

The AQUARIST AND PONDKEEPER

Founded in 1924 as "The Amateur Aquarist"



THE HUTTS, HALF ACRE, BRENTFORD,
MIDDLESEX

Telephone: EALing 4703

PUBLISHED MONTHLY
SUBSCRIPTION RATES

The Aquarist will be sent post free for one year to
subscribers for £1 2s. 0d. Half-yearly 11s. 0d.
U.S.A. \$3.00 yearly; \$1.75 half-yearly.

QUERIES

Special replies are made to all specialised queries
submitted by a stamped, addressed envelope.
No reply is afforded only to registered readers and
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VOL. XXIII No. 2

1958

Editorial

AT this time of year many gardeners extend their activities to fish-keeping and aquarists their interest to the garden by the construction of garden ponds. It is not the best season for the task because in the pond this month should be intense biological activity, as plants and fishes finally break away from their winter torpor, whereas a pond started now will not be in a fit condition for planting and stocking for many weeks. One of the dangers of pond-making in spring and early summer lies in stocking the pond too soon, because the pond-builder feels that he must hasten to catch up with the pace of the season. Lime extruding from the fresh concrete into the water is the trouble-maker, of course, and the most satisfactory way of making sure that poisoning of the fishes does not result from this is to fill the pond and to change the water several times during some weeks after construction. This occasions a delay before stocking which tries the patience.

One way in which a temporary pond can be made and stocked all in a week-end, which might appeal to those who are impatient to have some fishes in the garden now and which could be useful to established-pond owners seeking temporary extra pond space, has been suggested in a recent issue of *The Aquarium Journal* (U.S.A.). The method employs polythene sheet as used for making "plastic bags"; this material is obtainable in large sheets and can be guaranteed to be sufficiently tough for the job since it has been used successfully to make quite large garden swimming pools. After the hole for the pond has been made sheet polythene is laid within it and folded at the corners to make a box-like lining capable of holding water. About one foot of sheet left at the top edges of the pond is anchored beneath heavy stones, which also provide a rockery edging, and the surrounding earth. Within practical bounds, the size of the pond made by this method is limited only by the size of the largest sheet of polythene available to you.

The New Vancouver Public Aquarium

by MURRAY A. NEWMAN, B.Sc., M.A. (*Curator of Vancouver Aquarium*)

VANCOUVER Public Aquarium is the first large public aquarium to be built in Canada. It is situated on a hill in Stanley Park looking out over Burrard Inlet toward the snow-capped mountains of the north shore. Surrounding it, beneath the great cedars of the park, are most of the modern zoo buildings: the otter pool, the aviary, the penguin compound, the mammal house and the pheasant cages. Nearby are monkey island and the children's zoo.

The Aquarium is a one-storey, concrete structure 145 ft. long by 99 ft. wide with an exterior made of moss-coloured cedar brightened by salmon-coloured panels beneath the windows. Built in modern style, it incorporates the better features of other North American public aquariums investigated during the 5 planning years which preceded actual construction.

It represents a joint project of the Canadian, British Columbian and Vancouver governments after a recommendation of the 1951 Massey report on arts, letters and sciences in which it was stated that a national aquarium was very much needed. Operation of the Aquarium is performed by the Vancouver Public Aquarium Association, now made up of some 1,000 members.

From the floor plan you can see the unusual arrangement of the public area which, instead of consisting of four straight walls, is broken up into bays. This is a distinct advantage in increasing the display area.

As you enter the Aquarium lobby you pass the sales counter, containing an extensive selection of books on tropical fishes, ichthyology and natural history. At the back of the lobby, illuminated by the skylight, is the alligator pool surrounded by tropical vegetation. Around the sides of the lobby are small tanks containing exhibits of amphibians, reptiles and also some unusual fishes such as electric catfish and mudskippers. These tanks are changed frequently and often contain special exhibits of particular

kinds of animals like catfish, members of the family Anabantidae, members of the family Cichlidae or examples of the various orders of reptiles.

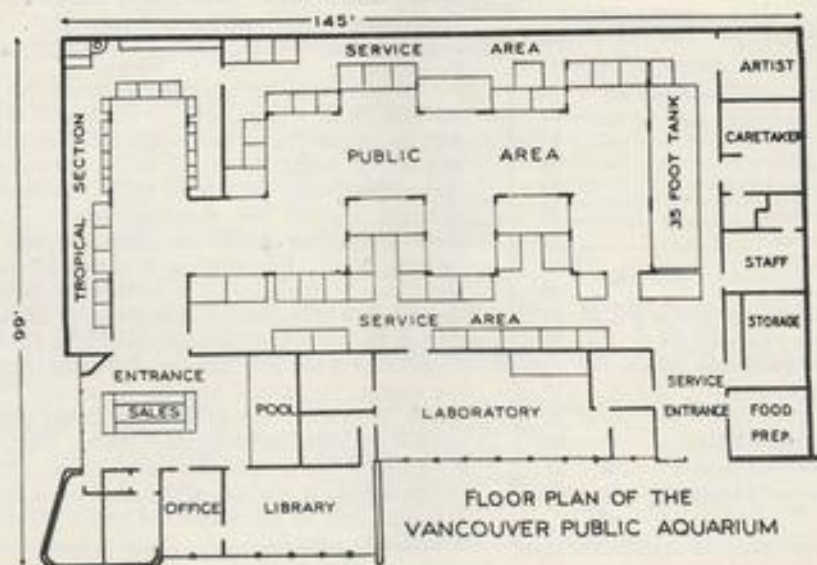
The primary displays consist of a battery of 25 small glass tanks and 33 large concrete tanks having capacities of 400 to 12,000 gallons. These tanks are divided into four main systems: tropical saltwater, tropical freshwater, cold freshwater and cold saltwater.

There are three 400 gallons tropical saltwater display tanks and two reserve tanks of the same size. These receive water from a closed system of 5,000 gallons capacity in which the water is maintained at 75° F. and continuously passed through a sand and gravel filter. The fishes exhibited in these tanks come from tropic seas around the world. Because of the direct flights from Honolulu, many come from Hawaii.

The small tropical-freshwater tanks are heated by individual electric heaters connected to thermostats which maintain the temperature between 75° and 85° F. The water is clarified by under-sand filters using air from a large compressor in the basement. As the water evaporates from these tanks it is replaced by preheated water piped from a thermostatically controlled 300 gallons reservoir in the work-space.

Tropical fishes are selected for display on the basis of different qualifications. It is important to have common species to show people who have had no experience in fish-keeping but who would like to commence the hobby. For this reason most of the basic tropicals like guppies, platys, swordtails, danios, gouramies and angel fish are shown from time to time. In contrast to the people who know nothing there are the aquarium experts who must be shown relatively rare species seldom possessed by individuals or at least highly prized by their owners.

Among the more valuable tropicals on exhibition are several large pompadours (*Symphysodon discus*), clown





Main public area of the Vancouver Aquarium, a view shows the way in which bays are formed by the arrangement of the tanks

leaches, neon tetras, arowana, large kissing gouramis and goby cichlids. Most important, perhaps, to this section of the Aquarium are fishes selected for their strange and unusual adaptations. Among these are archer fish, African lungfish, flesh-eating piranhas, electric catfish, knifefish, climbing perch, upside-down catfish, mouth-breeding cichlids and quite a few others.

The cold-freshwater displays are contained in seven concrete tanks, most of which receive a constant flow of water from the city main in an open system. All of this water is dechlorinated by a water purifier and filtered by a diatomaceous-earth filter. Since the city water comes from melting snow at the source of the Capilano River a few miles away, these tanks are never over 50° F. even in the summer. But this is an ideal temperature for the many salmonid fishes native to the region, including steelhead, Kamloop's trout, Dolly Varden, cut-throat trout and five species of Pacific salmon.

We have temporarily modified some of these tanks to provide different temperatures. One tank has a thermomatically regulated 1,500 watt immersion heater which maintains tropical temperatures in still water for two 3 ft. electric eels. Two other tanks are filled with non-circulating water which remains at room temperature, a more satisfactory condition for perch, sunfish and sturgeon. The latter would not eat anything while maintained in our cold circulating water but have thrived very nicely at 65° F. We have installed hand-made filters of various kinds in these non-circulating tanks with different degrees of success. Under-sand filters consisting of branching perforated plastic piping covered with sheets of glass wool and sand have worked quite well. The water is moved by compressed air in the same way as it is in small aquaria.

The most interesting exhibit that we have produced in freshwater has been the spawning of Pacific salmon. During

the autumn, salmon fill the rivers and streams of British Columbia as they migrate to their spawning ground. They are strange and magnificent creatures whose change in form from silvery oceanic fish to scissor-jawed humped adults is as striking as the metamorphosis of butterflies.

We provided a tank for salmon by temporarily converting a 15 ft. seawater tank into a freshwater one. The freshwater intake was connected to a perforated horizontal plastic pipe buried in the bottom gravel at one end of the tank. This provided adequate current stimulus for the ripe fish, most of which spawned satisfactorily. We found that salmon taken directly from the spawning ground consummated spawning more readily than did those taken during migration and held in the Aquarium.

The main display part of the Aquarium is the cold-salt-water section where fishes and marine life of the North Pacific are exhibited. The system of water supply for this section is a compromise between an open (constantly supplied from the sea and used only once) and closed (recirculated and used many times) system, water being pumped directly from Burrard Inlet five times a week, then recirculated over the week-end.

The actual mechanism of water intake is as follows: a 300 ft., 8 in. asbestos-cement pipe acts as a siphon from the lowest low-tide level to a sump in a pump-house at high-tide level; this water is then forced by two pumps about 1,150 ft. up a hill to the Aquarium building (elevation 130 ft.), where the water passes through a sand-and-gravel filter into three 50,000 gallon reservoirs in the basement. From the reservoirs three pumps circulate the seawater through the individual tanks, where it flows back through the filter to the reservoirs. The return flow is controlled by valves, such that when pumping from the sea the engineer can let the tanks overflow into drains going out of the building. Since all pipes and fittings are of polythene



Main entrance to the Vancouver Aquarium

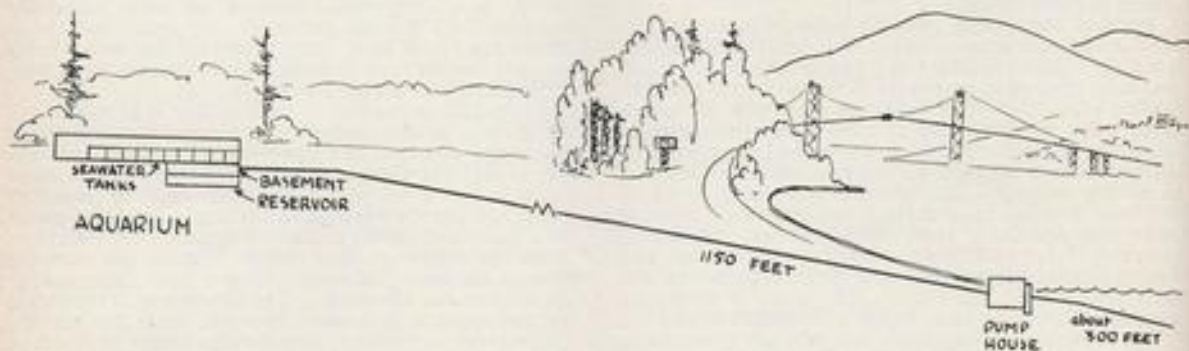
plastic, hard rubber, or asbestos-concrete, and since the pumps are lined with rubber, the seawater never makes contact with metals. This avoids the many problems of toxicity, electrolysis and corrosion resulting from the use of metals with saltwater.

The American North Pacific ocean is distinctly different from the American North Atlantic ocean and the animals within it require correspondingly different conditions in order to survive in captivity. The north Pacific is uniformly cold temperate with relatively little variation in temperature, and practically all of its marine organisms suffer when the temperature rises above 60° F. For this reason it is necessary either to refrigerate aquarium water or to pump from the sea often enough to keep it cool. The Vancouver Public Aquarium follows the latter course, because more forms can be exhibited with less danger of contamination if the water is frequently replaced. During the last year, however, it was found necessary to install a refrigeration

unit in one tank for octopus specimens, which are extremely intolerant of warmer temperatures.

Some zoogeographers believe that the North Pacific has remained uniform in temperature over a great expanse of geologic time and this enabled innumerable species to survive that might otherwise have perished during periods of climatic change. We find to-day that the North Pacific ocean is very rich in marine organisms of all kinds from seaweeds to fishes. Among the invertebrates which are commonly displayed in the Aquarium are anemones, sea pens, tritons, rock oysters, marine snails, mussels, octopuses, chitons, abalones, sea urchins, sea cucumbers, crinoids, starfish, tube worms and crabs of many kinds. The starfish fauna is particularly rich and exciting and there are almost always at least ten species on view in our tanks.

The most spectacular exhibit that we have had is the North Pacific octopus (*Octopus apollyon*). This octopus, which is one of the largest types, commonly weighs 50 lb.



or more and has a span from tip of tentacle to tip of opposite tentacle of 7 or 8 ft. Specimens weighing over 100 lb. are known. Its colour varies with its mood. When it is active it is generally bright red but when it is sleeping it is dull grey. During intermediate states of activity it may be mottled brown in colour. Actually it can change colour very rapidly and, when disturbed, waves of colour will pass over its body. At the present time there are five specimens on exhibition but because they are very aggressive toward each other only one can be kept in a tank. Once in a while they attack fishes but for the most part they leave them alone, eating only crabs.

The mail-checked or scorpaenoid fishes are particularly numerous in our waters and are conspicuous residents in the Aquarium. These include 21 species of rockfishes, 34 species of sculpins, 11 species of sea poachers, 14 species of lamp suckers, five species of greenling, sablefish and the lingcod. Many of these are quite small and we have attempted to arrange them in natural communities in various tanks. For example, one tank represents a scene between the tides on a rocky shore with the fishes found there. Many of these are sculpins. The lingcod is a conspicuous exception to the small size of the others and grows to a length of 5 or 6 ft.

In addition to the public displays, the Aquarium operates

research quarters which can be used by any qualified investigators who make application to the Vancouver Public Aquarium Association. There are four small rooms and one large laboratory. Basic facilities include work benches, sinks, glass aquaria, wooden holding tanks, culture tables and a large glass-fronted research tank. All of the scientific equipment now on hand such as microscopes, water still, colorimeter, pH meter and temperature-control equipment has been purchased through a grant from the Koerner Foundation.

Some of the studies in the laboratory have been very interesting. One was a comparative study of metabolic activity in flounders and sole. At the present time Dr. Edgar Black of the University of British Columbia is investigating the effects of exhaustion on the physiology of various species of marine fishes. Dr. Robert McLeod of the Federal Department of Fisheries' Technological Station is holding a large school of young steelhead trout and determining the changes which take place in the chemistry of their tissues as they grow.

The Aquarium has proved to be a place of interest and education for many visitors. In the 2 years since it opened about 800,000 persons have passed through its doors, toured its displays and watched with untiring excitement the fascinating world of aquatic life.

Mints for the Pondsides—and for the Aquarist

by JACK HEMS

THE pond surround can be made much more interesting, and deliciously fragrant, by sinking several old buckets or large tins into the ground close to the water's edge, and planting them with various species of mint (*Mentha*) which always do well in a moist environment.

The reason for planting them in containers is to keep them under control, for all the mints have the habit of spreading rapidly by runners and, unless kept in proper check, soon form a tangle of roots and stems where you do not want them to grow.

One of the loveliest of mints to grow is the bergamot mint or eau-de-Cologne mint (*M. citrata*). This mint grows about 18 inches high, and has rather rounded, dark-green heavily veined leaves coloured rich purple on the undersides. The species exudes a delicious scent of eau-de-Cologne when pinched between the fingers, or after a shower of rain, or even late at night, when the ground is moist with dew.

Although it is one of the ingredients of the liqueur *Cherry*, it is rarely used for culinary purposes. But the experimentalist in unusual flavours can use it with advantage in certain preserves such as apple jelly, and for giving a slightly scented flavour to custards.

The genuine peppermint (*M. piperita*) is another worthwhile mint. This species resembles the common garden mint (*M. arvensis*), but it has longer and more pointed leaves of a deeper shade of green. It gives off the unmistakable scent of peppermint, and a few leaves infused in a glass of hot water sweetened with sugar makes a pleasant drink. The leaves are also used in the preparation of mint julep, which is composed of whisky, ice, sugar and mint leaves.

The so-called apple-mint (*M. rotundifolia*) is the classic mint for serving with lamb. It has the flavour and the scent of apples, and its rounded leaves are greyish green in colour with a soft nap of silky hairs. It grows about 12 inches high.

For covering a patch of ground at the base of a rock, or right at the water's edge, there is nothing more delightful than the tiny, prostrate-growing *M. requienii*. This little gem has leaves smaller than those of *Helixine*, and when

pressed by the hand or trodden on, the strong scent of mint literally fills the air. About June or July it produces tiny lavender flowers. But all the mints produce flowers. Some, such as those of the species mentioned above, are quite decorative, usually lavender- or purple-coloured, small and borne in tight clusters around the spiky stems.

And for growing in the water itself, what a reward awaits the pondkeeper who plants the common water mint (*M. aquatica*), which not only scents the air in the immediate vicinity of the pond, but helps to keep the water sweet-smelling and pure.

DIRECTORY OF NATURAL HISTORY SOCIETIES

THE Council of the British Association for the Advancement of Science have decided, at the invitation and with the financial backing of Carnegie United Kingdom Trust, to undertake the publication of a new edition of the Directory of Natural History Societies, which was first published in 1948 by the Amateur Entomologists' Society. The Directory will cover archaeological, astronomical, biological, botanical, geographical, geological, meteorological and zoological societies—both national and local amateur bodies—and any other cognate societies which the Advisory Committee may feel should be included.

Over 3,000 questionnaires have so far been distributed, and it is hoped that any clubs or societies coming within the above terms of reference that have not yet received one will write to the editor, Dr. Averil Lysaght, c/o Bird Room, British Museum (Natural History), Cromwell Road, London, S.W.7, and ask for a copy.

The Carnegie Trust hopes that the directory will be as complete as possible since it wishes to encourage the work of local societies, and facilitate the co-operation between amateurs and professionals which can be so fruitful in advancing our understanding and appreciation of the world in which we live.

The Keyhole Cichlid

by JACK HEMS

IT is most unusual to recommend a cichlid for a community tank, but the keyhole fish (*Aequidens maronii*) from Guiana is so unlike the majority of cichlids in its behaviour, that once the species is kept in the aquarium the aquarist soon realises what he has been missing; for the fish is not only delightful to look at, but docile by nature.

No fishkeeper, of course, would think of keeping a full-grown *A. maronii* (the species reaches a length of between 5 and 6 inches) with small neon tetras or guppies and expect the fish to leave them unmolested, for any large fish, however docile by nature, regards all tiny fishes as live food provided for its nourishment. But placed with fishes of about its own size, *A. maronii* will not do them any harm.

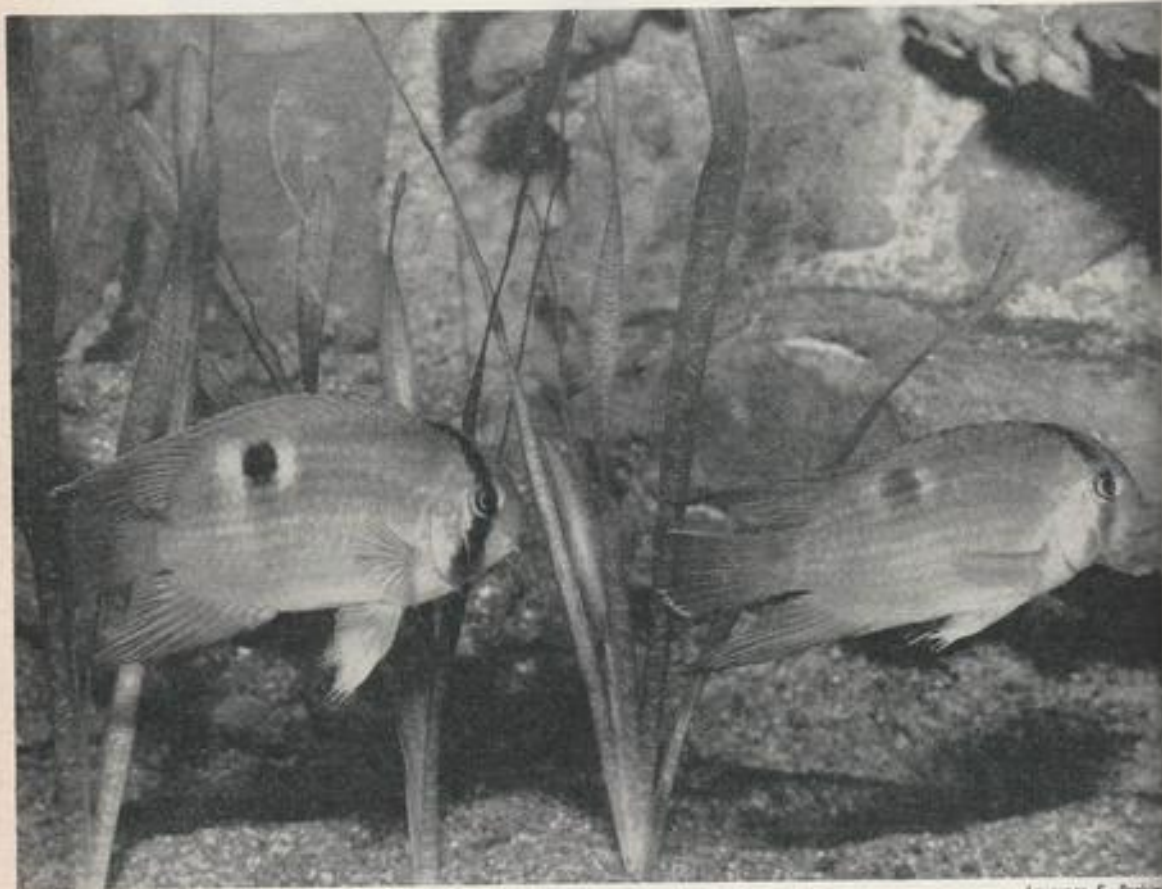
The general appearance of the keyhole cichlid is charming: olive to greyish beige with a curved black band extending from the crown of the head through the eye to the throat. The eye is black, encircled with gold with an inner rim of dark red. A dense black spot on a gold ground adorns the body high up on the side close to the

dorsal fin. A wedge-shaped marking, which sometimes becomes quite dark when the fish is excited, runs from the ocellated marking to the silvery-white underparts. This marking, topped by the dark blotch, gives the appearance of a keyhole, hence the fish's common name.

The major fins are hyaline, though the dorsal and anal fins in mature specimens have light-coloured edges. The pointed ventrals are tipped with white. In certain lights the side reflects a greenish hue, and there is a greenish blue sheen on the gill-cover.

The fish is extremely active and is all the while searching the plant life and floor of the aquarium for food. It seems to eat anything offered, and does well on dried food, though naturally it will grow more quickly and shows better colours when it is given frequent meals of finely chopped red meat and live food.

The breeding habits of the fish are typical of the cichlid group. The fish fans a depression in the sand to form a clean spawning ground, though sometimes it prefers to



Photos :

Pair of keyhole cichlids (*Aequidens maronii*)

Laurence E. Perkins

clean a flat surface such as a slab of stone or small portion of the aquarium glass on which to lay its eggs. When spawning is imminent it is advisable to remove all other fishes from the aquarium, for the protective instinct quickly asserts itself, and then the fish loses its normal docility and becomes offensive and markedly pugnacious to any fish which ventures too close to the spawning ground, eggs or fry.

The fish will breed at about 78° F. and the eggs take about 4 days to hatch out. The same time will elapse before the fry become free-swimming. Then they will need very fine food such as Infusoria, followed within a few days by micro worms, newly hatched mosquito larvae, brine shrimps or tiny *Daphnia*.

The parent fish keep a close watch over the fry and shepherd them about the aquarium. Sometimes it is wise to remove the parents from the tank soon after the eggs hatch out in case a sudden shock, such as a tap on the glass side of the aquarium or a passing shadow, un-nerves them sufficiently to start them off on an orgy of cannibalism. But generally speaking, the fish make excellent parents.

A. macrurus has been known to tropical aquarists for above 25 years, and it is something of a mystery why the fish has never achieved the popularity it so justly deserves. For it is less delicate than and not moody like that other mild-mannered cichlid *Cichlasoma festivum*, and it will live for a long time, say, upward of 6 years, if given sufficient swimming space in a clean aquarium. Another point in its favour is that it does not uproot plant life, except when feeding, nor does it chew choice plants to pieces.

The sexes may be distinguished by the richer colours of the male, and his longer and more pointed fins.



Typically cichlid in appearance, the keyhole cichlid is less pugnacious than its relations. The marking from which its common name is derived is only partly seen in this picture.

The Garden Pond in May by ASTILBES

THE garden pond should now come into its full state of beauty, with many plants making active growth and perhaps a few flower buds appearing on the water lilies. There should be little to do as far as looking after the plants so early in the year, as most water plants die down in the winter and make fresh growth as the water and the weather warm up somewhat.

There should be no need to prune or thin out any of the plants as yet. Some fresh planting may be done and any new subject added to the pond will usually make rapid growth at this time of the year. Where water lilies do not appear to thrive soon after having been introduced into a pond it is possible that the root-stock has been planted too deeply in the water. Even with those types which will eventually grow in 2 feet of water, it is a fact that when they are first planted the water should be lowered or else the root-stock raised so that only a little water is above the crown of the lily to begin with. As the new leaves appear the root may be lowered or more water added.

Any fresh oxygenating plants can be added and it is a good plan to make a small bunch of cuttings of these and then to wind some coarse string loosely round the lower stems and tie a large stone to this. Once the plants lie on the bottom they will soon send out roots and grow well. Do not try to tie pieces of lead strip to tender stems as you are likely to damage or break them, when they may not thrive. There is no need to overdo the oxygenating plants. They generally grow rather rapidly and may take up too much room in the water before long. After all, there is no need to plant too many oxygenating plants in a pond as the water will be kept well charged with oxygen from its contact with the air.

Goldfish in the pond may spawn during a fine spell, and unless special care has been taken it is probable that many of the eggs will be eaten; if not many fry will be devoured by

the parent fish if some protection is not available. If the pondkeeper does not wish to remove the eggs from the pond and hatch them under cover, then it is necessary to provide a shallow part of the pond fairly well planted with fine-leaved plants so that the fish will spawn there. All the goldfish types and many of the British freshwater fishes prefer to spawn in shallow water when this is available. The fishes seem to know that this shallow water will be warmer than the deeper water and so be better for the hatching of the eggs; also fishes will swim into very shallow water to spawn and then never swim in such water again. The eggs and fry are then far safer. I have seen fishes spawning on many occasions with their dorsal fins and sometimes half of their body out of the water when actually laying their eggs. The same fish would never swim in such shallow water when feeding normally.

When some ponds are built, a ledge is made at the sides so that very shallow water is always there for fishes to spawn in safety. There is always the chance that cats may catch fishes which are busy spawning in such shallow places. It is a good plan if possible when constructing such a pond to make a swamp garden adjoining it, as most cats do not like to walk through water to get near enough to the fishes to do any harm.

Many pondkeepers do not appear to know when their fish are spawning, and if fry are seen later on they evince real surprise. It may be that the fish have spawned early in the mornings and so have not been seen, but they usually keep it going for some hours. The early morning seems to be the favourite time, especially if the sun can shine on the pond for a time. What makes the fishes start to spawn on a particular morning is rather hard to explain. All sorts of theories have been put forward but of all that have been

(Please turn to page 32)

"Radioactive" Pond

by MICHAEL LORANT

A LAZY, sun-splotched pond complete with bulrushes, is the latest and most up-to-date laboratory tool of biologists, of the General Electric Co. in the United States, seeking to learn more about the effects of radiation on living things.

The pond is isolated in a corner of the vast Hanford atomic plant which the company operates near Richland, Washington, for the U.S. Atomic Energy Commission. Set up as a duplicate of ponds formed in nature by seepage and rainfall, the Hanford pond was recently "spiked" with an ingredient which will make it useful in determining the effects of radiation on two dozen different plants and animals living there.

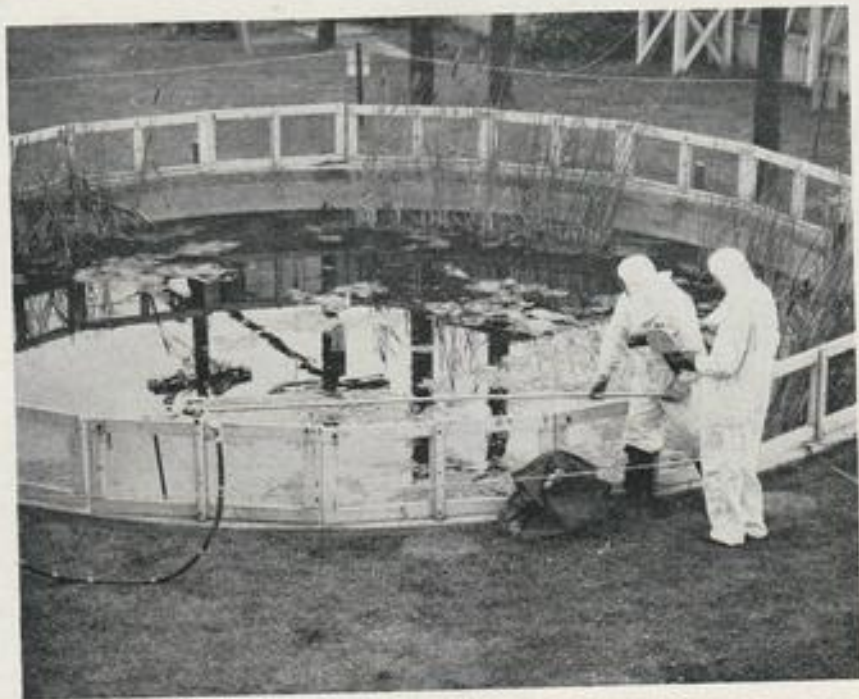
The ingredient was caesium-137, a radioactive element created by the fissioning of atoms within nuclear reactors. Because of its long half-life (in 30 years only half of it decays), it is one of the most troublesome of all fission products and is of major importance in the study of radioactive "fall-out." A dose of 200 millicuries of the isotope was carefully piped into the shallow, fenced, concrete-lined pond.

Of interest to biologists will be the effect of the caesium-137 on water insects, blue-gills, carp, tadpoles, frogs and other animals introduced several weeks before, when the complex, balanced aquatic community was first established.

(Please turn to page 33)



Samples of algae and water plants are gathered from the pond before radioactive material is added for comparison later with samples removed from the pond after treatment



General Electric Co. biologist Robert C. Pendleton carefully delivers the dose of radioactive material into the pond used for studies on the effects of radioactivity on aquatic life

AQUARIST'S Notebook

by

RAYMOND YATES



AQUARISTS are hobbyists for varying reasons. Some are interested only in breeding (and this means success), either in the thrill of success or the financial gain (if any). Others are collectors pure and simple and acquire new species just as stamp collectors look upon specimens. All have their likes and dislikes. There is no accounting for taste and it is hard to understand just why one man's fish is another man's poison. Of course, bitter experience and bad luck will turn most people against a species but what other factors militate against fishes so that an individual may be heard to say "I wouldn't have those things?"

Beauty, colour or size or temperament plays a big part. Some like brightly-coloured fishes, others cannot stand bull-headed or pugnacious types, others like fast-swimming specimens and dislike the fish who lurk for hours out of sight. Some have a fancy for the "quick on the feed" fish and others for the retiring type. Association with another hobbyist often turns us against fish although we do not realize it, and failure on a previous occasion to get anywhere with a particular variety often turns us against it in the future, only because we blame it for our failure.

I am always surprised when I hear people say "I loathe tiger barbs" or "No tiger barbs for me," or "Aren't gouramis ugly?" or "What a hideous fish!" Beauty is in the eye of the beholder and a true fish lover has only to stand for a few minutes alongside the most exotic set-up at the public aquarium to realize how few visitors see it as he does. By my own experience, I have found that 10 seconds is about the average time for viewing any tank, however worthy.

You could run a club night on "The fish I like least." Every member could fill in a card and pass these up and the results would surprise many there. For myself, I have a few aversion dislikes in the fishy world and frankly the ogre of them to me is the kissing gourami. I have tried but I cannot abide it. Others which make me shudder are the black morris, hatchets, *Anostomus*, moors, *Corydoras*, black sherry mollies, comb-tails, half-beaks, mouth-brooders, grey eels, bumble bees and puffers. In the main these fish either are or are faddy or are pests in a community tank. Whatever the reason they certainly put my back up. I have been trained from judging shows (and table shows) to look for all of no real concern, but every judge has his own likes and dislikes although he will never admit to any of the obvious reasons. I remember one who was always said to favour black-and-silver fishes, and others who have had their pet fads and aversions. Even if you own a dog there are some breeds you can't abide, although not why could not be explained. I never took to cocker spaniels or bulldogs; least of all, chows, and some people find them fascinating and an uncle of mine was a well-known breeder of the last-named two.

Fishes are not viewed so viciously, probably because they are so easy to come by. Most aquarists are ready to try all tropical plants although some disfavour those which make poor growth, fall easy victims to rot or chemicals or which the fishes disturb or which have spiky leaves.

Pompadour (*Symphysodon discus*) being what they are it is to be expected that the lucky owner carries them home from the dealer's shop with some trepidation. Arrived home, he uncorks his Thermos jar and recoils in horror to find the creature flat out on the bottom. Hurriedly he makes some pectoral movement and the fish is half-transported into its new home. Wonders never cease to be heard of after all and swims away quite oblivious

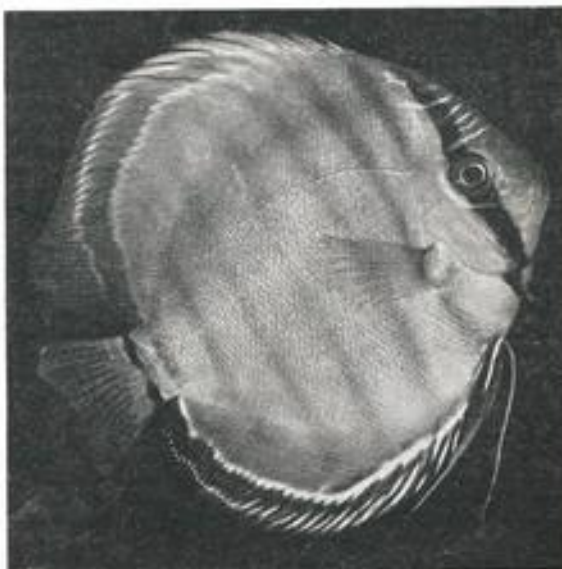


Photo:

Lawrence E. Perkins

Pompadour fish (Symphysodon discus)

of the panic it had caused. Most pompadours do this, a habit they have in travelling, guaranteed to upset their owner just as clown loach do on first acquaintance.

The main worry with pompadours is feeding, and the hobbyist is only likely to sleep well if his fish eats constantly. Actually these fish are hearty eaters and spend most of the time looking for food. However, they can be very aristocratic in the way they go about it and, conversely (if big), demonstrate impatient haste when their favourite food is put in. I find mine very tame indeed, almost finger-tame, and always there with a rush whenever the tank cover is lifted if food is about. You never can tell with pompadours: some days *Tubifex* is eagerly accepted, other days disdainfully refused. They have a wealth of contempt in the way they spit out anything not to their liking. Dried foods are quite popular if of the meaty (shrimp) type, as also are garden worms and white worms. Liver seems unattractive, as also is white fish. Salmon is snapped up with relish, and so are live *Daphnia*, but dried *Daphnia* is ignored. Greatest tit-bit of all with mine is boiled ham, possibly because it is also first choice with the two paradise fish which live in the same tank. Pompadours are not built by nature for haste in taking food, and they seem to be slow at catching anything falling from the surface. However, the bottom is well and truly gone over for left-overs and it is odd to watch the peculiar way in which these fish seem to blow food away when they want to get it. In a tank with faster fishes they are liable to miss the choice offerings, which are the prize of quicker, more alert fishes.

Small pompadours tend to move about quite a lot, particularly if an aerator is running, a circumstance they

seem to enjoy, but larger specimens tend to indulge in long, meditative rests in clumps of vegetation. They are not shy fish, nor are they easy to frighten. For them no headlong dash in angel fashion. They are most attractive when their heavy stripes are showing, which is fairly often. The eye stripe gives them some aspect of the keyhole cichlid. They do not molest other fishes or act as bullies or chasers, although they can act this way with each other in a most annoying way. Pompadours keep their attractive shape by keeping all finnage well spread and rarely close their dorsals as angels often do. Although they look so very different at first glance the body shape of large angels and pompadours is much the same without the finnage. Newly purchased specimens are best treated with care and kept at a high temperature (say 85° F.) until they have had time to acclimatise themselves thoroughly, after which they

can be lowered to normal tank temperatures.

I have seen it in print that these fish don't contract white spot, but this is just another old wives' tale. Like all cichlids they seem more immune than some other varieties, but can get it. Often the spots are not noticed on the sides of the fish unless it is seen end-on. Mercurochrome treatment does not seem to have any ill effect on them nor does it put them off their food, but aeration is advisable. Pompadours show caution and will not dispute food with large, roughneck fish. I think their rate of respiration should be watched; it rises with temperature, after heavy feeding and when aeration is discontinued. Presence of other lively fishes stimulates them, especially in feeding. When kept on their own they tend to get too sedate and too quiet, and perhaps this is why they become introspective and go off their food.

GARDEN POND IN MAY

(continued from page 29)

stated it is probable that the one which puts the amount of oxygen present in the water as the important factor is nearest the mark. It is rare for goldfish to spawn in water which is foul or lacking in oxygen. Where fish have been reluctant to start spawning the addition of a quantity of fresh water has immediately made the fish start to chase and spawn. It is possible for goldfish 1 year old to breed, especially if they were hatched fairly early the previous year.

Occasionally the male fish may be seen following a female fish around late in the evening. The following morning may see a commencement of actual spawning. The male fish chase the females and nudge them vigorously to encourage them to lay their eggs. More than one male may join in the chasing and the female will be pushed among the water weeds in the shallow part of the pond. Several of the fish may then lie motionless for a time on their sides and suddenly with a thrashing of tails the fish will splash through the weeds and some eggs will be laid. The chasing then goes on around the pond until the fishes once more enter the weeds, when the same process is repeated. When the eggs are first laid they are tiny transparent blobs of jelly and they adhere to the weeds. Soon after having been laid they increase in size to be about that of the head of the average pin. As the female lays the eggs the male fish spreads the milt which contains the thousands of sperms which enter and fertilise the eggs. In a vigorous spawning few eggs escape being fertilised.

The eggs may not show up very plainly whilst they are in the water but if some weed is lifted the eggs will be clearly seen as small slightly amber-coloured beads of jelly. Often whilst spawning is taking place those fish which are not actually engaged in the spawning will follow the others

around and eat many of the eggs. Where some fry are needed it is better to take out the plants bearing eggs so that they may be placed in a hatching tank or bowl.

Sometimes a female fish may be so exhausted by the persistent chasing that she lies on her side apparently in trouble. There is no need to worry, however, as such fish soon recover. The actual spawning is usually so vigorous that the splashing can be heard from a distance, and it should be quite apparent even to the uninitiated that something very unusual is happening. Fishes which generally swim about in a very leisurely fashion become so excited that they rush about as if mad and this can go on the whole morning.

After spawning it is a good plan to feed the fish with some chopped garden worms or give a little extra of their usual food. Where there is a fair amount of water plant life in a pond or if the pond is fairly large there may not be any need to give much food at all. There will always be something for the fishes to find among the plants and if too much artificial food is given the water may soon foul.



Photo:—

Lawrence E. Perkins

These small splinter-like bodies hanging vertically in the aquarium are goldfish fry, 2 days after hatching and pictured approximately life-size

Hemigrammus *pulcher*



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

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

SPECIES: *Hemigrammus*, from Greek *hemi*—half, and *gramme*—line; Latin *pulcher*—beautiful.

A YOUNG *Hemigrammus pulcher* (specific name pronounced as if the *ch* was a *k*) is easily distinguished from the many other characins commonly kept from time to time by innumerable aquarists, by a black wedge-shaped area on its body. The marking extends from just above the lateral line immediately below the last rays of the dorsal fin to the extreme edge of the caudal peduncle.

The old pulcher tends to lose the intensity of colour, the black fading to a dark grey, although keeping in ideal conditions helps to prolong its beauty and durability. Close examination reveals the presence on both sexes of a pair of tiny light areas behind the gills. There are brown tinges in the lower fins, and the dorsals are flecked with red. The fish grow to a maximum size (it is said) of not under 2 inches, although I have never seen them as large as this.

Inaccessible and not too shy, they form admirable members of a community of mixed fishes, although being of somewhat delicate appearance and colouring they tend to be overlooked among solid live-bearing types. Some aquarists say that fishes so greatly contrasting act as foils to each other; others agree with me that delicate, semi-translucent ones are far better kept among similar species. They certainly attract more attention when kept in this manner.

In spite of their appearance, however, pulchers are quite able to tolerate fluctuating temperatures, enjoying a range from 70° to 80° or even 85°F. Perhaps I should add a word of warning here. If the fishes you obtain have come from water kept more or less at a constant temperature, they will be unable at first to stand much variation.

Under such circumstances it would be wisest to subject them to no more than, say, a range of 5°F. variation for a week or so before increasing this to 10°, the fluctuation to take place every 24 hours. The softest fish can be hardened over a period, but the motto must be "Hasten slowly!"

Slightly acid water is preferred to alkaline or neutral. A layer of boiled granulated peat under the sandy compost will help in this direction. If covered by compost the peat will not spoil the beauty of a well-laid-out aquascape.

As soon as the fish are set up in their new home, begin to feed liberal supplies of small live foods such as new-born *Daphnia*, *Cyclops*, gnat larvae and pupae, small bloodworms, etc. On such a diet and with slightly raised conditions the fish should come rapidly into breeding condition. I am yet to be convinced that such natural foods are not the finest that can be given, although in some circles there seems to be agitation against them.

The fish scatter adhesive eggs among the plants, so the provision of fine-leaved varieties is a must if many are to be reared. It is wisest to remove the parents after the female has spawned.

Alternatively, temporary bundles of fine-leaved plants

can be placed in the aquarium to catch as many eggs as possible, with the idea of removing them to fresh aquaria when spawning is completed. Here again I must add a word of warning. It is not good enough to remove the egg-laden plants to fresh water unless the new environment is exactly the same as the old as far as temperature and pH is concerned. You may get away with it, but the chances are that you will not. I believe that many failures of hatching could probably be traced to too great a change of conditions from those obtaining in the spawning tank.

Other things being equal, the eggs should start hatching in from 36 to 48 hours from spawning. The fry are tiny and practically helpless. With a good light and a hand lens they may be observed hanging from the foliage.

A further 48 hours or so must elapse before they begin to move freely about the aquarium. They are shy and easily frightened, darting for cover on the slightest disturbance. At this stage the smallest of live foods (*Infusoria*) should be given, in adequate quantities, but not too much at a time to avoid a large surplus of food using up oxygen required by the fry, or alternatively dying and polluting the water. "Little and often" is the slogan to remember during this period.

Follow the *Infusoria* with *Cyclops* nauplii and any other food of similar size, such as brine shrimp. Start culling weakly, mis-shapen fry as soon as they are seen. This policy pays dividends in stronger and bigger, more shapely survivors, of which one can be justly proud.

“Radioactive” Pond

(continued from page 30)

During the course of the 8-months-long experiment, the animals, together with samples of algae and water plants, will be examined to find out what happens to them when they are exposed to a known amount of radioactive caesium. Some of the findings can be applied to other forms of life, including human beings. Some can be correlated with the possible effects of radioactive fall-out on aquatic life in ponds which dot woodlands and meadows throughout the United States. Some can be used to guide the release of liquid wastes from future atomic-power installations.

The study is part of a continuing programme instituted to determine and control the effects of Hanford's operation on the nearby Columbia river and the environs of the giant plutonium plant. It was planned and is being carried out by Robert C. Pendleton, a scientist in the company's biology operation.

Past work with such radioactive elements as iodine-131 and phosphorous-32 has gained for Hanford biologists and Hanford laboratories world-wide recognition in the field of radiobiology.

The Merry Minnow

by JOHN GRAHAM

WITH the arrival of early summer and, we hope, fine weather, our kiddies and very likely their aquarist parents too, will be out in the fields dabbling around the ponds and streams searching for the bountiful supply of natural treasure-trove to be found there. That bountiful supply is unfortunately on the decrease, for pollution and fouling of natural waters still seems to spread. On my journey into London from country my train regularly crosses a stream upon which I never fail to notice frothy rafts of white foam, presumably from some detergent which has entered the water. Nevertheless, one can still derive much pleasure from the search of pond and stream.

Among the several common fishes which one may expect to be brought home and put confidently into the family aquarium you may be sure there will be specimens of the common minnow (*Leuciscus phoxinus*). This lively little fish is usually found swimming in shoals in running waters with rather gravelly bottoms, for it likes clear water, but it does also turn up in more slowly moving waters, among them the Wey in Surrey. It is a greedy little fish and in consequence is very easy to catch with almost any bait, a small wriggling earthworm being very popular with junior fishermen. Because of its greediness it is sometimes a nuisance to the serious angler, who either continually loses bait or reels in a succession of minnows when he hoped for something more boastable!

The common name is derived from the Latin *minimus*, a name presumably left to us by the Romans, but in some parts of the country it is also known as "pink" in reference to the reddish flush which suffuses the male when in breeding livery. It is common throughout Europe and a similar species occurs in America. It is rare, however, in the North of Scotland and in Ireland appears only locally although plentifully when it does appear. The usual length is from 3 to 4 inches, but giants are known and Mr. Eagle Clark has recorded some which he caught in the Lake District which were 7 inches in length.

As previously indicated, the males in the breeding

season are very colourful and can be very splendid indeed. Normally the colouring is the usual fishy olive with a series of dark blotches upon the sides which disappear under the influence of fear or in ill-health.

Although in a state of nature the minnow prefers to swim in clear running water it will accommodate itself to the aquarium, but it must be acclimatised gently to the still tank water. The best plan is to have a trickle of water flowing steadily into your aquarium. This dribbling will make your captures quite happy and they will usually spend many hours playing in the current so produced. Feeding presents few problems as they will eat practically anything. In my own experience they show a preference for chopped earthworm, although small crustaceans and dried food are eagerly gobbled up.

They spawn in April and May and when free are very prolific breeders, as might be expected of a fish which is an important item of diet for all our carnivorous fishes. They are very difficult to breed in the aquarium, however, although I believe the process known as "stripping" has been performed successfully and the eggs hatched in about a week. In an article published some 20 years ago Mr. Arthur Derham described a method of breeding them which he had tried and which was partially successful. This involved the use of two tanks, one being used as a storage tank from which water was continuously pumped into the breeding tank and passed back through a siphon, thus simulating the running water of a stream. The tank was floored with gravel and some suitable plants and he recorded that he secured spawnings, the occurrence seeming to be influenced by the amount of light falling upon the tank. It seems, however, that he lost most of the fry through inability to cope with their prodigious appetites. I wonder if he has been more successful since?

Minnows, by the way, are edible and are said to eat quite well if prepared in the same way as whitebait. Izaak Walton offers an interesting recipe for minnow tansies, in which they are fried with the yolks of eggs and seasoned with the flowers of cowslips and primroses.

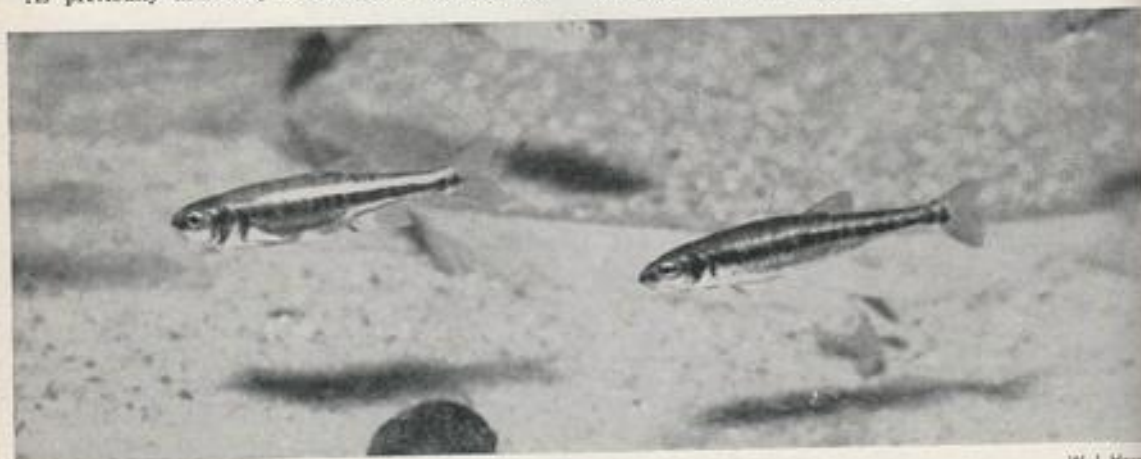


Photo:

Common minnow

W. J. Hewitt

Fancy Goldfish Breeding—15

by A. BOARDER

SOME advice on the exhibiting of fancy goldfish may be welcome to newcomers to the fascinating hobby of breeding and exhibiting. Unless a breeder is able to show his fish against others he is rather at a loss to know how good they are and how near they are to existing standards. Standards for all the recognised fish have been described in these articles already and so it is now necessary only to give details of procedure.

Unless a fish conforms to its particular standard it is of little use exhibiting it in a fairly large open show. A table show is the best place for the novice to make a start. This may save many disappointments and give him great assistance in picking out his best fish. One is always likely to miss a fault in a fish if one has seen the fish all its life, whereas another aquarist seeing it for the first time may spot a weakness in a moment. It would often save a lot of time and space if only those fish were shown at open shows which have done well at table shows. If an aquarist is living too far away from a club he should try to attend a few shows and study the particular classes which cater for his fish. He can then make an assessment of whether it is worth his time to exhibit or not. This is not the best way, as one is always inclined to imagine that one has better fish at home, and how often we hear this phrase!

Having made up your mind to exhibit, the conditioning of the fish will be the first task. I consider that this is much better than training. It is all very well to run a fish into a show tank now and then to get it used to it, but this can be overdone. When some types of fancy goldfish are over-trained they take the show tank so calmly that they can lie on the bottom as unconcerned as if they were in their ordinary tank at home.

On the other hand, if you can get your fish in the pink of condition they will be very active and show off their

feeding garden worms exclusively. I consider that it is better to give a fairly varied diet but I would recommend that at least a piece of worm should be given to each fish being conditioned every day. Of course, I do not suggest that other forms of live food are not very good. For instance, white worms, *Tubifex* and *Daphnia* all play their part. I think that *Daphnia* can be used to help keep a fish alert in a show tank. The idea is to put the fish in a show tank now and again and immediately add some *Daphnia*. The fish will then associate the fresh tank with a feed of *Daphnia* and will be alert and search around for them. This tends to keep the fish moving well when at the actual show.

A good packet food can be used as a main diet, not too much each day, and then vary this with occasional feeds of dried shrimp and Bemax. Other forms of wheat germ are equally good. Do not, however, give too much dried foods when conditioning a fish as they may make them lazy. See that the live foods are given at frequent intervals, and once a day at least one form of live food should be given. See that the show fish have plenty of space in their tanks. You will never keep exhibition fish in good condition for long if they are overcrowded in their tanks. Often exhibition fish can be kept in an outdoor pond for most of the time, when they are likely to keep in good condition. However, where such types as moors and veiltails are concerned it is safer to keep these under cover during the winter.

When examining schedules for shows make sure that you enter your fish in the correct classes. Do not enter a fantail in the class for any other variety of fancy goldfish when there is already a class for them in the show. Any goldfish other than a common goldfish is classed as a fancy goldfish. Send your entry form in so that it reaches the show secretary as soon as possible. When you take your fish to the show report to the show secretary and make sure that your fish go into the correct tank. Test the water in the show tank. The water may be much colder than in your carrying can. This can shock a fancy goldfish and put it right out of the running. If the water is not clear enough in the tank for you, get it changed; either get a steward to do it or with his permission do it yourself. No fish looks its best in cloudy water.

Be very careful when catching the fish from a pond or tank. Great care must be taken with the net or a fish can be damaged. A few scales missing may lose a fish a first prize. I am not too severe when judging fish with apparent damage which looks as if it was recently done. After all, the scales will soon grow or a split fin soon mend. On the other hand, no matter in what condition a fish may be, a fault in shape can never improve. I have always found it a good plan to take fairly large show specimens from the carrying can with the hand. An experienced handler can do less damage than can be done with a net. See that your fish is in the tank in good time for judging, but I do not favour an all-night wait if it can be avoided.

It is often difficult to catch a fish from a garden pond when one is needed for exhibition. A good plan to adopt is to feed the fish at the same spot in the pond every time. Near the time when a fish or two are needed for showing, immerse a good-sized net (a landing net is ideal) on the bottom of the pond where the fish are fed. After a day or so most of the fish will gather over the net at feeding time and when most are over it the net can be raised and the fish caught. If this method fails go to the pond at night with a strong torch. The fish can be seen much better then and are usually much more quiet.

Good luck with your breeding and exhibiting, and if you need any further advice—the queries section is there for your guidance.

Conditioning for Exhibition

shows far better than the fish which is so at home in the tank that it doesn't trouble to swim around at all. There are 20 points allotted for condition and deportment but the main point here is condition. I have yet to find many fish with good deportment if they are badly out of condition.

What must one look for in a well-conditioned fish? It must be bright of eye and active. Its colours should be as bright as possible and all its fins should be well extended. The dorsal fin is a grand indicator of health. As long as this is held quite erect and well spread there is little likely to be wrong with the condition of the fish. Fish which are actively engaged in exploring every corner of the tank will be much better in the show tank than the one which cannot be made to budge an inch even with the aid of a planting stick. I have seen many such fish when judging and there is nothing more irritating than to try to judge, say a fantail moor, which sits permanently on the bottom of the tank. One cannot see if the caudal fin is divided let alone whether the fish has paired anal fins. When this show tank has another on the top it is quite impossible to do anything about it. This may be why some fish do not win prizes when expected to do so by their proud owners.

Having emphasised how important condition of the fish is when exhibiting, it will be well to give some hints on how to get the show fish into this prime condition, which is half the battle. I can state without any doubt that garden worms are the best food for conditioning fancy goldfish. I have never known any harm come to a fish from being any amount of these. However, I do not believe in

Reed mace for the Pond Margin

by WILLIAM J. HOWES

THERE are two kinds of reed mace common in Britain, the great reed mace (*Typha latifolia*) and its slightly smaller relation, the lesser or narrow-leaved reed mace (*Typha angustifolia*). Reed mace is quite abundant in some places.

Both the reed maces have long sword-shaped leaves which may reach a height of some 7 ft. As the reed mace grows so it spreads into a big clump or bed and this may extend for some distance along the edge of a stream, river or at the margin of lake, pond or dyke.

The great reed mace is a very striking plant, growing from 3 to 17 ft. in height. Incidentally, it was once the practice of gypsies to use the long leaves and stalks of reed mace for making coarse but hard-wearing matting.

The flowers of the reed mace appear in July and August, and occasionally as late as September. They are quite long and of cylindrical shape. The lower part of the flower is thick and brown in colour and the upper part is thin and curved and of a yellowish colour. These flowers are borne at the end of tall very straight stems. According to local names they are sometimes known as black pokers and cat's tails. The reed mace is, however, far more commonly called the bulrush, although it is not really a bulrush at all.

The true bulrush (*Scirpus lacustris*) belongs to the sedge family. It is common enough, and it may also be seen

growing at the edges of ponds, streams, rivers and other waterways. Like the reed maces it is tall, reaching anything up to 8 ft. in height, and its flower is borne on a tall erect stem.

The great reed mace is rather a large plant for the average garden pool, but the lesser reed mace will be found quite suitable and it will grow and form a thick clump the same as the yellow flag iris does.

When collecting some reed-mace plants for transference to the pool, pick on some of the newer growth; the short young plants to be found at the fringe of the clump. But take care where you tread, for reed mace likes boggy conditions and you might easily sink to the knees in soft squelchy mud! As they are usually found growing in such wet conditions the number of plants required may simply be pulled up by hand without the aid of a fork or spade.

The reed mace needs plenty of moisture, so a bog garden or a similar very moist situation closely allied to the conditions prevailing in its native haunts is the best for it therefore. If you can offer it the right conditions it will thrive, and its tall erect stems and long narrow leaves will give an outstanding appearance. You can be sure that if it is given a position with consideration to the comparative heights of the other various species of plants, it will help give your pond and its margin that well-planted and attractively natural look.



Photo:

W. J. Howes

Reed mace growing at the edge of a small lake. This water-side plant gives a natural appearance to the larger garden pond

Microscopy for the Aquarist—40 by C. E. C. COLE

DID you pull off the head of the half-decomposed beetle, as recommended in my last article in this series? What happened? I expect a lot of you found that the head came off easily enough, but that after a short length of alimentary tract had followed there was slight resistance and the tract broke off. The piece pulled out seemed to terminate in a hard knob, dark in colour, as though the beetle had swallowed a small stone.

In fact, the "knob" was one of the most, if not the most, interesting of the beetle's internal organs, well worthy of close attention. Its correct name is the proventriculus. Its structure varies according to the genus of beetles and can be used, in conjunction with other features, to reduce the possible number of species amongst which you must seek for the true identity of the creature you are examining.

It terminates the fore-gut, so if it was at the end of the piece of alimentary canal you removed, you have left the two interesting mid- and hind-guts in the corpse. Not to worry! Let's make the most of what we have!

With a very fine needle it is possible to break open the proventriculus and carefully spread it out. It is better to do this while looking through a low-power lens, with a good light focused upon the object. Our microscope lamp is first-rate for the job. The light can still further be intensified

by using a condenser in a stand. Another needle can be used to hold the oesophagus (the part above the proventriculus) steady while breaking it open.

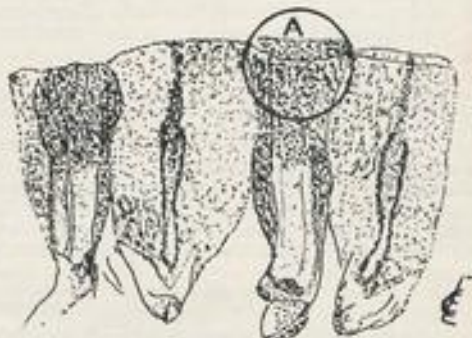
The operation should preferably be carried out upon a flat glass slip. Immediately it is completed, remove the slip to the microscope stage, and focus with your 2 in. objective and $\times 5$ eyepiece.

You will see that the proventriculus consists of eight distinct and separate lobes. Maybe tiny thorn-like teeth are visible on the lobes, maybe they are absent. Possibly the lobes are more or less circular, or appear very long like tall cones. The eight could be all practically the same size or every other one could be much smaller than its neighbours. Satisfied with a general view, use a higher magnification and focus a single lobe.

You can now examine the teeth, if they are present. They are on the larger lobes and are backwardly pointing. In a given species they are of similar shape, but differ between various genera. On the smaller lobes there will be strong, thorn-like hairs instead of teeth.

In some groups all the lobes are furnished with numerous close-set hairs, as in the diagram on this page of *Ilybius*. The proventriculus acts as a filter. Digestive juices are passed up from the mid-gut into the oesophagus, where

Internal organ of a water beetle as seen from the dorsal aspect

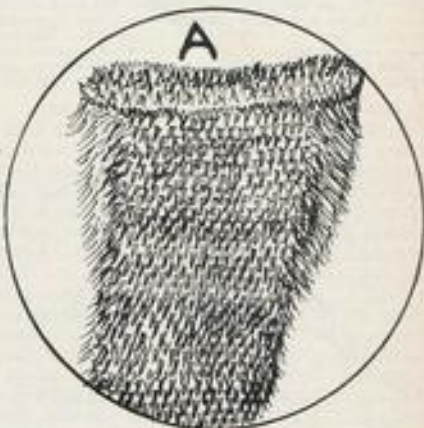


Part of proventriculus of *Ilybius* as seen with $\frac{1}{4}$ in. objective and $\times 5$ eyepiece



Removal of the internal organs of a water beetle allows them to be displayed in this way

Enlargement of part of the proventriculus of *Ilybius* drawn above ($\frac{1}{4}$ in. objective, $\times 5$ eyepiece)





Appearance of a small section of intestinal wall of a water beetle

digestion starts. The partly digested food already in the mid-gut would pass back into the oesophagus with the juices were it not for the proventriculus.

It is thought that the all-hair-covered lobes are more advanced (higher up the evolutionary scale) than the toothed lobes.

Catch another beetle and drop it into very hot water. Death is instantaneous. We now want to examine the

internal organs *in situ*—as they are in the animal when it is alive. From which side shall we work?

It is far better to start from the back, for here we have the elytra, which are comparatively easy to remove, exposing the soft, membranous flying wings. These, too, can be removed fairly simply, thus revealing the soft back of the insect. With a razor blade, or a fine-pointed needle, cut round the body where the soft skin fuses to the extremely hard abdominal chitin.

Remove the thin body wall with the point of a needle and the internal organs are revealed. The diagram gives some idea of how they will appear.

At the base of the abdomen we have exposed a blackish, bulbous organ, which feels hard to the point of the needle. Breaking into this, we find the aedeagus and parameres of male beetles, or the ovipositors of female beetles. All the neatly arranged tubes which lie revealed are connected with the sex organs, and can be unravelled with care without separating them from each other. When unravelled they appear somewhat as shown in the diagram.

OUR EXPERTS' ANSWERS TO TROPICAL AQUARIUM QUERIES

Please will you tell me how to kill the alkaline content present in some aquarium composts?

Place the aquarium compost in an earthenware vessel and pour a small amount of hydrochloric acid on to it. Stir it well with a stick. After an hour or so, pour in plenty of fresh water and swirl it round. Empty away. Then wash the sand well under running water before placing it in the aquarium.

Would any trouble develop if I place a pair of blue gouramies in my community aquarium containing a collection of small fishes?

Until the blue gourami attains a size of about 2½ inches it is perfectly safe in the aquarium, but as it develops into a much larger fish, as it will do if given proper food and sufficient space, it usually bullies other fishes away from food, and often attacks them. When it starts breeding, it becomes a positive danger to other species smaller than itself.

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.

What can I do to ensure a plentiful supply of earthworms in my garden? I find that earthworms make the ideal food for my collection of cichlids and large barbs.

If you sink a large wooden box in the ground and then fill it with plenty of rotting leaves, pieces of sacking and ordinary soil and tip spent tea leaves as they become available on the surface, you should always have a plentiful supply of this valuable live food. But make sure that the spot set aside for earthworm cultivation is always kept moist, particularly in dry, warm weather.

COLDWATER FISH-KEEPING QUERIES answered by A. BOARDER

I set up a coldwater aquarium last year, 18 in. by 10 in. by 10 in., and bought four goldfish and two shubunkins. In a short time four of them died; the two remaining ones are in good health. Now I have got three more goldfish but they don't seem very healthy, they have their dorsal fins down but seem to feed. I have sand in the tank with some water plants, snails, etc. The water from our mains comes through copper pipes, is this all right for fish? I feed with a packet food and ants' eggs.

You do not say how large your fish were. It is a strange thing but I have had hundreds of letters from readers who never fail to say how big their tanks are but never say how large are the fishes they intend to keep in them. This is the whole crux of the matter. Your tank will hold only about seven and a half inches of fish and even with the aid of aerator and filter more fish than this would not thrive, although they might keep alive longer. I expect that your fish were at least 2 inches in length and so the six represented 12 inches of fish, which is too much. As a rule some die off until the proper balance is arrived at, but why aquarists persist in trying to pack too many fish into a tank I do not know. Your water may be impure. Water containing even small traces of copper can be poisonous to fishes. Soft water supplied through copper pipes that are fairly new is more likely to be harmful than hard water or water collected after pipes have aged and have a coating

on their insides, say of lime deposit. Water taken directly from the tap before letting some run away would be more dangerous, as it has been in contact with the copper for longer. In most houses where copper pipes are used it is only for the internal plumbing that it is used. The feed pipe from the main is often of lead and is not copper at all; and so if an extra tap can be fitted to the lead-in pipe the copper can be by-passed. Why do you feed with ants' eggs? These as bought dry are actually the dried pupae, which have little food value. There are plenty of better foods advertised in *The Aquarist* every month. Stock your tank with 6 inches of fish only, and give no more food than can be cleared up in 5 minutes.

I have a female shubunkin which I purchased in 1947. It has spawned at times but I have never been able to rear the fry. Now the fish has developed what I think is swim-bladder trouble. It swims in a jerky fashion and sometimes rests with its head on the bottom of the tank, the body being upright. The fish seems to have developed a kink in the body. I have it in shallow water. Can I do anything else?

There is not much more you can do for your fish. When the season gets warmer the condition may improve. Your fish is no doubt very full of eggs and these are pressing on the swim bladder and causing some derangement. This

often happens with female fish which are getting on in years. Although your fish can live for 20 years, there is no doubt that once a female fancy goldfish gets over 10 years old it is rather prone to get small troubles during the winter. Often these clear up by themselves once the water warms up a bit. These fish do not seem to be unduly worried if they cannot keep their balance and I have even seen them upside down for long periods without seeming the least bit put out.

Should I set my plants singly or in groups in the tank?

Water plants always look better and much more natural when they are planted in small clumps. I consider that little looks worse than to have a number of single stems of plants stuck in at fairly regular intervals in the compost.

I am adapting a greenhouse for coldwater fishes and would like to know if there is anything I can use for base compost other than the prepared aquarium gravel?

If you require a quantity of the compost you can use washed river grit, sometimes referred to as "Thames washed sand." This is very sharp and of varying sizes, usually quite clean. I use a lot of this myself and find it very good, especially for topping up the old compost now and then. It is always well to give it an extra wash under the tap, but it is generally clean enough for use when supplied.

I have a coldwater tank with some types of goldfish in. I use ordinary aquarium gravel for the base but cannot get such plants as *Vallisneria* established. The goldfish keep pulling them up. What can I do about it?

I find that the best way is to place *Vallisneria* on the base of the tank and lay a small stone over the roots. This prevents the fishes from disturbing the plant and holds the roots down until they get a firm hold.

I have gravel at the base of my tank. Do you think it would be better to have some fine sand among it for the roots to get anchored in?

I consider that most plant roots need something finer among the coarse gravel. In time the mulm and droppings from the fish make this up. I am one of those aquarists who believe in using a little good potting compost at the back of the tank under the sand when setting up a tank for the first time. I am sure that this gives the plants a better chance to grow well before the benefits from the fish droppings have become available.

I notice that some of the gravel has gone black. What is the cause of this?

This may be due to decaying uneaten food. I notice that you feed dried *Daphnia* only as your staple diet. While not deprecating the use of this food I do not consider it to be enough by itself. I prefer to use other foods as well, which can be found in the usual packet foods or by using wheat germ and dried shrimp. Various live foods can be added as a treat.

One of my shubunkins swims most of the time at the surface with its body at an angle of 45 degrees. Is it unwell?

The shubunkin is certainly off colour if it stays in the position you describe for long. I suspect that your tank has not been set up for long and that you have been over-feeding or using the wrong foods or have over-crowded your fish or introduced them into the tank too soon, that is, before the plants were well established.

I have shortly to make a pond in my newly acquired garden. I have a number of shubunkins which I have kept in tanks for some years. I have never given them warmth and all the winter they have been fairly cold. Will it be all right for me to put the fish in the garden pond if I wait until the warmer weather? The fish

have become very tame. Do you think that they will be likely to fall prey to birds when in the pond?

I think that your fish will enjoy the move to the pond as long as you see that they are not put out into water which is much colder than their tank. Wait also until your water plants have grown up well and the water is matured. I do not think that you need worry about birds taking your fish. It would be a good idea, however, to almost cover the pond with duck weed until the plants such as water lilies grow up to give more shelter. Although the fish may be tame in their tanks it is probable that once they get in the pond they will soon lose most of this tameness and should not be taken by birds. The only birds you need fear in your garden are herons, kingfishers and sea-gulls. The nearer your pond is to your house the safer will it be from such predators.

I have a gas fire in the room where my coldwater tank stands; do you think that it will harm the fish? Also I would like to have a small-wattage lamp over the tank, but wonder if this will make the water too warm for the fish?

I do not think that the gas fire is likely to do any harm to the fish. Many gas fires have an outlet up a chimney to carry off any fumes. Where this is not done some people stand a bowl of water directly in front of the fire. A cover glass and hood to your tank would help to keep the top of the water pure. An electric lamp would warm up the water somewhat but this will not harm the fish; they will enjoy the extra warmth. My own coldwater tanks have two 25 watt lamps above them which are switched on occasionally, but they do not harm the fishes in any way. There is no need to have strong lamps, and if there are some holes in the back of the hood, excess of heat will escape.

I am about to set up a coldwater tank, 24 in. by 12 in. by 12 in. Which plants would be best and how many? How many fish could I safely keep and are catfish safe to be included with goldfish?

The best plants for your tank are: small clumps of *Egeria densa*; *Lagarosiphon major*; *Vallisneria spiralis*, var. *torta* and *Hygrophila polysperma*. There is no need to have too many plants for a start. If all goes well they will soon grow. The first two named are good for the back corners of the tank. As some of the stems grow they may be anchored down in a fresh spot with a small stone. New shoots will then spring up to clothe the tank well. Your tank will hold 12 inches of fish, but there is no need to have as many fish in the first place. The more room they have the better will they grow. Coldwater catfish can be placed with goldfish as scavengers, but as they grow to a large size they can become dangerous. A small tench would be better for your tank.

Cacti in the Fish House

CACTI which have had a good winter's rest should be watered with care in the early spring. Once new growth is seen the usual watering can be given. Never water a plant until the soil has dried out from the previous watering. Re-pot any plants which need it as soon as they start to grow. Old plants may not need re-potting for 2 years or more but young growing plants should be re-potted every year. Remove all the old soil and see that the fresh pot is clean. See that the potting soil is very porous. Cacti will not survive in soil which holds moisture too long. A suitable potting soil can be made with John Innes Potting Compost no. 1, to which has been added one-sixth of a part of washed river grit to increase its porosity.

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.

School in Need

MAY I ask, through your letters column, whether anyone with surplus fishes, plants, books, tanks, magazines or equipment, would like to offer them to me, for my school, either freely or very cheaply? This idea might commend itself to anyone who has lost interest in the hobby (!) or who has no longer the time, inclination or money to pursue it.

I could make a "collecting trip" to the London area if anyone would like to drop me a line.

D. N. WOOD,
Braughing C.P. School, Nr. Ware, Herts.

South African Request

I AM a comparatively new member of this Society and 6 months ago was allotted the job of arranging programmes for our monthly meetings, and while I have been able to provide lecturers and films for the last six meetings, I feel that I have possibly used up all available material in this town.

We appreciate that material availability covering tropical fishes in this country is difficult, and we wonder if you would care to put us in touch with a Society in England who may be able to assist with certain ideas.

We have considered purchasing colour films on tropical fishes from overseas, but unfortunately the duty makes the scheme very expensive. A thought is that possibly tape recordings of lectures would be available in England, in which case we could buy the recordings to play back at our local meetings.

We feel that probably some Society in England has similar problems to ourselves and we trust you will convey our thoughts to a Society from whom we look forward to a reply with interest.

A. J. MUTIGHEAD,
Eastern Province Aquarist Society,
P.O. Box 677, Port Elizabeth, South Africa.

Fuses for Heaters

I DO not know the wattage of the heaters used by Mr. Wightman (whose collection of aquaria was described in the January issue of *The Aquarist*), but I use safety fuses for my aquarium and have found that 1 amp. fuses for the heater are inadequate. I fitted a 1 amp. fuse for two 240 v, 25 w hood lights, a 2 amp. fuse for a 240 v, 150 w immersion heater and a 3 amp. fuse for the automatic base heaters. Had not these automatic base heaters been fitted to my aquarium I could have lost my fishes twice last winter. It seems that the line-side fuse warms up



write

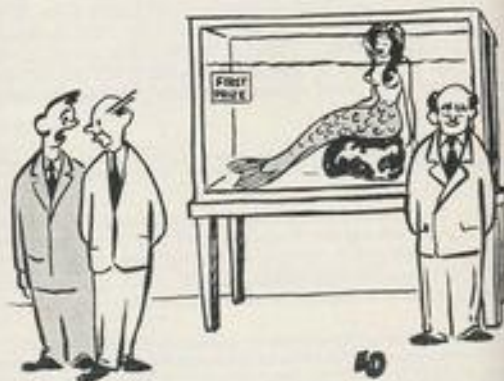
Address letters to The Editor, *The Aquarist*,
The Butts, Half Acre, Brentford, Middlesex

considerably and in a few weeks the fuse wire is reduced in diameter and finally breaks, causing the heater circuit to fail. I have modified the fuses as follows: 1 amp. for two 240 v, 25 w lamps, 3 amp. for one 240 v, 150 w heater and a 5 amp. for base heaters and all electrical installation. These are served by a 10 amp. power point. I have experienced no trouble since then.

J. MAYES,
Whetstone, London, N.20.

FINNY BUSINESS
by
LD

IC EXHIBITION



"Crafty blighter—said he was only showing an old flame of his"

How to Breed Grindal Worms

by K. SMITH

I FIND that many aquarists do not know how to breed this important live food successfully, so I will try to give a simple explanation of their propagation in the hope of saving them disappointment which I had at first when I tried my hand with them.

I use a wooden box measuring approximately 10 in. by 7 in. by 2½ in. (these being the inside dimensions). The thickness of the wood should be at least ½ in. because of the moisture absorbed from the medium, which should be kept wet all the time. The medium used is peat, which is placed in the box to within ½ in. from the top. A shallow depression is made in the centre and the culture introduced into this and then covered over.

The next important thing is the type of food used and I find the most suitable ones are the patent baby foods; the one I use is Farex. This is mixed with luke-warm water to a mushy consistency and a teaspoonful is placed on the peat over the culture. I then place a piece of glass cut to size directly on to the medium and cover the box with a piece of wood. The reason for the cover is that Grindal worms do not like light.

Temperature is the next important thing, which must be kept between 70° and 80° F., and for this reason I keep my culture in the cistern cupboard, which is both warm and dark. Do not give too much food until the culture is really starving and then only enough that will be consumed within 24 hours. Also, do not always feed in one spot; place small portions of food all over the surface. In this way the risk of souring the medium is lessened. When the culture really gets going, which should be within a week, you will be able to scrape with a razor blade sufficient worms from the under-surface of the glass to feed to your fishes.

It is possible to control the culture by cutting down the feeding and keeping the medium rather drier than is required. Do not let the medium become over-run with worms or they will start dying and foul your culture; harvest the worms regularly and throw them away if you do not require them. In this way you will keep the culture under control.

These are the three important factors: temperature (70°–80° F.); food (Farex, or similar food); wet medium.

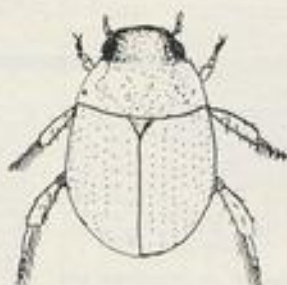
BOOK REVIEW

Tropical Aquarium Fishes in Colour by Gwynne Vevers.
H. F. & G. Witherby Ltd., London, W.C.1. 9s. 6d.

THIS recent addition to the hobbyist's library is a small book (roughly 7 in. by 4½ in.) written by the new curator of the Aquarium at the London Zoo. The book runs to just over 100 pages, 64 of which are given over entirely to colour illustrations of tropical (and semi-tropical) fishes, almost all life size. Where the male and female differ in coloration, both are shown. Altogether some 188 species are illustrated and the colours are as near perfect as possible in almost every case. Quite a number of the lesser-known fishes are included, such as the headstander, *Latesnila*, red-bellied dace, *Botia hymenophysa*, *Acanthopsis diamblychius*, croaking gourami, *Macropodus opercularis*, various sunfish and leaf fish and many others not usually depicted in colour. Each species has a short "write-up" which gives the more important known facts. Illustrations

FRIENDS & FOES No. 66

Water Beetles (*continued*)



Laccobius (X 7)

Coleoptera

CONTINUING our examination of and search for the smaller water beetles we come to a genus of very round beetles, found in clear static water or slow-running streams or both, consisting of seven known British species, some of which are rare.

Occasionally these members of the *Laccobius* genus (from Greek *lakkos*—lake and *bios*—life, living) climb out of the water and walk around on the banks. If caught when on one of their perambulations most people would take them for terrestrial species, but examination with a hand lens will reveal swimming hairs on the second and third pairs of legs.

Laccobius may frequently be found in garden pools, where they delight in crawling around among the vegetation. They make their presence obvious in a close-woven net by climbing up the sides away from the mess in the bottom. Like most beetles which are not mud dwellers, they object to being covered in it, and make vigorous attempts to get out of it.

Laccobius are members of the same family as the largest British water beetle, *Hydrotus piceus*, and the adult beetles are vegetarian. I have no evidence about the larvae—they may be carnivorous, herbivorous or omnivorous. I cannot imagine that they constitute any serious menace to either fishes or fry. They are of such a size, indeed, that unless distasteful to fishes they might well comprise an occasional tit-bit in their diet.

C. E. C. Cole

of the scalare and Eimeke angel fish are shown side by side. The author suggests that the differences are difficult to define but mentions that the scalare is the more nervous, up to 2 inches larger, is lighter in markings and does not have the slight indentation in the head shown by the Eimeke. In a short preface it is mentioned that the object of the book is to make it possible for those interested in aquaria to identify fishes which come their way, and the 225 coloured illustrations given will certainly prove most helpful to many newcomers to the hobby who lack facilities to see actual fishes in public aquaria, dealers' shops or at shows.

RAYMOND YATES.

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.

DURING the discussion on progress at the annual meeting of the **Dublin Society of Aquarists** it was acknowledged that the membership was very steady, including a number of former members who had come back to the hobby. The financial position was also satisfactory. Recent events have included a competition with Leinster and talks by breeders. The Secretary is Mrs. H. Spurling Jewell, 89, Walkinstown Road, Dublin.

RECENT meetings of the **Brockley and District Breeders Circle** have included a table show of Characins at which no prizes were awarded, members bringing fish along "just for fun." A discussion on the merits of the fish exhibited and points to be looked for when choosing a characin for exhibiting was held with the visiting judge. One meeting was devoted to geology, a talk illustrated by maps and samples loaned by the South London Field Studies Society being given. Suitable rocks for aquaria were shown, and the maps illustrated points where attractive rocks could be found and also where it might be expected to find various limestones. A simple test for suitability was mentioned. Breeding successes notified so far this year are various livebearers, fighters, white clouds, nigger barbs, braccos, glowlights, flames, leerts, rosacrus.

A TALK given by Mrs. Meadows on "Breeding Egglayers" was the highlight at the **Medway Aquarists Society** meeting and members found this extremely interesting and helpful. The meetings are held on the second and fourth Wednesday of the month at Henderson House, New Road, Rochester.

RECENT events in the programme of the **Bristol Aquarist Society** have been the annual dinner and the usual monthly meeting. Mr. Littleton, of the Bristol Tropical Fish Club and Bristol Tropical Study Group, was the speaker at the meeting and he gave a talk on the Show Standards of the Swordtails and Platys, also on the breeding and correct feeding of livebearers. He also mentioned that he found a good spawning medium was 100% nylon wool wound round a 4 in. piece of card; one side of the wool is cut with scissors and weighted with lead to form a small clump for the fish to deposit eggs. The annual open show will be held on the 31st October to the 1st November at the Bishopston Parish Hall. The Show Secretary is Mr. V. Capaldi, 18, Glen Park, St. George, Bristol, 5.

AT a meeting of **Yeovil and District Aquarist Society** Mr. Katrinsky, aquarium and house plant specialist, gave a talk and showed slides of over 100 different plants which he had grown in his London home. He gave members useful advice on how to grow the plants in their aquariums to the fullest advantage.

AN exhibition is being held by the **Macclesfield Aquarist Society** on the 11th and 12th July in association with the National Cactus and Succulent Society. This is the seventh annual event and will include fishes of good quality and variety. Enquiries will be welcomed by Mr. H. F. Cox, 24, Boynton Road, Macclesfield. Telephone 4156.

AT the assembly of **The North West London Group of Aquarists Societies**, Mr. P. W.

Meyer announced his resignation as Competition Secretary for business reasons.

The delegates of the six clubs in this Group expressed their regrets at losing such an able Competition Secretary but after passing a vote of thanks for all the work he had done for this Group, they unanimously elected him as the first Chairman of the N.W.L.G.A.S. Mr. E. H. Mann was then elected as Competitions Secretary.

Result of Competition Programme for 1957-58 was as follows: Hendon 90 pts., Willesden 64 pts., Independent 34 pts., Harrow 31 pts., Hampstead 28 pts., Arnold 24 pts. The Hendon and District Aquarist Society have thus won the N.W.L.G.A.S. Shield for the second successive year.

If any aquarists in the North West London area are interested in joining one of the clubs in this group Mr. E. H. Mann, Competition Secretary, 63, Whitechurch Avenue, Edgware, Middlesex, will be pleased to supply full particulars.

THOSE interested in joining the **Merseyside Aquarist Society** may obtain a copy of the Society's monthly Bulletin on application to Mr. B. T. Roe, Secretary, 9, Westway, Liverpool, 15. This will also be sent to other interested aquarists on application. At the last meeting one of the members, Mr. L. Connell, gave a lecture on "Making the Most of the Hobby" and a talk was also given by Mr. L. Colvin on Catfish. The Society meets every other Thursday in the Grenville Cafe, Tithebarn Street, Liverpool, 2.

AT the last meeting of **Sunderland and District Aquarists' Club** a lecture was given by Mr. H. Perkins, a biologist of Durham School. His subject, "The Cycle of Life in Freshwater," included a talk on *Daphnia*.

FUTURE meetings of the **Dunstable and District Aquarists' Society** will be held at Chew's Hall. Recent activities have included talks by Mrs. W. Meadows and Mr. Russell-Holland.

DATES for table shows of the **Guildford and District Aquarists' Club** have been fixed for 14th May, 9th July and 10th September, and North Hants. and Redhill clubs are being invited to participate in the July and September shows. Recent events have included an illustrated talk on plants by Mr. F. C. Katrinsky, a well-known authority on this subject.

THERE was a good entry at the table show of the **Middleton and District Aquarists' Society**. The judge was Mr. McDowell of Salford A.S. A quiz formed part of the evening meeting and was keenly contested.

SOCIETIES interested in an Association of Yorkshire Aquarists are invited to communicate with Mr. R. Winterburn, 15, Woodhall Place, Thornbury, Bradford, 3. Objects of the formation are to promote closer liaison between Societies, encourage more inter-Society visits, and foster the hobby of fishkeeping.

THE eighth annual show of **Accrington and District Aquarist Society** is to be held on the 6th and 7th September at the Town Hall, Accrington. Particulars and schedules may be obtained from show secretary, Mr. K. Ingham, 76, Westwood Street, Accrington.

NEARLY 40 were present at a film show given by the **Paignton Aquarists' Society**. Included in this number were some members of the Torquay Society.

A SUCCESSFUL year is reported from the **Folkestone Aquarist Society** with an increase in membership and attendances at the meetings. The new president is Mr. L. G. Bokin, and Mr. Pücher (chairman), Mr. W. G. Rees (secretary) and Mrs. M. Bokin (treasurer) were returned to office. The meetings continue to be held at 62, Tontine Street, Folkestone, on the second Thursday in each month and the secretary is Mr. W. G. Rees, 32, Windmill Street, Hythe, Kent.

THE dinner and dance of the **Riverside Aquarium Society** (Hammer-smith), which was held recently, proved a great success. Future events include table shows for barbs and coldwater fish and also a visit to Jannans Aquarium, Redhill, during May.

RECENT developments in the **British Aquarists' Study Society** have been the formation of a technical committee, consisting of Messrs. R. Mealand, P. B. Urton, H. Russell Holland and A. Cooper (secretary). Also, two informal area meetings have been held, one at Southampton and the other at Surbiton, both being well attended and successful. It is hoped to arrange similar meetings in other areas soon. A lecture is to be given to the Society in the near future by Dr. F. N. Ghadially and the annual conference will be held in October.

THE annual show of the **East London Aquarist and Pondkeepers' Association** will be held at the London Co-operative Society Hall, 201, Ilford Lane, Ilford. The show will be held on Saturday, 29th September, and schedules are available from the show secretary, Mr. J. Bryden, 22, Kingston Road, Ilford.

BREEDING and feeding fishes were discussed by Mr. Foden at the recent meeting of **Bradford and District Aquarists' Society**. On 7th May, Mr. M. Watson, B.Sc. will address the Society and on the 4th June there is a quiz with the Leeds Society at Leeds.

AT the Spring meeting of the **Carassius Club** the topic was fancy goldfish breeding and the necessary live foods for success. The giant water lily, *Victoria amazonica*, being grown from seed, is proving successful. Until further notice meetings will be held at 125a, Haslemere Road, Southsea.

WE understand that in response to the appeal by Hellingley Hospital, Hailsham, which appeared in *The Aquarist* for February, that **Bexhill and District Aquatic Society** are assisting in the installation of two aquariums and further assistance will be forthcoming should these be a success. Mr. P. H. Smith is making a return visit in May to lecture to the Society. A Bexhill Grammar School teacher, Mr. Smith, recently gave an illustrated talk on the digestive system of fishes.

THE open show of the **Leeds and District Aquarist Society** will be held on the 16th-20th September. There are generous prizes and schedules will be sent to Society secretaries. Individuals interested can also apply to the secretary, Mr. L. Grimshaw, 28a, Dawlish Road, York Road, Leeds, 9.

THE new headquarters of the **Riverside Aquarium Society** (Hammer-smith) are now at the "Hampshire Hog," King Street, Hammer-smith, London, W.6. The hon. secretary is Mr. T. Thewless, "White Building," Barley Mow Passage, Chiswick, W.4.

A BEGINNER'S Night was held by the **Portsmouth Aquarists' Club** recently and was well attended. Talks were given on the Basic Principles of Fishkeeping by Messrs. Diverson, Gauntlett, Handcox and Nichols. During the evening, Mr. A. Taylor was presented with the Tropical Points Trophy and Mr. F. Lush with the Coldwater Points Trophy. Table shows will be started on the 5th May.

Illustrated talk was given by Mr. J. Wheeler at the monthly meeting of the Bath Aquarists' Society. His topics included the setting up of an aquarium, plants, stocking and foods, an always popular subject as there always appears something to be learned from the variety of experiences from other aquarists' experiences.

At the annual general meeting of the Chester and District Aquarist Society, the following officers were re-elected:—President, Mr. G. S. Thompson; vice-president, Miss G. A. Oldbury; chairman, Mr. F. Oldbury; secretary, Mr. J. A. Bowyer; treasurer, Mr. G. S. Thompson. The previous year had been a good one with many interesting meetings, a good show and financially stable. The new year's programme is laid out and anyone interested is invited to the meetings at 46, Upper Northgate Street, on the second Thursday in each month.

At the last evening meeting of the West and District Aquarists' and Pondkeepers' Society were a table show of fighters which was won by Mr. Parsons, and of promotion won by Mr. Thomas. There was also an auction sale.

At the annual meeting of the Mansfield and District Aquarist Society were as follows: Chairman, Mr. E. Thompson; vice-chairman, Mr. F. Drew; secretary and treasurer, Mr. R. L. Firmin (12 West Road, Lowestoft). The retiring chairman, Mr. E. Chapman, expressed his thanks for the assistance of the committee and members, and following the election of officers a discussion was held regarding the forthcoming programme for the year.

At the Kingston and District Aquarist Society gave information of an inter-club table show at the Clapham Aquarists' Society. At the time of going to press, Clapham had won the table with 800 points to 940 points. Other club interest has been a talk by Mr. J. Brown and a feature of native coldwater fish.

At the annual meeting of the Chester Aquarist Club at the annual general meeting, Mr. Ken Allen succeeded Mr. Ken Allen. During a year of some difficulty, Mr. Allen really commenced on the full week's show of tropical and coldwater fish in the foyer of a large cinema in the summer, which was open to the public. Mr. J. Cook, of 36, Buller Street, was re-elected secretary, Mr. J. Cook, treasurer, and Mr. H. P. Finch, secretary.

At the Coventry Pool and Aquarium Society, a large and enthusiastic audience, including members of the Rugby, Nuneaton and Leamington Societies, heard Dr. Goadby describe his experiences in breeding the common Dr. Ghadially illustrated his notes with his films on breeding the brown snake eels and tiger barbs.

At the monthly table show for A.V. livebearers at the home of Miss N. Barnett with a red play. The show was made on planning and stocking a tank on the grounds of a local Occupational Centre for Backward Children. The Society has many tanks in most of the local schools and homes but never refuse when asked to make.

At the table show for barbs, danios and minnows at the monthly meeting of the Mansfield and District Aquarists' Society, Mr. J. Bond won first, second and third, and third was won by Mrs. B. Bond. The table was Mr. N. E. Lyon.

Answers to questions were answered in a panel discussion "Who are the experts," the panel consisting of Messrs. Berlin, Malpas, Lyon and others, with Mr. G. Twissell as chairman.

North-East Federation of Aquarist Societies

It is announced that a new Federation has been formed comprising the following Societies:—North-East Tyne and District, Tyneside

Aquatic and Biological, Newcastle Guppy Breeders, Middlesbrough and District Aquarists, Peterlee Aquarists, Sunderland and District Aquarists. The secretary of this Federation is Mr. T. Pearson, 31, Sydenham Terrace, Sunderland, and he is also the secretary of the Sunderland and District Aquarists' Club. The chairman is Mr. R. Brown, of Newcastle. It is hoped that through the Federation, speakers and judges may become available, exchanges of fish to strengthen breeding stocks will be possible and that a wider and better selection of programmes will be open for club members. Aquarist Societies in the north-east who are interested are invited to write to Mr. T. Pearson.

Suggested New Coldwater Club

Coldwater enthusiasts will soon be given an opportunity to form a club in the south London area.

This information was released after representatives of the Goldfish Society of Great Britain and of the Association of South London Aquarist Societies met on 31st March.

To ensure the maximum facilities for the members, included in the subscription will be the annual subscription to the G.S.G.B. In this way members will automatically become Associate Members of the G.S.G.B., entitled to participate in all its activities (including meetings should they so desire). The Goldfish Society will treat the club meetings as G.S.G.B. meetings—providing speakers, fish and all other services as required.

All interested aquarists are cordially invited to attend the inaugural meeting on 16th May at 8 p.m.—to be held in the Sutton Adult School, Benhill Avenue, Sutton, Surrey. The G.S.G.B. committee will be present in force. For further details apply to A.S.L.A.S. secretary, Mr. S. Davies, 16, Milton Road, Wallington, Surrey, or G.S.G.B. secretary, Mr. O. D. Taylor, 166, Kings Court, London, W.6.

Goldfish Society of Great Britain

At the first quarterly meeting of the above Society it was proposed to hold a combined Summer Show and an "At Home" in July. Capt. Betts had kindly placed his grounds at the Society's disposal and the committee were already working on the details. The inaugural meeting of the Junior Section is to be held at the new Parish Hall, Sussex Place, Hammersmith, on 30th May at 6.30 p.m., and the support of members was requested by bringing along suitable candidates for membership. The table show for adult singletails competing for the Upchurch Trophy was won by Miss D. Morris, who took first and second place, Mr. J. H. Bundell being third. The fishes benched were discussed by Mr. Saunders. During the meeting diplomas were awarded to Capt. L. C. Betts (for work on raintails), Miss D. Morris (for work on new characters), Mr. P. R. H. Franklin (for work on water plants), Mr. E. L. Telfer (for work in hydrology). In addition there was an illustrated talk by Mr. R. E. Ison, B.Sc., on Colour Patterns.

A TABLE show was held recently by Colwyn Bay & District Aquarist Society. First place was taken by a gourami shown by Mr. Barron of Llandudno Junction, second was a serpaie and third a tiger barb, both shown by Mr. Hanley, of Llandudno Junction. Members are now busy making a show stand which it is hoped to exhibit locally in an attempt to get more people interested in the hobby.

At the annual meeting of the Mansfield and District Aquarists' Society the following officers were elected: Chairman—Mr. A. J. Blake; Secretary—Mr. A. Atkins; Treasurer—Mr. R. Heath. Forthcoming events include, 5th May, Table Show for "Cichlids", 26th May, "Beans Trust"; members' questions answered.

Secretary Changes

CHANGES of secretaries and addresses have been reported from the following societies:—Arnold Aquarists (Mr. W. Green, 57, Crabtree Avenue, Wembley, Middlesex). Dewsbury and District Aquarist Society (Mr. P. Glyn Peace, Cliffe View, 7, New Street, Pudsey, Yorks.).



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