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<td>Comets</td>
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<td>Golden Orfe</td>
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<td>Goldfish and Shubunkins</td>
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### POND FISH

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The Aquarist
The Bloodfin

by Michael M. Clark

The bloodfin (Aphyocharax rubripinnis) is a member of the family of characins. It appears both lively and hardy and, in suitable surroundings, it is outstandingly attractive. The body colour of the fish is a translucent creamy green, but a blood-red covers the anal, pelvic, dorsal, and caudal fins. The anal and pelvic fins also bear a tinge of white at their tips. The black eyes of the fish are comparatively small.

The bloodfin is fairly easy to breed, but distinguishing of the sexes is not easy. The male possesses a small hook on his anal fin but this is barely visible. However, the female should appear deeper bellied than her mate.

The breeding tank, which should measure about 18 by 10 by 12, should be thickly planted with floating fern (Ceratopteris divisia) or Indian ferns. The tank temperature should not exceed 80°F. A ready pair will commence spawning in the early hours of the morning after they have been introduced into their new surroundings. For several hours they may be observed to chase each other. Suddenly, they will start leaping out of the water. In the air they come into contact. The female expels a handful of eggs and, at the same time, they are fertilized by her mate. The eggs fall into the water, many being caught on the leaves of plants, while some continue to sink until they settle on the gravel base of the tank.

This action of spawning is repeated many more times. When they have finished spawning, they will both swim separately. Now they should be removed from the tank at once. If they are left it is quite possible that every single egg will be readily devoured by them.

The young fry are born between 24 and 48 hours later. At first they appear barely visible but after four or five days their size may have doubled. At first they should be fed on fine dried foods, infusoria and egg yolk. Within nine months they may measure 14 inches and, at this age, they will reproduce readily.
Fishes of the Congo
(Part 2)

by A. VAN DEN NIEUWENHUIZEN, Translated by AL KLEE

In 1956, Dr. Max Poll of the Congo Museum in Belgium described a new species of Neolamprologus, Neolamprologus brevis. Some three years later, I received the first eggs of this fish from the Graindorge family in Jadoville and at the same time they furnished the data which was presented in my previous article. These data are, without doubt, exact for they were gathered on their many excursions by the members of the now defunct society in Jadoville, "Barbus Tritrama," said society having the facilities of a laboratory at their disposal. One of the laboratories of the Union Minière Company analyzed these water samples to add to what was not already known about water composition.

The eggs were sent to me by airmail and I divided the post with eggs among three wide-mouth dishes. These were eggs from wild-caught specimens that the Graindorge family had bred in their aquarium during the months of February and March. In May, when I examined a few...
eggs in the porch, I found them to be in the first stage of development. Only towards the end of the summer did I decide to immerse the porch in water finding nothing noteworthy in the hatching of the young. At first, it seemed that all were "blessings" but I was astonished when, after a short while, they all swam normally. They grew wonderfully, reaching a length of one-half inch after four weeks. This was not out of proportion really for at that time I was not able to offer the foods that I would have liked to have given.

I now had about 60 youngsters which I divided among three rearing tanks, (15 x 10 x 10 inches) in order to minimize the risk of losing my new acquisitions. Nevertheless, I received quite a disappointment in the fifth week when, one after the other, the young began to die and in some of my efforts they were all dead by the sixth week. Previously they died they all exhibited very accelerated breathing and hung at the surface of the water. In brief, it appeared to be precisely the same sort of experience that we have had on occasions with Notobranchius guentheri. The young fish were kept in peat-filtered, crystal-clear water that was at the same time passed through a charcoal filter. One could not, therefore, suggest an excess of CO₂ and since feeding was precise there was no unclean food in the tank either. In a short while the fish were dead.

In the meanwhile, due to the unrest in the Congo, the Gouwande family returned to Belgium bringing with them additional eggs which they sent to me. This time, things were better as evidenced by the following account. In breeding Notobranchius guentheri one can hatch out young in as little as 6 to 8 weeks although results are better if the porch is held longer. If one examines the eggs of N. brienii under a magnifying glass, very little development is seen in this amount of time. This is understandable for the eggs of this species go through a drying period in nature from June to the end of October or the beginning of November in all about 3 months. After 6 weeks, the development of the eggs is scarcely begun. Moreover,

this species lays a great many "resting eggs"; that is to say that such eggs begin their development very late and remain clear for quite some time. Such eggs are insurance against a premature and short rainy period. They are, in fact, a precautionary measure of nature's. This is, by the way, not unique for the same phenomenon is observed in N. guentheri, N. palmensis, N. brevii and many bottom spawning Aphronemus and south American annuals. Consequently, we can say that the eggs of N. brevii (and N. brevii) require, optimally, a drying period of from 6 to 8 months. It is appropriate now to say something about breeding of N. brevii and in general, it will be shown to parallel that of the other species of Notobranchius.

1. It is best to separate the sexes about a week before breeding and to feed normally. This is to say, alternating with mosquito larvae, well-washed tubifex (not too much at one time); small flies, etc.

2. Prior to breeding, relatively small tanks may be used. My personal preference is for aquaria measuring 10 x 10 x 10 inches since my breeding tanks are of at least this size. The water height in this breeding tank should be about 4 inches; the water itself well-aged, crystal-clear and either soft or hard. (My experience is that the hardness of the water is not significant.) On the bottom of the tank, place a layer of peat about 1 inch deep. The water temperature should be about 72-75°F.

3. There are many ways in which the breeding tank can be arranged. In the tank, a refrigerator dish containing a layer of peat moss or a layer of dark nylon wool can be placed. In lieu of other opportunities, the moths eagerly lay their eggs in this substrate. The advantages of such an arrangement will soon be made apparent.

4. For breeding, one male and two females are used. After several days, the females may be replaced with fresh.
conditioned females so that a high egg production can be maintained. If peat is used in the breeding tank, everything may be poured out (after first removing the fishes of course into a nylon net or of the sort used to collect daphnia) and squeezed gently to produce a slightly moist paste. This paste is then placed into a plastic bag or a covered container. It is not advisable to store the paste in the breeding tank for not only would this preclude using it for many months but moreover, the paste would dry too fast and too much. The latter especially applies to _N. brienii_. This is rather remarkable since in nature these eggs lie in a substrate during the dry season which is so devoid of moisture that it cracks and runs through with fissures.

(5). The paste containers are best stored in an area where the temperature is kept constant (70 to 73°F). At temperatures between 73 and 80°F, my experience is that most eggs go bad. During the long incubation period it is advisable to ventilate the area in which the eggs are stored in their sealed packages. If this is not done, there is a tendency for mould to form, something which is very undesirable.

(6). After the drying period is at an end, return the eggs to a breeding tank and flood them with water. With _N. brienii_, high water levels are not recommended. Many hobbyists complain of bellysiders. At first, I could not explain this or why it happened again and again until one day I sat down and observed the fry hatching from the eggs. The water level in the tank stood at 6 inches. Within the hour, the first fry hatched out and I discovered in general, all were bellysiders. At the same time, it was noticed that all of the fry attempted to reach the surface of the water. Not succeeding in this, they swam in a skipping motion throughout the water. When I lowered the water level to 1½ inches their conduct changed. All of the "bellysiders" swam naturally. Probably air is taken at the water's surface to fill their swimbladders. This has not only been my own, but the experience of many other hobbyists.

(7). Before flooding the eggs, a brine shrimp culture should be started in order to feed the fry immediately after they are free-swimming, for they take food right in the first hours after hatching.

(8). _Nethobranchius brienii_ grows very fast. In the Congo, they reach full growth about 55 days after the start of the rainy season. With good feeding, they reach a length of 1½ inches after two weeks under aquarium conditions. On the third day one can even feed sifted daphnia; later on, larger foods are given. Moreover they grow so rapidly that they should be transferred to larger quarters.

(9). Frequently, these fishes are burdened with parasites. Primarily _Oodinium_ (velvet) is found about the borders of the scales. This disease is contagious but in spite of the great danger, I have never lost many fishes from it. Remarkably the disease can even appear in the relatively clean hatching tank. Many hobbyists are of the opinion that many diverse species of _Nethobranchius_ are infected at birth.

Finally, it has been shown that high water temperatures are injurious to this fish. It cannot be emphasized enough that temperatures above 80°F coupled with extensive feeding of but a single food often results in a dropy-like condition. In my next article, I shall describe other things, the advantages of using refrigerant fishes containing nylon mops (mentioned previously), and also the living conditions of other _Katanga_ and neighbouring species.

(to be continued)
Insect Individualists:

Hydrometra—the Water Measurer

by F. WILMOT

The tiny Water Measurer or Water Goat (Hydrometra) is a creature both of the surface-film—the thin covering which is a natural property of all surface water—and the damp parts around the margins of ponds. Like the Pond Skater (Gerris), as it moves over the surface-like surface-film its feet merely make little dents and do not become immersed. But unlike the Pond Skater it never ventures below the surface, neither does it run or jump. For it can manage nothing more with its long hair-like legs than a slow and laborious walk—a thing most uncommon in insects. Indeed it is difficult to imagine, if the Water Measurer did somehow become immersed, how it would succeed in getting back through the underside of the surface-film.

I remember that on the occasion when I first saw Hydrometra walking slowly on the surface of a pond, I thought it must be either injured or affected by cold. Certainly, with its thin body and legs, it well merits the descriptions “slender” and “fantastically slender” given to it by zoologists.

Presumably, because of its fineness, the Water Measurer doesn’t venture outside sheltered nooks at the water’s edge. Its body is only ½ inch long and being so thinner than a pin is not easily seen, although the insect is quite common on still and slow running water during the summer months.

Fish Diseases (26) Mouth fungus

by R. E. MACDONALD

Although mouth fungus looks similar to skin fungus (Saprolegnia) it is not, in fact, caused by a mould but by a slime bacterium.

The mouth and cheeks of a fish suffering from this disease will swell and a substance looking like white cotton wool will protrude from the mouth. The fish will become extremely languid and serious damage may be caused if the disease is not treated early. The fish’s breathing frequency and appetite will become affected and death may follow. The disease appears to be contagious.

Mouth fungus (not a very accurate name for a non-fungoid disease!) may be treated by swabbing the mouth of the infected fish with a solution of the dye—Brilliant Green. The fish is then placed immediately after swabbing in a tank containing clean, fresh water.

The recommended solution is prepared by using just enough ethanol to dissolve 4 grains of brilliant green. The dissolved dye is then diluted with 1 Imperial gallon of water. Brilliant green can be obtained from dispensing chemists.
The Junior Aquarist

Reader's Letter

I will excuse me for all the grammatical and other mistakes I will make in this letter. My name is Karl De Groot and I live in Berchem, a suburb of Antwerp. I am 16 years old and I speak French (you know some people in Belgium speak French). I am a member of the Antwerp Aquarium Society "De Gierurscien" ("The Ornamental Fish Lover"). For the moment there are 20 or 21 fishes in my fishroom of varying size and a capacity between 2 gallon and 30 gallons (8 liter and 200 liter). Some days ago I saw an old issue of Water Life and Aquarium World. So I wrote a letter to the adress of the editor. Some days later, I received a letter from Cape and Atlantic Birds. I read that Water Life had ceased publication four or five years ago. In that letter there was also the adress of the publication The Aquarist and Pondkoger. So I would ask you, if possible, to send me a letter too and some newer aquarium magazines (1960, 1961, 1962, 1963, 1964, 1965 or so). I would be very pleased if you could give me the address of somebody who would correspond with me, naturally also an aquarium friend (boy, girl, man, woman: everything is good). I am also interested in terraria, so I keep some lizards, frogs, snakes and turtles in 10 large terraria. Perhaps my letter will help to make more ties of friendship between English and Belgium aquarium-fans and that would be fine. O, I should prefer if my correspondent had an age between 17 and 57 years.

Aquatic Notebook

Have you ever considered keeping an aquatic notebook or diary? Such a book can form a very useful reference book for items of information which could normally be forgotten. Although a normal printed diary will do for the job, an even better one can be made from a school exercise book. What sort of information should be included in such a notebook?

One can include short notes on useful information obtained from books or magazines, or from dealers or other aquarists. It is also useful to keep several pages devoted to notes on each separate aquarium which one has. Such notes can begin with the particular date on which a tank is set up, the sort of gravel and rocks used, the numbers and kinds of fishes and plants kept, the temperature of the water, the wattage and type of light used and the number of hours during which the tank is lit, daily. Three columns can be ruled on one page, these being used for the date, the pf, and the hardness of the tank water—shown by tests at, say, monthly intervals. Types of food used can also be noted. Dates on which, and sources from which, new plants and fishes are obtained, can be recorded. Personal breeding records of various fish can be kept. These should contain information on how the fish were conditioned, the water conditions in which they spawned, the date on which the fry were born, how many were raised, first foods on which they were fed, etc.

Other useful facts could include corresponding scales on Centigrade and Fahrenheit thermometers, conversion scales for say, ounces to grams, and grams to grains for use with chemicals when dealing with diseases or algae growths in aquaria. A note of water contained by different sizes of aquaria (remembering to allow for rocks and gravel) is useful information when calculating amounts of chemicals to add to water when treating diseases.

There are a host of other personal details of aquatic interest which could be included in such a notebook, and it is interesting, after a few years, to look back and recall various stages in the development of one's aquaristic hobby. A notebook can cost only a few shillings and is a very worthwhile investment.
Colourful Diet

It was nearly midnight when the schoolmaster suddenly remembered that he would need some sea water for a lesson on marine biology next day. Rather than leave it till the mad rush of the morning, he decided to go down to the shore there and then. The tide was out. The full moon made his torch unnecessary as he picked his way carefully over the slippery mud and seaweed to the rock pools at low water mark.

There, in the quiet night, he stopped to listen. What was that extraordinary scraping, sucking sound? He bent to stare in amazement at the dozens of limpets, normally clamped so firmly to the rocks. With their shells raised a good quarter of an inch off the ground, they were moving about feeding on the algae, scraping them off the rocks with the edges of their shells. In the stillness of the night the combined noise they made was quite extraordinary.

Yet no one really knows how often limpets need to eat. One professor decided to spend his six weeks vacation studying their feeding habits. He found a thriving colony and sampled it, but the shellfish refused to co-operate. The wriggled creatures simply refused to budge during the whole six weeks.

Periwinkles, too, are known to go without food for a month or more. But if you go down to the water's edge at low tide you can often see them moving about.

Did you know that the colour of a whelk's shell depends on its diet? When it feeds mainly on mussels, the shell is dark, but when it lives on barnacles the shell is off-white or yellow. A striped shell probably means that the whelks have had a varied diet. Wouldn't it be odd if this applied to humans? It is true that people who live mainly on bread and milk have skin that is often pasty-faced, but supposing meat eaters turned scarlet and vegetarians green! The famous Tyrian purple dye used by the Romans for their imperial trappings was obtained from a species of whelk, the perna.

There is competition for food among shore animals, just as there is on the land. To reduce this competition, each kind of shellfish keeps to its own regular zone between high and low tide levels, so there is very little overlapping. A few animals live above the high water line where they only get splashed with sea water. You will find periwinkles and other shellfish wedged into cracks in the rocks. On Portland Bill, for instance, the splash zone is so high that there are sea animals living thirty feet up on the cliffs. Warm water always come only just as far along the south coast as the Isle of Wight and Dorset, where about two hundred varieties have been recorded. However, only about twenty of these are common.

Most shellfish make their homes on the underside of rocks or in crevices, where they are protected from the full force of the waves and from the heat of the sun at low tide. Others, like the cockle and razor shells, bury themselves in wet sand or mud by pulling themselves down with their strong muscular feet. By contracting and then suddenly extending its feet, the cockle can leap into the air, jumping along the shore like a frog.

To a limpet there is nothing like 'home, sweet home'. When it goes for a walk it always comes back to the same spot and settles down in exactly the same position. If you manage to take a limpet off guard with a sudden knock, try turning it round to face the other way. Then, if you spend the rest of the day watching it, you can see it gradually wriggle itself round until it fits into its own particular groove. Its shell grows to fit the rock and it stays there all its life. In fact, on chalk cliffs limpets sometimes dig themselves in so deeply into the soft rock that they can't get out again, and their tunnels help to cause cliff erosion.

Barnacles, too, live all their lives on one spot, but unlike limpets they don't go off in search of food. Their food comes to them in the microscopic plants of the plankton which drifts in the sea. Perhaps this is why the barnacle larvæ will only settle in a place where there are, or have once been, other barnacles. Here they can cement themselves to the rock knowing that the right kind of food is available. Nobody knows just how long ago the first lazy barnacle decided to fasten on to a ship's hull and be taken for a ride, instead of swimming around on its own. That is just one of the many mysteries of the sea.

Living Space

One of the most important things to remember when keeping fishes is that they must have plenty of swimming space. Even with artificial aeration it may be possible to keep more than the usual number of fishes in a tank, but they will not thrive and grow unless they have enough room. The old idea was to have an inch of fish to each gallon of water. This is dangerous as the shape of the tank can make all the difference as to whether or not this old rule applies. For instance, let us consider a tank which has a frame 48 inches by 12 by 12 inches. If the tank was glazed so that it stood on end then there would only be 144 square inches of surface area (12 by 12 in.). This would only hold six inches of fish. If on the other hand the tank was glazed so that the surface area was 48 in. by 12 in., then it would hold four times as many fishes but only the same amount of water namely, 24 gallons (approximately).

This rule then, should be an inch of fish (not counting the tail) to each 24 square inches of surface area. When collecting such fishes as minnows for your tank make sure that you do not overcrowd them in the carrying-can. If you do it is practically certain that you will have nothing but dead fishes when you get home. It is much better to carry two or three and arrive home with the fishes in good health than to chance trying to have too many and lose the lot.

Do also remember that fishes do not have to be fed every hour or so. They can exist for long periods with no artificial feeding. Most fishes can eat much of the soft vegetation in the pond or tank and so no more feeding than twice a day is enough for most fishes. Any unspent food can soon pollute the water, with eventual fatal results to the fish which will die through lack of oxygen.
THE White Cloud Mountain Minnow (Tetraodon albosellatus), a true jewel of the aquarium, was first introduced into Britain as an aquarium fish in the 1930s, following its discovery in the White Cloud Mountains of Canton, China, by a Chinese Boy Scout—Tan. Since this time it has enjoyed great popularity, now being a fish eagerly sought after by both new and experienced aquarists.

During the summer months it is possible to keep the species in unheated aquaria. Indeed, in this respect it can be said to be a “coldwater fish,” being able to withstand water temperatures as low as 45°F. It is surprisingly catholic in taste, being not too particular about water conditions, nor food, accepting virtually anything and everything. It is an excellent shoaling fish, two dozen to a three foot tank well planted with Cryptocorynes and Amazon Sword plants (Echinodorus varieties) providing a beautiful, ever-moving picture.

The general body colour of the fish is a reddish-brown, the sides being adorned by three horizontal stripes of gold, green, and brownish-black. Maximum length of the species is 1½ inches. Breeding is easily accomplished with adult fish, females being easily recognised by their plumper appearance over the slimmer male.

Both fishes should be separated for a period of seven days and fed on lavish amounts of Daphnia and Tubifex together with a little white worm in order to bring them into breeding condition. The spawning tank, preferably not smaller than the standard 24 in. x 12 in. x 8 in., should be set up with water pH 6-6-7.2. Course gravel should carpet the bottom, which should be thickly planted with anchored bushy plants such as Elodea densa, hornwort, Nitella etc. Water depth should be 4 inches, and temperature maintained at 75°-78°F.

The pair should be introduced into the breeding tank late in the evening in order that they may rest before the rigours of spawning which usually occurs early the next morning. There are exceptions to this rule, however, as I have had infrequent spawnings during the late afternoon and early evening.

The mating act itself is very reminiscent of the breeding performance of the Danio family (Zebra fish etc.) in that vigorous driving of the female is undertaken by the male, resulting in the former scattering up to 150 eggs, which are immediately fertilised by the male.

Upon termination of this act it is always advisable to remove both parents as although it is widely reputed that neither fish take any further interest in either the eggs or the resultant offspring it is better to be safe than sorry.

As an added precaution methylene blue in the form of five drops of 5% aqueous solution per gallon of water may be added to the aquarium in order to discourage bacterial growth.

Hatching occurs within 48 hours, the fry becoming free swimming on the third day after the absorption of their yolksac. They will now be ready to accept their first food, which for the first week to ten days (depending upon growth), should be restricted to infusoria. Thereon the now familiar foods of newly hatched brine shrimp, micro-worm, sifted Daphnia etc. may be fed on which rapid progress will be made until within six months they will be displaying adult livery.

An alternative method of breeding favoured by some aquarists is that known as “lock breeding,” when perhaps a dozen, or even more fish (an equal number of males to females), are housed in an aquarium exclusively devoted to this species.

This is perhaps an ideal method for those aquarists who, like just one or two aquaria, though to my mind it does not allow the choice of selective breeding in order to bring out desired characteristics in future stock.

Market Review

Review of the Dynaflo Motor Filter

by Stan Harmon

Filters and Aerator are so numerous as to become tiresome to the novice, but here is a unit that is both both for Breeding and Show Tank alike.

Gone is the clutter of the spit-drip-drip and the tangle of the plumbing and in its place is a simple, clean, effective and unobtrusive Dynaflo Magnetic Drive Filter.

Description

This Power Filter is constructed from the same materials as the Filter Box, Return Tube and Grid, Siphon with Removable Suction, Starter/Locking Stick and non-switched Drive Motor. The Filter Box is rectangular (2" x 4" x 5") and made from unbreakable clear plastic and is secured to the aquarium. Inside the filter is the Return Tube and Grid which also houses the non-switched impeller water pump.

The Filter Box (Magnetic not Direct) compact and easily switched or removed from the bottom of the Filter Box by a sliding action. Locking of Drive to Filter is done with the Starter/Locking Stick.

Performance

Filtration through glass wool and charcoal is fast and efficient. Staining the siphon is easy with the use of the Starter/Locking Stick and ample water is carried to the Filter.

Flow of water through the Directional Return Tube is powerful, and provides both circulation and aeration.

The Motor runs cool, silent and free from vibration.

Observations

As an aid to the efficiency of the Return Tube on the filter, the use of charcoal and a thin slice of activated charcoal or a finely powdered mixture of charcoal with water should be employed. In the filter to ensure a constant supply of fresh water, glass wool was also inserted in the breeder tank.
HAVING glazed a couple of aquaria about six months ago, using a well-known brand of aquarium glazing compound, I was surprised to find recently that the glass seemed to be absorbing the compound at various places around the points where glass met glass in the corner supports, and where the glass met the frame at the top of the aquaria. This seemed unusual as the tanks had only been set up for six months. On investigating further I noticed an accumulation of a white dust-like precipitate on the gravel in each of the four corners of the tanks. As the glazing compound visible on the outside of the tanks was normal, I assumed that the water in the tanks was dissolving the compound.

With the aid of a hand lens, I found a lot of the white precipitate to be composed of disintegrating snail droppings. I had at last traced the cause.

Examination of the glazed joints showed a coat of small snails, mainly ramshorns, which were obviously enjoying the glazing cement as a food. Eating expensive aquarium plants is a bad enough problem with which to contend, but the prospect of having to strip down an aquarium, replace it, and set it up again, all because of snails, makes the former problem a relatively minor one. Obviously the glazing compound contains something which the snails can use as food and which is non-poisonous to them. In both tanks the glass was cut slightly smaller than that which would have been ideal, hence there was enough compound exposed for the snails to be able to eat. Larger pieces of glass would have helped to solve the problem of the glazing compound which the snails will not eat in the cement. Poisonous additions to glazing compounds to prevent attacks by snails would obviously kill fish as well. Aquaria glazed with another compound have not suffered attacks from snails.

The usual precautions can be taken when setting up the aquarium as regards the cleaning of plants, using solutions of various chemicals such as potassium permanganate, but none of these is completely effective against the introduction of snails’ eggs. Sooner or later snails will be introduced into the planted aquaria and, unfortunately, once they are in it is almost impossible to get rid of them. Removal by hand is an obvious method, even if slow and time consuming.

One method which I have found to be of some use is to introduce into the tank a small piece of raw meat such as mince, on a piece of thread. It should be allowed to remain in the tank overnight, resting on the gravel. The next morning, with luck, a number of the snail population should be found adhering to the meat which can be removed. It should not be allowed to remain in the tank for too long or it may foul the water. This procedure may be repeated at intervals and will help to cut down the snail population.

With the large number of remedies available for the treatment of diseases in aquarium fishes, it is a pity that none of the makers of such products has, as yet, produced a compound which can be used to control water snails in the home aquarium. Let’s hope they soon do.

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Book Review


BOOKS on aquarium plants are few in number, but here we have a paperback book of 94 pages at a reasonable price. Translated from the original German, the book is well illustrated with drawings which are an aid in the identification of aquatic plants, and the cover has an attractive colour photograph of a variety of plants. Originally published in 1963, the book includes some of the more recent introductions missing in older books on aquatic plants.

Beginning with an introduction on the purposes of plants in aquaria, the book continues with an interesting section on lighting and the most suitable types of lamps and fluorescent tubes. Water conditions are quite well treated both as regards pH and hardness, as well as sources of water for aquarium use. The author has also noted the necessity of the correct choice of rocks and gravel as regards their calcium content.

Food requirements of plants is well covered and suitable temperatures are given in both Fahrenheit and Centigrade scales, with an interesting note on the fact that temperatures in the gravel may be lower than in the general body of tank water. Sections on plant propagation and choice of plants are useful. Plants are classified by leaf forms and not by flowers, the latter type of classification being of little use as many aquatic plants do not commonly flower in the home aquarium. An explanation of botanical terms used is useful to the aquarist not schooled in this area of plant nomenclature.

Continued on page 73.
Многие озера и пруды в нашей стране замерзают в периодические или непериодические заморозки. Заморы снижают рыбопродуктивность, а часть водоемов становится безводной.

ХОРОШИЙ МЕТОД БОРЬБЫ С ЗАМОРАМИ

Фото из советского издания

Russian

Canadian

THE AQUARIIST
**Fish ‘Winterkill’**

by FRANCIS DICKIE

It is one of the remarkable workings of the human mind that men, many thousands of miles apart, and unknown to each other, have sometimes achieved exactly the same solution to a problem never previously satisfactorily solved.

The most unusual of these was recently carried out. The amazing feature of this is the coincidence that, fishermen in Russia did their experiment about the same time as that in British Columbia. This is borne out by the fact that the official Soviet government publication, Fish and Fish Culture, printed the pictures (shown here), that reached Vancouver, British Columbia, the same month as similar photographs were made at Kilpoolsa Lake, B.C., of the same experiment. The comparative pictures are shown here.

Here are the extracts from the article in the official Soviet government publication. The striking similarity between the pictures here and those of British Columbia experiment is apparent. The translation reads approximately as follows: "Many lakes and streams in Russia are subjected to severe freezing. This freezing reduces fish population in some and kills completely in others".

The project developed at Osoyoos, British Columbia, is so much like that described in the Russian journal that the Soviet text could have been translated to describe the British Columbia successful experiment. It is truly amazing that a group of fishing enthusiasts in a small British Columbia town named Osoyoos, and Soviet technicians some 4,000 miles away, should both have tackled the problem of 'winterkill' in exactly the same manner at exactly the same time.

When someone suggested that the installation of a windmill at distant Kilpoolsa Lake, B.C., would overcome the regular 'winterkill' of fish there, it sounded like a pretty wild idea. The Osoyoos Fish and Game Club had undertaken some difficult projects in the past but the windmill project seemed as unlikely an undertaking as they had yet attempted.

'Winterkill' is a phenomenon observed in many British Columbia Lakes. Such lakes are usually shallow, and warm up rapidly in summer. This encourages a heavy growth of microscopic plant and animal life known as plankton. During the summer there is plenty of oxygen available at the lake's surface, but this is cut off each fall when the lake is covered with ice. The continuing decay of the plankton produces in summer results in a heavy depletion of oxygen and, as winter conditions continue, the oxygen may be so much depleted that fish life is destroyed.

Many attempts have been made to oxygenate the water in such lakes and so overcome 'winterkill'. Manual destruction of lake ice, mechanically operated pumps to stir lake waters and the scattering of lamp-black to induce ice-melts, are among the methods that have been tried. As far as can be ascertained, the Kilpoolsa Lake experiment marks the first time in North America that a windmill has been used, although the principle has just been adopted in the Soviet Union. (See photographs). The first step was to lay a perforated pipe along the bottom of Kilpoolsa Lake. Then the erection of the tower and the installation of an air pump geared to the reciprocating action of the windmill. The force of the wind would press air along the pipe on the lake's bottom thereby circulating the warmer water at lower levels and preventing the surface of the lake from freezing. Five inches of ice covered Kilpoolsa Lake when at last the windmill went into action and a large crowd had gathered to see what would happen. The people grouped themselves around a hole, that had been cut through the ice at the foot of the windmill. As great air bubbles were seen being forced up through the hole, a loud cheer went up. The plan had worked. Within forty-eight hours the warmer sub-surface waters cut through the ice in five large, round rings. The battle of 'winterkill' in Kilpoolsa Lake had been won; also in northern Russia.

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continued from page 71

**Book Review**

The book gives valuable information on the cultivation of individual species of plants, with special reference to light, water hardness and feeding requirements, although not much information is given on pH values of water for specific plants. But exact figures for this latter facet of plant growth are often of doubtful value anyway. Helpful sections on the identification of different species of plants in four of the most popular plant groups concludes the book which has an index.

For the novice or the more advanced aquarist, this attractive book has a lot of very useful information to impart, and at such a relatively low price deserves a place in the aquarist's library. Three other books on aquarium keeping subjects are also available in this series, and other paper-backs are being prepared.
OUR EXPERTS' ANSWERS TO TROPICAL FISH-KEEPING QUERIES

What are the most natural ways of making soft water acid?

Strain it through a thick layer of dried oak or beech leaves or waterlogged peat. Alternatively, store it for several weeks in a container made of tank, cedar or oak.

Will the Japanese weatherfish (Mogurusa anguillicaudatus) live in an unheated tank, and will it live on peaceful terms with other fish?

M. anguillicaudatus will stand a temperature down to the forties (°F), but specimens bought from a dealer who has been keeping them under tropical conditions should not be subjected to any sudden change of temperature. In other words, acclimatization to cold water should be brought about slowly and gradually. It is not a pugnacious species, but the fact that it attains a length of nearly a foot, and stirs up the compost tends to limit its appeal.

I have just purchased four baby Symphysodon discus. What sort of conditions and treatment do you advise?

Give these fish a well-planted tank filled with a soft, non-alkaline water and disturb them as little as possible. That is to say, don't poke about in their aquarium with a dip-tube and the like. If other fishes are present, see that they do not chase after the discus, or scare them away from food. And speaking of food, see that the young discus get their fill. Young ones in captivity often lack appetite and can be extremely faddy.

I have an angel fish which has developed fungus disease on its tail. Will this disease spread to the other fish in the tank?

We do not think so, provided the tank is kept scrupulously clean and the other fishes do not have any open sore or bad bruises or spine fins to attract infection.

I siphon the water out of my 18 in. by 12 in. by 12 in. community tank every fortnight or so, and fill up with fresh from the tap. I also give my fish plenty of live foods. Yet with all this care I cannot keep my fishes alive. Where am I going wrong?

Generally speaking, tropical fishes do not last long if they are given frequent complete changes of water, unless it is of the same quality (chemically speaking) as that in which they have been living. Another thing that tropical fishes cannot stand is an abrupt change of temperature. If your tank is overcrowded—if some of the fish gasp at the surface a few days after fresh water has been introduced—reduce their numbers, or install a pump to maintain an adequate supply of oxygen. But leave the water alone. Unless you overfeed the fish and leave the uneaten food to turn bad on the bottom, the water in a properly stacked and cared for aquarium should stay wholesome indefinitely.

What is the scientific name of the blue shark? Is this beautiful fish suitable for a community tank?

The scientific name of this species is Prionace glauca. It is a peaceful species that grows to a large size—about 6 ft. in the aquarium against 14 ft. in the wild. Therefore, it needs spacious quarters to allow for proper development.

I hope to obtain several black-banded sunfish before the summer is out. What sort of food, set-up, and temperature range do you advise?

Feed this centrarchid on live Daphnia, gnat larvae and worms. Few black-banded sunfish will accept dried food. A temperature of about 65°F (18°C), with a range of a few degrees (°F) in either direction is recommended. In the wild state this species inhabits the acid swamps that are quite common in New Jersey and many of the eastern states of the U.S. southwards to Florida. Therefore, the black-banded sunfish needs soft, acid water in the aquarium. Plenty of swimming space and dense thickets of plants to play hide-and-seek in are necessary, too.

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

Astronotus oxolotl or marbled cichlid

It is possible to keep a young Astronotus oxolotl in a community tank.

The short answer is yes. But do bear in mind that as this handsome marbled cichlid increases in size—and it will attain about 12 in. in length—do its appetite, and any fish small enough to be swallowed will be eaten before long.

I have been told that the so-called Indian fern (Gonapogon chalcotoma) is eaten as a vegetable by some of the inhabitants of south-east Asia. Is this true?

It is true. Both the rooted and the floating forms of this aquatic fern are eaten as a greenfood (presumably when there is nothing better to be had) in parts of Indonesia and Malaya.

Can you give me some information about a floating plant botanically known as Hydrila virescens?

This plant is found in a variety of climates in many parts of the world. It is rare and localized in Britain. Our native species does not appear to prosper in the aquarium. Maybe this is because it needs cool and very shallow water, which is not acid and mud and plenty of bright daylight.

I have a Plectostomus catfish which is growing fast in a 3 ft. tank. What length is it likely to attain and what foods can it best be?

This interesting sucker catfish, referred to by some authorities as Hypostomus pterostomus instead of the more widely used name of Plectostomus pterostomus (commersoni), can attain a length of about 7 in. to 12 in. It should certainly reach at least 7 in. in your aquarium provided you keep the water well-aerated and at a temperature of about 72°F (24°C). The foods most likely to keep it in tip-top condition are tiny worms (red or white), minced raw beef and frequent feeds of cooked lettuce, spinach or turnip or young nettle tops. (In the wild state this catfish feeds largely on soft algae.)
COLDWATER FISH-KEEPING QUERIES answered by A. BOARDER

I am writing to ask for information on Dog Fish. I have one about 2 ft. long but no one seems to know anything about it.

This is the name given by some people to one of the Blind-Minnows, probably Umbra limi, or another called "Ombre". They are found in the Mississippi valley and the Great lakes. They grow to about four inches long and are not difficult to keep as they will take most kinds of fish. They do not require high temperatures and in their native habitat eat crustaceans, annas and soft vegetation. I remember that one was caught in a pond some years ago by one of Hendon Aquatic Society members, and no doubt it had been there by another aquarist but how long it had lived under those conditions it is impossible to say.

Some of my fishes in the pond have been attacked by fungus disease.

Many goldfish get attacked by fungus during the spring. It is probably caused by several factors. In the first place the cause is a form of spore of the disease "Aspergillus", which is found in most waters. A healthy fish has a covering of mucus or slime which protects it from attacks by the disease. Once a fish gets out of condition it loses some of this mucus covering or it is weakened. It is then that the spores of the disease can get a hold. A healthy uninfected fish is seldom attacked. The fungus may also get a hold on a fish which may be quite healthy but which has had some damage which has broken the skin or removed some scales. Even the careless handling or picking up of a fish can remove some of the mucus and the fish would then be liable to be attacked. The cure is to place the fish in a spare clean tank. Add a tablespoonful of Epsom's salt to do well, or a gallon of water. Do not stir but allow the salt to dissolve gradually. Leave the fish in this solution, in the shade for a few days. If the treatment is repeated at a regular amount of water. This should cure the fish unless it has become weakened in some way. The fish is then washed or the tank is filled with new water and the fish is added. If the water is clear out well the fish will be cured.

The shallower the water the more likely is it to become well oxygenated.

Last summer I had a galvanized bath in the ground and used it as a fish pond. The fish died and I wonder if I should have painted the bath with anything to make it safe?

If the galvanized was fairly fresh it is possible for it to be painted with a non-toxic paint or by a strong wash with cement. If the water is used it will only be safe if first washed out well to remove any fresh lime.

I have a stream at the bottom of the garden with two pools filled by a waterfall. It is usually fairly clean and quite free from heavy rains. Could I grow water lilies in the pools?

Water lilies prefer a fairly still water and do not thrive where there is much water movement. It may be possible to construct a screen so that any excess water would flow away from the normal course, thus missing the pools. You could also try to arrange that fresh water could be run into the pools if and when necessary.

I would like to know how to keep a pike and where I can obtain one.

Pike feed almost entirely on live food, other fishes being out of their diet. They will however take garden worms or other forms of live foods. A small one of not more than 8 inches long would be a very attractive fish to keep in a 36 by 12 by 12 in. tank. Pike grow to a very large size, up to 35 lbs. or more, but you might keep a small one for a few years. I do not know of any dealer able to supply one, but it would be possible to get in touch with a local angler who might be able to catch you one. If you knew of a local water where Pike abound it might be possible to catch a small one by netting among the water weeds at the sides.

I have had golden orfe on their sides in my outdoor pond and cannot make out what is the matter with them?

Golden orfe will turn on their sides when the water lacks oxygen. During thundery weather the water gets too warm and finds for these river-type fishes. If you find one on its side again just play the hose on it with fresh water for a little while and the fish will soon return to normal and be none the worse for the experience.

What is the ingredient which brings out the colour in fish?

This is ground paprika pepper as used to colour feed canaries, etc.

What is agar-agar, please?

This is a substance used by biologists to make a culture for growing bacteria, etc. It is made from a red seaweed.

What is Kelp meal?

This is made from seaweed.

What is the best way to keep up fish to big sizes?

Plenty of swimming space is the most important point in my opinion. Then an adequate supply of varied foods together with the correct temperature. A well oxygenated water at all times ensures that the fishes are able to feed at their maximum and so keep growing.

I have a large pond with golden orfe, fancy goldfish and golden Rudd. I would like to add a pair of Terrapins. Would they live with the other inhabitants?

The Terrapins would have to have a rock or small island to which to climb at times. They can take a bite from a fish if they get near enough to one. They would live in the pond during the summer, but would have to be taken inside for the winter.

I have six 3 in. and two 2 in. goldfish, could I keep them in a tank 54 by 12 by 12 in., well planted and aerated?

Your tank will hold 12 in. of fish, not counting the tail. If you have more they may not thrive, even with aeration.

My pond water does not keep clear even though it gets plenty of rain water from the roof. Is there anything I can do to improve matters?

The first thing to do is to stop using rain water from the roof. Rain water might be all right for the pond if one could be sure it came in clean and pure. The water from a roof is unlikely to be either clean or pure. Just as an experiment, tie an old sock over the bottom of the rain water pipe for a mouth or so. Then turn it inside out and you will get a surprise. I don't think that you would like to know that your fishes have to endure the mixture of soil, fish and sulphur you find in the sock.

I am anticipating breeding shubunkins. Can you recommend a book on breeding them? Also, do all strains have long tails, and if so when do they grow longer than the average tail?

You can get all the information on breeding shubunkins and other types of goldfish from the Aquarist book, "Coldwater Fishkeeping," price 5s. 6d. post free from The Aquarist. Bristol shubunkins differ from London shubunkins in that the former are more streamlined with larger fins. The caudal fin or tail is broader and a bit longer. Young shubunkins should show the difference at six months of age, although the tail will not develop fully for some months after, a lot depends on the way they are grown on as to when they would be fully developed.

July 1966

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The Common Carp

by B. Fry

That the common carp (Cyprinus carpio) is so widely and plentifully distributed over the world today—it was first introduced into Europe from Asia some five or six hundred years ago—is largely due to its usefulness to man as food, its prolificity, and its tolerance of conditions (climatic as well as environmental) that would kill most other coldwater fishes in the proverbial no time. Moreover, it provides the angler with excellent sport.

The common carp can live a long time—twenty or more years—in waters favourable to its development. The waters that suit it best are those which are still or sluggish and cover a soft bed in which it will make itself snug during the coldest days of winter. There it will remain quiescent and live on the fat it has accumulated over the past months until milder days return. And when these do it starts seeking food again.

The natural food of C. carpio consists of insects and their larvae, tiny molluscs and crustaceans (many of which it sifts from the mud), worms, the eggs and fry of its own or other species, and the tender leaves and shoots of submerged plants. Essentially it is a bottom-haunting fish, but in favourable weather it will rise to the surface every so often to gulp in anything edible which floats its way, or a mouthful of air. Sometimes it will even linger awhile among the lily pads or water-inrading sedges to bask in the sun.

The largest carp ever caught in Britain (in 1952) weighed 44 lb. and was presented to the London Zoo Aquarium. This fish, however, was a very exceptional specimen, for ordinarily carp in Britain seldom exceed 2 ft. in length or weigh more than about 9 lb. Yet on the Continent, where the fish is bred and fattened especially for the table, C. carpio sometimes attains a length of more than 3 ft. and a weight of up to 30 lb. Incompletely scaled and/or beautifully

Mirror of king carp
A fine specimen of the golden variety of carp known as Hi-go.

Anchored forms of this species, such as the mirror (Spiegel), or king, carp, the leather carp, and the red or yellow carp as due to oriental gourmets and fish-fanciers and popularly referred to by their Japanese name of hi-go (though bearing a Japanese name the fish are said to have been first developed in China), may be regarded as triumphs of the breeders' art. A few of these forms (the least decorated, of course) are eaten with relish on Fridays and feast days in many north or central European households; the more sensibly enough, are cultivated for their beauty alone and are sought after for stocking ornamental ponds and lakes.

Externally the most characteristic features of the common carp are a noticeably humped back, large scales, two pairs of barbels on the fleshy-lipped mouth, and a dorsal fin that rises about the middle of the body and extends almost to the tail. The colour varies greatly with age and locality, but generally it is drab-brown to greeny grey above, brassy on the flanks, and white in lining to yellow below. The fins are grey to brown flushed with red.

C. carpio attains sexual maturity in its third or fourth year and breeds as early as April and as late as June. In this it follows the pattern of most coarse fish. When the breeding season comes round, the gill covers of the potent male develop a slight rash of white blisters or tubercles, and the ova-loaded female shows, quite naturally, distended sides.

Countless adhesive eggs are extruded during vigorous pursuings and bumptings in the weedy shallows, and it is not uncommon for a single female to be driven by two or three males. It is said on good authority that up to 300,000 eggs can be laid at a spawning by a female not more than five years old. At a temperature of 60°F (16°C) to 68°F (20°C) quite a large proportion of these eggs hatch out within the space of a few days and the fry absorb the yolk sac and become free-swimming a day or two later. Thenceforward they live on infusorians until they are large enough to go after bulkier food.

Two or three young carp which, for the first few months of their lives, are of an attractive burnished bronze hue, make a worthy addition to any coldwater aquarium large enough to accommodate them in comfort and leave room for some growth. Unless there is something very exceptional about them or their conditions, they will stand quite a wide range of temperature without ill effects and accept any small live or dried food. When they reach an embarrassing size nothing suits them better than life in a well planted and correctly proportioned garden pond—that is to say a pond that is wide enough to absorb plenty of oxygen from the contacting air and deep enough (at least 2 feet) to give protection against winter’s freezing touch.
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.

Llanrhoch Deer Park

It is with some surprise that I read in an article by Mike Sheedy that Mr. Petrie of Llanrhoch Deer Park told him that he (Petrie) was responsible for the Aquarium at the Deer Park.

I would point out that it was I who, before Mr. Petrie took over, conceived, designed and indeed did most of the construction work on the Wine Cellar Aquarium. The only reason I protest against the statement is that as so many people who visit my own Aquarium in Rhyl know that I was responsible for the Llanrhoch Aquarium they are now asking questions about it. I might add that I have been responsible for the designing and running of a number of public Aquariums for the past twenty years, the present one has been running for the past eight years.

T. T. Williams, F.Z.S.
Dyserth, Flint.

Co-operation overcomes Disaster

On behalf of the Preston Bury A.S., I would like to convey through the medium of your magazine, my appreciation and admiration of the behaviour of exhibitors at our recent open show. Half way through benching, a large table collapsed, shooting tanks, jars, fish and water on to the floor. Everybody sprang into action, another table was found, spare jars appeared as if by magic, and in a miraculously short space of time, only the wet floor remained to indicate that anything out of the ordinary had occurred.

Not one murmur of complaint or criticism did I hear and I consider this a splendid example of the bond which so closely unites people who keep fish as a hobby.

T. Campbell,
Show Secretary.
Bury, Lancs.

A Problem Answered?

Referring to Mr. MacKinnon’s letter in the May issue, I have thought out and tried this variation.

I had an old 15 by 10 ins. sheet of glass I saved from an old tank which suited my requirements. My 24 by 12 ins. tank hood was just 10 ins. deep.

I then proceeded to make four aluminium brackets to fix to the hood. These were fixed by one set of nuts and bolts to each. The glass was then carefully slid in leaving two inches either side of the hood, for ventilation. In my view (no boasting) this is a neater but more expensive job than that of Mr. MacKinnon’s and still retains his advantages.

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

Here ventilation and cooling is no problem; the gaps left either side prevent (1) over heating, experienced by many, (2) the damage done by drops of water from the air stone. This is overcome by controlling the air stone in the middle of the tank, under the gravel or surrounded by plants.

I hope this is of some use to the person who wants something extra.

A. Gardner,
Chelmsford, Essex.

A Slight Clarification

The article on “Why not try marines?” in the May edition was, I feel, just what is needed, a simple straightforward guide to anybody starting on this most interesting branch of the hobby. Mr. Soanes clarifies the subject so that even the most inexperienced aquarist cannot fail to see the advantages of having a tank whose inmates cost little or nothing, with no electricity bills (save the sensor) and little trouble to maintain.

One or two points, however, are mentioned: firstly, that seaweeds cannot be grown under aquarium conditions and, secondly, that the common dog-wheel can be kept successfully. It has been stated categorically by several books on the subject that seaweeds cannot be grown, but this is in fact only partially correct as many species such as Ulva and certain other chlorophytes adapt to aquarium life quite successfully and I myself have kept them in native and tropical marine aquaria. Secondly, I believe Mr. Soanes mentions the fact that the dog-wheel live on algae, but I was under the impression that wheel: live on other modules, basically mussels, and did not eat algae. Could Mr. Soanes be confusing them with the winkles, all of which are vegetarian?

G. Jennings,
Hon. secretary, Marine Study Aquatic Society of Great Britain

Cure for Hydra

With reference to many articles in fish books dealing with Hydra and the difficulties of removing these pests once settled, brings me to tell of my own experience a few months back.

I had collected rather a lot of daphnia from natural sources. After feeding for a couple of days I noticed Hydra in all tanks and I was horrified. I rushed indoors, looked up all books and saw to my relief that they will not.
Cut off larger fish. I then noticed a lot of work was needed to clean this pest from my tanks, such as drying out for a couple of days or a potassium permanganate bath; so I left it for a week until I had time to do this.

When the time came I noticed five tanks previously having Hydra in were clear, while all other tanks were much worse. These tanks after a lot of comparison, I discovered, had only one difference, and that was my little young eating fish, the sucking loach. I believe it was (Gymnocyphus aequus) from Thailand, so these I transferred to the other tanks and left for two weeks. They were, after this time also clear from Hydra. I had no reason to reinfect my tanks with Hydra to experiment, as I was well satisfied with the results of my accidental infestation.

All I can say is I was very grateful to this fish for many hours saved on a heartbreaking job of taking tanks to pieces. I do hope this letter will be published as it may help many people to get rid of this pest.

B. L. WILKES.
 Orokonui, Middx.

Rust-proofing tanks

It was suggested that the following idea used by many in our Society would be of use and interest to other aquarists.

It involves the use of self-adhesive P.V.C. tape.

By lining the inside top angle and round the outside top of a frame, prior to glazing, this will reduce rusting by condensation to nil. The tape is sold under the name "Brash Tape." R. SYRNS.

Secretary, Boston and District A.S.

Aquarium Frames

Could you kindly insert the following in your 'Our Readers' column.

I thank all correspondents for their letters on my albino gourami which I still have in good health (with no more snails). Could any reader tell me of a firm that can supply aquarium frames in a reasonable time, i.e., 10-14 days after order?

I have tried all advertisers in Aquarium. One returned all after seven weeks; one delivered in nine weeks and still awaiting delivery from the third firm after six weeks. All were stock size frames which could have been sent by return. I think these firms are taking aquarists for a ride.

W. BOWMAN.

Referring to March "Aquarists' Notebook"

In reference to P. M. Fuller's article in the March issue of The Aquarist, regarding the Proteus Fish from Yugoslavia. Page 221, Aquarists' Notebook.

I think you will find that this is not a fish but an amphibian—probably Proteus aequus, cave salamander or olm (purely aquatic).

K. DOUGAL.
Romford, Essex.

EDITOR'S NOTE—This is most likely.

Java Moss

A friend of mine, Mr. Allen by name, receives your fine magazine. A little while back you featured an article on Java Moss, the very plant that I have been trying to procure from sources both in Canada and the United States, but to no avail. Would you please be so kind as to direct me to a source of this plant; it would be highly appreciated.

You no doubt have heard of the American Killifish Association, an organisation which I have the pleasure of belonging (I am on the present Board of Trustees). We at present are trying to locate a source of Java Moss, a most valuable plant in a killifish set-up, and would gladly attribute any credit due to you if this plant was secured.

Anxious to hear from you. Thank you for anything done on our behalf.

Rev. GUY M. CARRIE,
Sacred Heart Parish,
Box 83,
Chauvin, Alberta.
Canada.

Terrupins and Guppies

On reading Mr. G. W. Williams' letter in the February edition of The Aquarist on keeping terrupins in the tropical aquarium, I decided that I would like to try it. I kept the water in my 24 by 12 by 12 in. tank at 76°F and placed on the cover a small wooden raft. I then purchased two terrupins which I placed in the tank and then watched them swimming about the tank looking for food.

They feed greedily on raw meat, fish, small earthworms and dried flake.

About a week later I introduced a pair of guppies to the tank. At first the terrupins followed them suspiciously, but after a few days they settled down and since then the guppies have bred twice in the same tank. The young fish are growing quickly and healthily in a fry-survey.

ALAN LEADING (14).
Flamborough, Wakefield.

Care with Phenoxetol

I WOULD like to refer to the article on Fish Diseases by Mr. MacDonald—page 55 of your June issue. I may point out that it is cheaper and easier to use Liquisol than Phenoxetol as suggested by Mr. MacDonald. Liquisol is pure Phenoxetol and is produced in capsule form so that one capsule will treat four gallons of aquarium water to give a one in 10,000 solution which is approximately the strength recommended in the article.

I would also like to point out that it is extremely important to use a special grade of Phenoxetol since some grades contain free Phenol which can kill the fish.

ANNE CAMERON,
Foe The Liquisol Company Limited.
**Aphyosemion vexillifer**

by JACK HEMS

*Aphyosemion vexillifer (male)*

This species which, given the right conditions, breeds readily in captivity is, without doubt, among the showiest and most active of the oviparous cyprinodonts or killifish native to West Africa. In fact, no one could see a few specimens confining in a dealer's tank without purchasing a pair before leaving, or carrying away the memory of their lively charm.

The general appearance of the male is a beautiful blue-green darkening to blackish on the back and shading to pale green-yellow on the belly. Numerous red blotches, spots and streaky markings ornament the body from the head to the tail. Red spots on a blue-green ground add attraction to the banner-like dorsal fin. The green caudal fin has red spots in the centre, a red posterior margin, and bottom and top margins of red, or orange, with an outer lining of yellow, or white. A red stripe underlined with yellow extends along the bottom of the yellow anal fin. The paired fins are either greenish or ochre yellow in hue. Telling the sexes apart is not difficult; for the female is more brownish than green and the red markings that decorate her sides and fins are fewer in number and more subdued than those of the male. Normally, the male is larger than the female, and attains about 2½ in. in length.

Above all things that contribute to the fish's well-being (apart from a generous diet of live food and/or suitable substitutes) are soft, acid water (preferably over a post-darkened bottom), and a rather subdued light. Among the submerged plants suited to such an environment are Java moss (*Vesicularia dubyana*), stonewort (*Nostoc floccosum*), fry-leaved duckweed (*Lemna trisulca*) and Cryptocoryne spp. A temperature of about 75°F (24°C) suits the species best though, provided the change is neither rapid nor prolonged, a drop to 68°F (20°C) or a rise to 80°F (27°C) will do no harm. Another thing, although a pair of *A. vexillifer* will live in amity with other fishes (small, inoffensive ones, that is) it is better in every way to give them a tank to themselves. A tank measuring about 18 in. by 10 in. by 10 in. will suffice for a pair. It is important to ensure that the cover glass fits quite closely at the sides for the fish is an excellent jumper.

It is the custom of *A. vexillifer* kept in a tank to their liking to deposit tough-shelled, adhesive eggs in tangles of thicket of plants at irregular intervals throughout the year. Spawning usually takes place close to the floor of the aquarium and, though the female seemingly extrudes only one egg at a time, as many as a dozen or more may be laid daily for a week, or weeks, on end. Sometimes a pair may choose to spawn at, or near, the surface as well as near the floor below. It seems hardly necessary to add that the colours of the male literally glow when spawning is in progress.

As a rule, well-fed fish take little or no interest in their eggs or newly-hatched young, which appear after about sixteen days have passed. The two absolute essentials for raising the fry are clean conditions and frequent feedings of live food grading from *Infusoria* and brine shrimps up to the tiny thread-like worms. As the eggs of *A. vexillifer* are deposited on different days over a short or protracted period, it follows that the incubated fry vary considerably in size, and to prevent overcrowding and bullying or worse (gammarus is a common occurrence among a lot of different-sized fry) it is a good plan to remove the more robust-looking youngsters to fresh quarters every now and again. Another point to bear in mind is that the fewer fry left in the tank to tempt the parent fish the better.

Aquarists who are greedy for fry should remove the eggs daily to shaded jars of the right quality water maintained at spawning temperature. Any eggs that develop fungi must be removed as soon as noticed to prevent the organisms spreading to their neighbours. As the fry emerge they should be removed with the least possible delay to one of a series of small growing tanks. With proper care and attention, the fry reach a length of about an inch before six weeks are out. Maximum size should be attained in about six to nine months.
Lagenandra thwaitesii

L A G E N A N D R A thwaitesii, a swamp or bog plant indigenous to Ceylon, makes a highly attractive addition to the decorative tropical aquarium; for, like so many of its near allies the Cryptocoryne, it produces handsomely marked and extended lanceolate leaves which, provided there is no disturbance at the roots (an event that, though it will not damage the plant permanently, will lead to a rapid deterioration of the existing foliage), will last in full beauty for months on end.

At the start of their lives, that is to say when they unfold from the purplish stems, the leaves are bright grass-green. But as they age and increase in size, they darken to deep blue-green relieved by an irregular band of silvery grey along the crinkled-edged margins.

The essential requirements of this species are soft, acid water, a temperature above 70°F (21°C), and a rather subdued light. One other point worth noting is that it does ask for a bedding medium richer than grit or sand alone before it can be seen at its best. A most satisfactory mixture may be made from equal quantities (by volume) of moist peat, grit and dried and pulverized clay. Sufficient of this mixture should be placed in a glass or earthenware dish to half-cover the roots of the plant, after which a layer of grit or, better still, small gravel should be added to prevent the fish upturning the peat and clay.

Naturally, after the container has been introduced into the aquarium the plants that should be hidden from view behind a screen of smaller growing plants. (Sagittaria subulata and Vincularia dubia are well-suited to this purpose).

In the aquarium L. thwaitesii seldom exceeds a height of 10 ins., but taller specimens are common in the wild. Propagation is easily effected by dividing a large plant at the crown and planting each piece with a stem or two and some roots afloat.

The AQUARIST Crossword

Compiled by L. BRADLEY

CLUES ACROSS
1. Colix fasciata (9, 7).
4. Precious stone from Chile (3, 5).
9. Anthurium amoenum (4, 8).
12. A French term is within, but get one through it (7).
13. They are in the opposite of 21 down (5).
14. Much parent becomes moist (4).
16. One of (9).
20. One-eyed crocodile used as live food (7).
22. Sleep (7).
24. Broken due to removing a pot from 3 down and shifting the remains (6).
26. Red (9).
28. Lot twice shy (8).
29. Live fish food within the order of the Clidias (7).
31. Insipid (7).
32. Encephalitis来了 from Russia (9, 8).

CLUES DOWN
1. Atrium (5, squ.) (7).
2. He arrived on earth by helicoptoring medium (6).
3. Leave of barbatus (7).
4. Stain by each (7).
5. Leap to remove one hundred from 20 down (6).
6. Pteris (7).
10. There is country to the east for this anthurium (5).
11. Sovereign of the Philippines (7, 5).
13. An error (5).
15. Whisky (5).
16. Give credit to a Member of Parliament for producing this tool (X).
22. Beet the damus (8).
23. Briny region of waters (7).
25. It is on us, that burden (4).
36. 4th organ, 1st ionization (4).

Solution on page 84
Monthly reports from Secretaries of aquarists' societies for inclusion on this page should reach the Editor by the 12th of the month preceding the month of publication.

At the last three meetings of the Northwich and District A.S. junior boys have been chosen for Mr. Oldbury of Chester, Mr. Beale of Crewe and Mr. Millington, the secretary of the Chester A.S., who is to take over the junior section of the club. It was reported that the group was increasing in numbers and the increasing strain of fish keeping was being met by the initiation of the junior section.

The Northwich Society was greatly encouraged by the welcome it received from Mr. Oldbury and his friends to help it over its first few months.

Recently the Portsmouth A.S. broke on Record, Brighton, Bournemouth, Dumfries, Grampont (Ireland), Yeovil, Salisbury, and Southwark Aquarists' Societies, as an inter-club table show. The classes were: tench, chartruse, roach, perch, roach, rudd, tench, bug, chub, dace, catfish, barbel, and tench tail golden. Each club was invited to enter six entries in the show, and a plaque was awarded to the club with the highest number of points obtained. The outcomes were: 1st, Portsmouth A.S. 42 points, 2nd, Southwark A.S. 40 points, 3rd, Grampont A.S. 39 points, 4th, Dumfries A.S. 38 points, 5th, Yeovil 37 points, 6th, Salisbury A.S. 36 points, 7th, Brighton A.S. 35 points, 8th, Edinburgh A.S. 34 points, 9th, Colchester A.S. 33 points, 10th, London A.S. 32 points.

The recent Aquarist and Livebearer Society held its annual meeting in the presence of the right honourable gentleman, the Lord Mayor of London. The meeting was opened by Mr. E. R. Sheehan, who was introduced by Mr. G. W. P. Brown, who was elected Chairman. The following officers were chosen for the ensuing year as follows: Chairman, Mr. G. W. P. Brown; vice-chairman, Mr. A. Goodall; treasurer, Mr. R. T. B. Brown; secretary, Mr. A. T. G. Poole; and Miss J. A. D. Poole. The meeting adjourned.

The recent South London Section of the Fancy Fish Breeders Association held its annual general meeting in the new premises provided by Mr. J. H. P. Brown. The meeting was opened by Mr. J. H. P. Brown, who was then returned as chairman, and Mr. A. T. G. Poole as secretary. The following officers were chosen for the ensuing year as follows: Chairman, Mr. J. H. P. Brown; vice-chairman, Mr. D. R. B. Poole; secretary, Mr. A. T. G. Poole; treasurer, Mr. A. T. G. Poole; and Miss J. A. D. Poole. The meeting adjourned.

At the May meeting of the Valley A.S. Mr. B. S. H. Brown read a paper on species and varieties, and the society, which has yet to have its first open show, learned a great deal from a most informative talk. It was decided that a meeting and talk should be given some consideration in the future.

At the recent meeting of the Ascot and District A.S. the members listened to a most interesting lecture on the marine life of the British Isles, which was given by the Honorary Secretary, Mr. F. J. G. Brown. The lecture was given by the Honorary Secretary, Mr. F. J. G. Brown, and was received with great interest by the audience.

The Honorary Secretary, Mr. F. J. G. Brown, has been elected as a member of the British Association for the Advancement of Science, for his work in connexion with the subject of marine life. He has also been elected as a member of the Royal Society for the Advancement of Science, for his work in connexion with the subject of marine life.

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The March meeting of the Streod and District A.S., Mr. Isaac, a former chairman and manager of the Oxford Fishery, gave an illustrated and very informative talk on giant breed. In April the Society enjoyed a visit from Mr. Erskine of Oxford, an expert in aquatic and indoor plants, who gave members many useful tips about the growth and propagation of tropical plants. The Home Aquarium Association has recently been formed and the first meeting was held in the ruins of the old Abingdon Museum. The Society continues to meet on the first Monday of each month. A new society trophy, the "Chub" trophy, is being awarded to the best aquarium at each meeting. The first meeting was held last month, and was won by the "Chub" trophy, a fish named for its striking red and blue markings. The society has also introduced a new programme of talks, with topics ranging from the biology of tropical fish to the care and feeding of domestic pets. The next meeting will be held on the 2nd of May, and will feature a talk on the care of goldfish by Mr. T. A. H. Ford. The society has a growing list of members, and welcomes new members with open arms.

The new secretary of the Ribble Society is Mr. J. A. Pennington, who has been involved in the society for many years. He has taken on this role to help increase the visibility of the society and its activities. The society has a wealth of experience and knowledge to offer to its members, and is committed to promoting the interests of aquarists in the Ribble catchment area. Meetings are held on the first Tuesday of each month, and are open to all interested in the care and breeding of fish. The society is always looking for new members, and encourages anyone interested in aquatics to come along and see what they have to offer.

The annual meeting of the South-western Fish Society was held on the 1st of May, and was attended by many members and guests. The society has a long history, dating back to the 19th century, and has played a key role in the development of aquaculture in the region. The meeting included a talk on the history of the society, and a discussion on the current state of aquaculture in the area. The society also celebrated its 50th anniversary with a special dinner and awards ceremony.

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Mrs. Smith's 60th birthday and she would soon be restored to good health. The Chairman expressed the thanks of the Association for Mrs. Smith's outstanding work as Hon. Secretary. An inscription in her name was placed in the new Society's room. The meeting was adjourned.

It is intended in the immediate future to organise an A.C.A. inter-society knockout competition and a voluntary subscription of £2.00 from each of the societies was contributed to support this venture.

The next monthly meeting will be held on the 13th April at 7:30 p.m. in the Library, 2A, New Park Street, London. The Chairman reminded members of the Society's obligations to the B.S.A. and A.C.A. and the importance of supporting both these bodies in the near future.

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July, 1966
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