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 panels beneath the windows. Built in modern style, it incorporates the better features of other North American public aquariaums 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 Cichildae 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 500 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 fishkeeping but who would like to commence the hobby. For this reason most of the basic tropicales like pupfishes, 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 tropicales 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

bacon, noodles, arowana, large kissing gouramis and electric catfish. Among these are archer fish, African cichlids, electric catfish, mouth-breeding cichlids and quite a few others.

The cold-freshwater displays are contained in seven large tanks, most of which require 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 sand and filter sand filter. Since the city water comes from 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

fishes native to the region, including steelhead, rainbow trout, Dolly Varden, cutthroat trout and five species of Pacific salmon.

We have temporarily modified some of these tanks to provide different temperatures. One tank has a thermally regulated 1,500 watt immersion heater which maintains tropical temperatures in still water for two 3 ft. long electric eels. Two other tanks are filled with non-circulating water which remains at room temperature, a more favorable condition for perch, sunfish and sturgeon. The low would not eat anything while maintained in our cold water but have thrived very nicely at 60°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 perspex plastic piping covered with sheets of glass wool and aluminum foil 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 consumed more readily than did those taken during migration and held in the Aquarium.

The main display part of the Aquarium is the cold-saltwater 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 1150 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 gallons 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
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.
The pond surround can be made much more interesting, and deliciously fragrant, by sinking several old buckets or large tins, in the ground close to the water's edge, and planting them with various species of mint 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 by runners and, unless kept in proper check, soon cover 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 (M. beebei). This mint grows 12 inches high and has a rather rounded, dark-green heart-shaped leaf that is quite decorative, usually lavender- or purple-coloured, small and borne in tight clusters around the spiky stems.

Another scented variety is the pineapple mint (M. piperita) which is one of the ingredients of the liqueur anisette; it is rarely used for culinary purposes. But the fresh leaves are excellent in the preparation of mint jelly, and for giving a scented flavour to custards.

The lemon mint (M. citrata) is another worth-while variety. This species resembles the common garden mint (M. viridis), but it has longer and more pointed leaves than the common species. It gives off the unmistakable aroma of peppermint, and a few leaves infused in a glass of water sweetened with sugar makes a pleasant drink.

The green apple-mint (M. rotundifolia) is the classic mint for serving with lamb. It has the flavour and the scent of apple in the leaves, and its rounded leaves are grey-green in colour, with a soft nap of silvery hairs. It grows about 12 inches high above the ground and is a particularly valuable variety.

The water mint (M. aquatica) which is propagate-growing M. aquatica. This little

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 common mint, 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.

Mints for the Pondside—and for the Aquarist

by JACK HEMS

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 many of the societies will respond to 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 among 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 maroni*) 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. maroni* (the species reaches a length 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. maroni* 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 and 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 occipital 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
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 pond is concerned, with the weeks of the month to come, thanks to the weather of late winter and make fresh growth as the water and the water 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 plants added to the pond will usually make rapid growth soon after having been introduced into a pond. It is possible that the root-stock has been planted too deep in the water. Even with those types which will grow in 2 feet of water, it is a fact that when they are planted the water should be lowered or else the plants raised so that only a little water is above the crown to begin with. As the new leaves appear the root-stock will be lowered or more water added.

Fresh oxygenating plants can be added and it is a good make a bunch of cuttings of these and then to cut off the lower stems and plant them in the pond. Once the plants lie on the bottom they will send out roots and grow well. Do not try to plant too close to tender stems as you are likely to break them, when they may not thrive. There need to overdo the oxygenating plants. They generate oxygen rapidly and may take up too much room in the pond. After all, there is no need to plant oxygenating plants in a pond as the water will be well charged with oxygen from its contact with the air.

In the pond may spawn during a fine spell, and spawn care has been taken it is probable that many of 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 bodies 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

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"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, concretelined 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.

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AQUARIST'S Notebook

by

RAYMOND YATES

Pompador (Symphysodon discus) being what they are it is expected that the lucky owner carries them to his shop with some trepidation. Arriving at the shop, he looks into the glass and sees his fish. The fish is flat out on the bottom. Hurriedly he looks for the pectoral movement and the fish is new home. Wonders never cease. All and swims away quite oblivious 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: someways 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. Mecurochrome 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 larger, 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 amongst 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: Laurence 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

Young Hemigrammus pulcher (specific name pronounced as if the ch was a k) is easily distinguished from the many other species commonly kept from the lateral line immediately below the last rays of the dorsal fin to the extreme edge of the caudal peduncle. This golden pulcher tends to lose the intensity of color, black fading to a dark grey, although keeping in ideal conditions helps to prolong its beauty and durability. Examination reveals the presence on both sexes of a pair of tiny light areas behind the gills. There are 8 to 10 in the lower fins, and the dorsals are flecked red. The fish grow to a maximum size (it is said) of under 2 inches, although I have never seen them as small as this.

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

One of their appearance, however, pulchers are quite hardy and are subject to fluctuating temperatures, enjoying a range of 50° to 80° or even 85°F. Perhaps I should add a warning here. If the fishes you obtain have come water kept more or less at a constant temperature, they will be unable at first to stand much variation.

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

Soft acid water is preferred to alkaline or neutral. Boiled granulated peat under the sandy compost helps in this direction. If covered by compost the peat helps to mask the beauty of a well-laid-out aquascape. On such a diet and with slightly raised temperature the fish should come rapidly into breeding.

I am yet to be convinced that such natural foods are the finest that can be given, although in some cases it seems to be agitation against them.

I scatter adhesive eggs among the plants, so that the fin-leaved varieties are a must if many are to be found. It is wisest to remove the parents after the female has spawned for the last time.
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 boastful!

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 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.
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 recognized fish have been described in these articles already and so it is now necessary 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 saves many disappointments and gives him great assistance in picking out his best fish. One is always likely to have 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, one is always inclined to imagine that one has better fish 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 far better than training. It is all very well to run a fish as a show tank now and then to get it used to it, but this must be done with care. When some types of fancy goldfish are trained they take the show tank so calmly that they are 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 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 shown 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 fan-tail 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 that 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 get 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.
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.
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 think 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 sort for the true identity of the creature you are examining. To terminate the fore-gut, so if it was at the end of the alimentary canal you removed, you have left the most 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 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 ×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 tail 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...
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 seems 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 nearly 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 swill 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 gouramis 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.

**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 seen 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 ant’s 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 about only 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 ant’s eggs? These are bought dry and 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.
happens with female fish which are getting on in age. 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 latter part of life. Often these clear up by themselves once the water temperature is reduced. These fish do not seem to be unduly affected if they cannot keep their balance and I have even seen them upside down for long periods without seeming to mind 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 if they are planted in small clumps. I consider that this looks worse than to have a number of single stems of the same species 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 river grit, sometimes referred to as "Thames sand." This is very sharp and of varying sizes, but quite clean. I use a lot of this myself and find it 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 required.

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

I am told that the best way is to place Vallisneria on the bottom of the tank and lay a small stone over the roots. This stops the fish from disturbing the plant and holds the plant down until they get a firm hold.

I have a gravel at the base of my tank. Do you think it would be a good idea to have some fine sand among it for the roots to grow in?

I consider that most plant roots need something finer than the coarse gravel. In time the mulm and droppings of the fish may make this up. I am one of those aquarists who prefer in using a little good potting compost at the base 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 have become available.

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

It may be due to decaying uneaten food. I notice that Daphnia, which are a staple diet, while having the use of this food I do not consider it a very good diet. I prefer to use other foods as well, such as the tinned fish foods or by using dried shrimp. Various live foods can be used as a treat.

I have a very fine grained gravel which swims most of the time at the surface of the water at an angle of 45 degrees. Is it unwell?

It is possible that the gravel is not well mixed in the tank. The water should be changed or the gravel may be too fine for the fish. The gravel should be mixed regularly to ensure even distribution of food in the tank.

I have a shubunkin which I have kept in tanks for some time and has never been in very good condition. Is it dying? Will it be all right for me to put the fish in a cold 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 their tameness and should not be taken by birds. The only birds you need fear in your garden are herons, kingfishers and sea-pulls. 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 Hydrophila pumilus. There is no need to have too many plants for a start. If all goes well they will soon grow. The first two are named to grow very fast and are to be found in the usual packet foods or by using dried shrimp. Various live foods can be used as a treat.

**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 repotting 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 (I) 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. McClibrad,
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 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,
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 2 1/2 in. (these being the inside dimensions). The thickness of the wood should be at least 1/2 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 1 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 lukewarm 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 act of sifting 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 Veysey. 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 4 1/2 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 to colour illustrations of tropical (and semi-tropical) fishes, almost all life size. Where the male and female fish 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 more common fishes are included, such as the head-striper, salmon trout, coho salmon, brown trout, red-bellied dace, brown trout, salmon, whitefish, and black cod. Each species has a short "write-up" giving the more important known facts. Illustrations

of the skate and Eimeke angelfish are shown side by side. The author suggests that the differences are difficult to define but mentions that the skate 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 that the 225 coloured illustrations given will certainly prove most helpful to many newcomers to the hobby who lack facilities to view actual fishes in public aquaria, dealers' shops or at shows.

C. E. C. Cole

Raymond Yates.
from AQUARISTS' SOCIETIES

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

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 Leatzer and talks by breeders. The Secretary is Mrs. M. B. S. Spurrier, 89, Walkinstown Road, Dublin.

RECENT meetings of the Brocken and District Breeder's Circle have included a table show of Characins at which no prizes were awarded to 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 slides joined 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, tetras, white clouds, niger barbs, beans, gloolights, flaves, lelies, rosacea.

A TALK given by Mrs. Meadows on "Breeding Egilaylers" was the highlight of 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 reports in the programme of the Bristol Aquarist Society have been the talks by Mr. J. R. Littleton, of the Bristol Tropical Fish Club and Mr. H. H. B. Heywood, speaker at the meeting and he gave a talk on the Show Standard, his experiences at shows and on the breeding and correct feeding of livebearers. He also mentioned that he was rearing clownfish in a tropicarium with a spawning medium that was 100% nylon wool wound round a 4 inch piece of card; one of the clownfish was very thin and was fed a diet of bloodworm and redworm and then the tail grew and he then had a small batch of clownfish eggs. The annual open show will be held on the 1st October to the 1st November at the Bishopstaple Parish Hall. The show is Mrs. V. C.2. Lloyd, Park Street, Haslemere, Surrey.

AT a meeting of Yeovil and District Aquarists Society Mr. Kettritzky, aquarium and house plants specialist, and also a member of the National Cactus and Succulent Society. The meeting is the seventh annual event and will include talks of good quality and varied. Admission will be welcomed by Mr. H. F. Cox, 24, Boynton Road, Maclesfield. Teletype 41556.

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 1976-77 were as follows: Hendon 90 pts., Walthamstow 58 pts., Harrow 53 pts., Hampstead 49 pts., Arnold 44 pts. The Hendon and District Aquarists Society have the most points and have 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, 6B, Whitchurch 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. E. T. Roos, Secretary, 6, 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 Greenvale Cafe, Tulsehill Street, Liverpool, 2.

AT the last meeting of Sunderland and District Aquarist Club a lecture was given by Mr. H. H. B. Heywood, on the breeding and raising of breeders. Mr. Heywood said that the talk was a "sensational" one and will be held on the 12th Haslemere Road, Southsea.

We understand that in response to the appeal by Bidingley Hospital, Harwich, which appeared in the Aquarist for February, that the Bexhill and District Aquarist Society are assisting in the installation of two aquaria and some assistance will be forthcoming should these be a success. Mr. P. H. Smith is making a return visit in May to the Society. A Bexhill Grammar School teacher, Mr. Smith, may give an illustrated talk on the digestive system of fishes.

CREATING and District Aquarists Society will be held at the Leeds Society on the 4th June there is a quiz with the Leeds Society at Leeds.

The Spring meeting of the Carassius Club is on the 25th May there is a talk on the topic of fancy goldfish breeding and the necessary live foods for success. The giant water lily, Victoria amazonica, being grown from seed, is proving successful. Further details will be held at 12th Haslemere Road, Southsea.

DATES for table shows of the Guildford and District Aquarists Club have been fixed for the 15th July and 10th September, North Ham, 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. Kettritzky, a well-known authority on this subject.

THERE was a good entry at the table show at the Middleton, J. C. 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, Thornton Bay, Redhill. A number 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 Aquarists Society is to be held on the 6th and 7th September at the Turnhall 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 Piquinont Aquarists' Society. Included in this number were some members of the Torquay Society.

A SUCCESSFUL year has been reported from the Folkstone Aquarist Society with an increase in membership and attendance at the meetings. The new president is Mr. G. B. B. Leed, Barnet, and Mr. F. J. Pask (chairman), Mr. W. G. Rees (secretary) and Mrs. M. B. Rees (treasurer) were present at the meeting. The meetings continue to be held at 62, Tynne Street, Folkstone, 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 (Hammersmith), which was held recently, proved a great success. Future events include table shows for bars and coldwater fish and also a visit to Jamms Aquarium, Redhill, during May.

RECENT development in the British Aquarists' Study Society have been the publication of a technical manual, consisting of Maps, R. E. M. Smith, P. B. Utton, Mrs. Russell and A. Cooper (secretaries). There have been one or two informal area meetings have been held, one at Southwark and one at Hammersmith. It is hoped to arrange for more meetings in other areas soon.

A lecture is to be given to the Society in the near future by Dr. F. N. Gibbons 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, Ely Place, Ilford. The show will be held on Saturday, 20th September, and schedules are available from the show secretary, Mr. J. Bryden, 22, Kingstone Road, Ilford.

BREEDING and feeding fishes were discussed by Mr. H. M. Chalmers, of Sudbury, Essex and Mr. T. A. J. Cooper of Redhill. The subject was "Making the Most of the Hobby" and the talk was given by Mrs. L. Colvin on Catfish. The Society meets every other Thursday in the Greenvale Cafe, Tulsehill Street, Liverpool, 2.

FUTURE meetings of the Dunstable and District Aquarists' Society will be held at the Dunstable Aquarium Society's premises at the Dunstable Town Hall. The specialist meetings have included talks on the breeding and rearing of livebearers. Future dates will be held on the 1st October to the 1st November at the Bishopstaple Parish Hall. The show is Mrs. V. C.2. Lloyd, Park Street, Haslemere, Surrey.

THE open show of the Leeds and District Aquarists Society is to be held in the October. There are generous prizes and details can be obtained from the Society. Individuals interested can also apply to the Society at the show. The show will be held on the 12th Haslemere Road, York, Lees, 9.

THE new headquarters of the Riverside Aquarist Society. Mr. H. H. B. Heywood, chairman of the "Hampshire Cooper," King Street, Hamiton, secretary is Mr. T. Thelwall, "White Building," Barley Mow, Epsom, Chichester, W. 4.

A BEGINNER'S Night was held by the Portsmout Aquarists' Club recently and was well attended. Talks given included the basic principles of fishkeeping, by members. It is hoped to have several more beginners' nights during the season. The meeting, Mr. A. Taylor was present at the meeting and Mr. G. H. Taylor and Mr. F. Lush with the Coldwater Points Trophy. Table shows will be held on the 5th May. THE AQUARIAN
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. Aquarists in the northeast 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 the Association of South London Aquarists 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.B. In this way members will automatically become Associate Members of the G.S.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.B. meeting—providing speakers, fish and all other services as required.

All interested aquarists are cordially invited to attend the inaugural meeting on 16th May at 5.30 p.m. to be held in the Sutton Adult College, Bennhill Avenue, Sutton, Surrey. The G.S.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.B. secretary, Mr. O. D. Taylor, 166, Kings Court, London, S.W.

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. Cap. 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 18th May at 6.30 p.m., and the support of members was requested by bringing among suitable candidates for membership. The table show for adult singletails competing for the Upland Trophy was won by Miss D. Morris, who took first and second place, Mr. J. H. Bundell being third. The fixtures bracket were discussed by Mr. Saunders. During the meeting diplomas were awarded to Capt. C. L. Betts (for work on twisttails), Miss D. Morris (for work on new varieties), Mr. F. H. P. Franklin (for work on water plants), Mr. E. L. Taylor (for work in hydrology). In addition there was an illustrated talk by Mr. R. E. Ison, B.Sc., on Colour Patterns.

The Aquarist's Badge

Produced in response to numerous requests from readers, this attractive silver, red and blue object emblem for the aquarist can now be obtained at cost price by all readers of The Aquarist. The design is pictured here (actual size). Two forms of the badge, one fitting the metal button-hole and the other having a brooch-type fastening, are available.

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