by: (a) 7 species. (b) 9 species. (c) 11 species. (d) 13 species.
- (Solutions on page 20)

## Book Review

*Handbook of Tropical Aquarium Fishes*, by H. R. Axelrod and L. P. Schultz. McGraw-Hill Book Co. Inc., New York, U.S.A. 10 dollars.

THIS is not a book for the beginner. It is at once the largest and most expensive book yet published on the hobby and is in the same class as the two existing standard works of reference, *Freshwater Tropical Aquarium Fishes* by Hervey and Hems and *Exotic Aquarium Fishes* by Linnaeus. This book is quite a monumental work and contains much that is new, with data gathered from Continental sources as well as from the U.S.A. and Japan. The authors are both well known in the hobby, the former for his books and bi-monthly magazine, the latter because he has been Curator of Fishes at the U.S. National Museum (Smithsonian Institution) since 1938.

There are some 718 pages (10 ins. by 6½ ins.) and over 400 photographs and drawings, 180 of which are in full colour; some of these are provided by *Life* magazine. About 550 pages are devoted to a detailed analysis of some 450 different species, giving in each instance the following information: scientific and popular names, their pronunciation and meaning; native habitat; size; temperament; sex differences; fin and scale counts and details of breeding, food, colour patterns and water and plant requirements.

An innovation is a glossary which covers some 500 technical terms and definitions and an unusually large index which runs to 27 pages. There is also a list of some 70 reference books and magazines dealing with the hobby.

Other sections include a history of ichthyology, methods of collecting fishes, global distribution, anatomy and functions, aquarium management, marine aquaria, plants and 25 pages on fish diseases and treatments by C. van Duijn, Jr. Treatments suggested are numerous, and mainly chemical, with a tendency to overstress the value of methylene blue. Surprisingly enough mercurochrome is not mentioned for white spot but is put forward as a cure for fungus, a suggestion which will find few supporters in Britain. Considerable detail is given to the use of antibiotics, the treatment of the future. Neon tetra disease is stated to attack glowlights and rosy tetras, although this has not been our experience in this country. A cure for velvet disease (*Oodinium*) is keeping the fish for 10 to 14 days in total darkness, without food, in the hope that the disease (related to algae) will die before the fish.

There are a number of contentious points, but this is hardly surprising in a volume of such size, and the reader must not grumble if an odd species or two such as the flying fox (*Epalzeorhynchus mallopteris*) are omitted. This book is one of those you will find hard to put down once started and one you will never lend to your friends, however hard they plead.

R. Y.

At the last meeting of the Kingston and District Aquarist Society members were entertained with an excellent series of films on tropical fishes and a commentary on these by Mr. Mason Smith, their producer, director and cameraman. The society has recently given honorary membership to the American aquarist-author and Mr. Herbert R. Axelrod, who has accepted an invitation to attend the May meeting of the society whilst he is in England. Following a suggestion made recently in the columns of *The Aquarist* an annual points scheme for an award to the most active club member is now in operation in the society.

CHANGE of names are announced by the Brighton Amateur Aquarists' Society (late Brighton Amateur Aquarists) and the Walsall Aquarium and Pool Society (late Walsall and District Aquatic Society). For secretaries' names and addresses see adjacent columns.

TRANSFERENCE of Wigan and District Aquarists' Society is reported, owing to lack of support.

MEETINGS of the Hornsey and District Aquarist Society are now held on the first and third Tuesdays of each month, 8 p.m., at the Hornsey Social Centre, Priory Road, London, N.8.



Presentation of a tropical aquarium by the Hornsey Aquarist Club to the local hospital. Mr. Bever, chairman of the hospital house committee (extreme right) is accepting the gift from the club chairman Mr. D. G.

## News

### from AQUARISTS' SOCIETIES

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

A copy of *The Aquarist's Directory of Aquarium Societies* will be sent free to any reader on receipt of a stamped, self-addressed envelope.

### Secretary Changes

CHANGES of secretaries and addresses have been reported from the following societies: **Arnold Aquarists** (Mrs. V. Trant, 20, Thirlmere Gardens, Wembley Middlesex); **Ashington and District Aquatic Society** (Mr. J. Simpson, 48, Glebe Road Villas, Bedlington); **Bradford and District Aquarists' Society** (Mr. G. Taylor, 8, Hedgeway, Allerton Road, Bradford 8); **Brighton Amateur Aquarists' Society** (Mr. R. Coldman, 96, Springfield Road, Brighton, Sussex); **Bristol Tropical Fish Club** (Mr. W. E. Ridler, 9, Friendship Road, Knowle, Bristol 4); **City of Salford Aquarist Society** (Mr. A. Gregory, 156, Derby Road, Salford, Lancs.); **East London Aquarists and Pondkeepers Association** (Mr. D. A. Gregg, 54, Castle Street, East Ham, London E.6); **Exeter and District Aquarists and Pondkeepers Society** (Mrs. Nora Crawley, 8, Clarence Road, St. Thomas, Exeter, Devon); **Gloucester and Cheltenham Aquarists' Society** (Mr. W. E. Smyth, 4, Brymore Close, Prestbury, Cheltenham, Glos.); **Grimby and Cleethorpes Aquarists' Society** (Mr. A. E. Parker, 19, Lichfield Road, Grimby, Lincs.); **Hampstead Aquatic Society** (Mr. K. J. A. Pye, 35, Steeles Road, London N.W.3); **Harrow Aquarists Club** (Mr. S. N. Spencer, 27, Woodway Crescent, Harrow, Middlesex); **Herne Bay and District Aquarist Society**

**Isle of Ely Aquarium Society** (Mr. A. Cawdron, 44, Nene Parade, March, Cambs.); **Lambeth Aquarist Society** (Mr. A. F. M. Bartlett, 27, Beckwith Road, Herne Hill, London S.E.24); **North Staffs Aquarists' Society** (Mr. D. I. Cadman, 6, Radford Road, Cliffe Vale, Stoke-on-Trent); **Nuneaton and District Aquarists' Society** (Mr. J. H. Roberts, 158, Long Shoot, Nuneaton); **Penistone and District Aquarists' Society** (Mr. G. Searle, 60, Ward Street, Penistone, Nr. Sheffield); **Rochdale and District Aquarist Society** (Mr. R. Hincliffe, 57, Abbott Street, Marland, Rochdale); **Romford Aquarists' Society** (Mr. R. Hammond, 23, Belmont Avenue, Upminster Bridge, Essex); **Rugby and District Aquarists' Society** (Mr. L. E. Burton, 15, Willoughby Place, Rugby); **Stretford and District Aquarist Society** (Mr. R. G. Walker, 3, Ripon Crescent, Stretford, Lancs.); **Sunderland and District Aquarists' Club** (Mr. T. Pearson, 31, Sydenham Terrace, Sunderland); **Southport Aquarist Society** (Miss K. Lessiter, Kirkstone, Bescar Brow, Scarisbrick, Ormskirk); **Walsall Aquarium and Pool Society** (Mr. F. E. Pank, 38, Thorpe Road, Caldmore, Walsall, Staffs.); **Walthamstow and District Aquarists' Society** (Mr. P. Whitworth, 2, Hawthorn Road, Buckhurst Hill, Essex); **West Middlesex Aquarists'**

A group of Hampstead Aquatic Society members and F.B.A.S. council members pictured together with trophies and awards won by the society during last year. The trophies were presented to members by Mr. W. S. L. Mellish, chairman of the F.B.A.S. (seated, right). On the left, seated, is Mr. P. B. Utton, chairman of Hampstead A.S. Standing, from right to left, are Messrs. W. T. Adams, L. G. Lawrence, J. P. Mitchell, R.O.B. List (F.B.A.S. secretary), K. J. A. Pye (Hampstead A.S. secretary), P. W. Meyer, L. Coatman, R. W. Tucker. The picture was taken at the society's fourth annual social evening.



### N.W. London League

SIX N.W. London aquarists' societies have decided to hold inter-club table show competitions and have formed a league for this purpose. They are **Arnold Aquarists** (Wembley), **Hampstead A.S.**, **Hendon and District A.S.**, **Independent A.S.**, (Islington), **N. London A.S.** (Kentish Town), **Willesden and District A.G.** Four meetings of two delegates from each society have been held and it is planned to hold six shows annually for four classes at each show. Each society can enter three fishes in each class. An additional furnished aquaria class will be held yearly at the Willesden Show. A shield for the society gaining most points over the year is to be awarded. The first table show (at Hendon) was held last month and this month a show at Kentish Town is planned.

### THE AQUARIST'S BADGE

THESE may now be obtained from *The Aquarist* by sending a postal order for 2s. together with the **Aquarist's Badge Token cut from page viii.** Two fittings are available, for lapel button-hole or the brooch-type fastening.

### New Societies

**Circuit Laboratory Aquarist Club** (Engineer-in-Chief's Office of G.P.O.). Secretary: Mr. W. A. Ryan, 74, Meadowview Road, Catford, London S.E.6.

**Colwyn Bay and District Aquarist Society** Secretary: Mr. A. J. Clayton, Edelweiss Hotel, Lawson Road, Colwyn Bay, N.Wales.

### Aquarist's Calendar

24th-26th May: **Bedford and District Aquarist Society** open show in Bedford. Details and show schedules are available from show secretary Mr. R. R. Pope, 51, Aylesbury Road, Bedford. Closing date for entries, 2nd May.

26th May: **Eastern Counties Section of the Federation of Guppy Breeders Society** third guppy show with three open class Benching 10 a.m.-1 p.m.; show open to public 2-7 p.m. at Altmore Avenue School, East Ham London E.6. Show schedules from show secretary Mr. E. Wignall, 481, Roman Road, Be London E.3. Closing date for entries, 18 May.

14th-16th June: **North Staffs Aquarist Society** second annual show, open to North Staffs area. Details and show schedules available from show secretary Mr. L. J. Pett, 6, Radford Road, Cliffe Vale, Stoke-on-Trent. Closing date for entries, 20th May.

11th August: **Romford Aquarists' Society** open show at Wycombe Hall, Romford Main Place, Romford, Essex. Schedules are available from show secretary Mr. C. E. Berkley, 3, Bridport Avenue, London Road, Romford, Essex.

22nd-25th August: **Midland Show** (Midland Aquarium and Pool Society). Details and show schedules are available from secretary Mr. T. L. Dodge, 48, Dunsmore Road, Hall Green Birmingham 28.

29th August-1st September: **Association of South London Aquarist Societies** annual show at Sutton Adult School, Sutton. Show secretary is Mr. A. Sayle. Society secretary Mr. H. J. Vosper, 23, St. Asaph Road, Brockley London, S.E.4, will supply details.



At an inter-club furnished aquaria show held in a local cinema, Dewsbury and District Aquarist Society were awarded the Mr. Roberts Cup, donated by the Playhouse Cinema, Dewsbury, management. Mr. W. Perrin (left) is seen receiving the cup from the Playhouse manager, watched by society members.

### Crossword Solution

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

PICK YOUR ANSWER (Solution)

1 (a), 2 (c), 3 (b), 4 (c).