

The AQUARIST AND PONDKEEPER

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Editorial

FOR many years the spoiling of this country's beaches by oil washing in from the sea has worried users of the amenities of our coasts. This year far more publicity has been directed to this form of pollution, and it is apparent that the amount of oil on the beaches is increasing annually.

Oil is a particularly unpleasant substance out of its proper place, and disposal of its sticky masses mixed with sand or coated on pebbles is not a simple matter; the procedures involved are costly and they bring only temporary relief. The whole problem is not one which must be solved for the holiday-maker only. Sun-bathers and swimmers find plenty to complain about on polluted beaches surely enough, but damage to nets and equipment that oil causes and the harm it does to sailing boats are for inshore fishermen and yachtsmen more serious aspects.

Of the effect of oil on the natural scene it can be said at once that sea birds are the worst sufferers. They can no longer fly or support themselves in the water once they have alighted near and become contaminated by oil. Although on first consideration it might be thought otherwise, oil affects fishes and other aquatic shore life hardly at all. It does not release soluble materials in poisonous concentrations in the sea or near its conglomerates, and its harmful actions are largely those resulting from its clogging and sticky nature when it contacts animals such as those marine molluscs exposed to air at low tide.

Control of the oil menace is not a British concern alone. Some of the oil originates from shipping ports but because the growing incidence of oil pollution has been coincident with expanding imports of crude oil, tankers releasing oil when being cleaned out at sea are suspected as chief offenders. International agreement about the distance from shore within which oil-dumping should be prevented by law has not yet been secured, and it can only be hoped that concerted action by shipping interests in all countries will eventually be arranged, and that this time will not be too long coming.



The General Electric Co. Ltd.

A 20 ft. long, 500 gallon tropical aquarium forms the bar in the officers' lounge of the 3rd U.S.A.F. Headquarters at South Ruxlip. It is glazed with inch thick plate glass and is heated by eight 4 ft. G.E.C. tubular heaters



AQUARIUM SCIENCE



IT can never cease to be a source of wonder to the biologist that many animal parasites have evolved such intricate life histories, some of them requiring to pass through several different kinds of host to complete their reproductive cycle. This wonder can only be matched by that of the layman marvelling that the biologist could ever have revealed and followed these complexities. Take for example the story of the gull, the water snail and the blind fish. These all act as host to stages of a trematode worm known to the scientist as *Diplostomum spathaceum*.

The fully developed worm lives in the intestines of water birds and gulls. Its eggs pass into ponds and rivers with the bird's droppings, and hatch there to form tiny larvae called miracidia. These swim and bore their way into water snails (usually the common pond snail *Lymnaea stagnalis*). In the snail each larva then enlarges and develops into a sporocyst; from each sporocyst emerges a host of new larvae—the cercariae. Now these eat their way out from the snail and float free in the water. On making contact with a fish the cercariae penetrate its tissues to make their home in the lenses of its eyes, causing it to become blind and soon bringing about its death. If the dying fish is caught and eaten by a bird the larvae are able to undergo their final transformation—into the trematode worms which are soon laying eggs to start the whole sequence off again.

Dr. Ben Dawes, zoologist of King's College, London, has lately been making observations on the larval stages of *Diplostomum* in a small natural pond near London. Large numbers of dead and dying snails (wandering snails, *L. pereger*, in this instance) indicated the presence of the infection, and sticklebacks captured from the pond were found on examination to have between 20 and 40 *Diplostomum* larvae in each eye lens. When Dr. Dawes kept some of the snails in his laboratory aquarium he observed that several broods of cercariae were released into the water each day, so that very large numbers of the parasites soon accumulated. Minnows, goldfish, carp, bitterling, tench, stone loach, perch and small sticklebacks placed in the water were killed overnight by the cercariae from the snails; 15 minutes contact with them sufficed to kill tadpoles. Crucian carp were found to be the fishes most able to resist attack.

Death of the fishes is believed to be caused by brain haemorrhages which the burrowing larvae produce. Dr. Dawes has pointed out how highly dangerous to fishes these parasites are; a few hundred of the cercariae, only a small fraction of the total number released each day by infected snails, can kill half a dozen fishes in a very short time. From the eye of one minnow swimming in cercariae-infested water nearly 200 advanced forms of the larvae were recovered by dissection after only a few hours. The danger to which the aquarist who collects snails, water plants or live foods from infected natural waters exposes his stocks of fish needs no emphasis after these observations! Once a fish is infected with only a few *Diplostomum* larvae it will become blind, and there is no cure or remedy for this condition.

How do fishes such as salmon, which will swim for miles from the sea up rivers to the spawning grounds in which

they were themselves hatched, find their way to these haunts? According to two Wisconsin, U.S.A., scientists smell plays a most important part. They believe that substances in the water released from plants and the stream bed give each river course a characteristic odour for the salmon, which it will remember and recognise even after long periods away from it.

In an aquarium arranged so that waters containing different odours could be switched through it at the will of the observers it was found that salmon soon learnt to choose between the waters. This was shown by the device of feeding the fishes in a special part of the tank when water with odour A was present, and giving a mild electric shock to any fish which entered the feeding area when water with odour B was in the tank. The salmon rapidly associated odour A with feeding and kept away from the feeding spot at other times. Moreover, they remembered this lesson sometime after the experimental period when the shocks were given had elapsed.

by
ANTHONY EVANS

One of the ways by which the function of a gland or other organ in the body of an animal can be ascertained is to remove it and then observe what

happens afterwards. The thyroid gland in fishes is not a compact structure however, and it would be most difficult to remove it completely. What can be done with much the same effect as total removal is to treat the fish with chemicals known to be "anti-thyroid" in action. The substance thiourea has such an action, preventing the formation of thyroxine, the gland's active hormone principle.

From the University of Nottingham comes news of experiments on thyroid function in minnows conducted by the professor of zoology Dr. E. J. W. Barrington and Dr. A. J. Matty who, by the use of thiourea, showed that in these fishes the thyroid gland probably has some controlling influence on the breeding cycle. Firstly they showed that minnows kept in water to which thiourea had been added developed microscopic changes in their thyroid glands indicating that production of the thyroid hormone was being impeded. Then they compared the state of development of the internal sex organs of male and female minnows kept for six months in the thiourea solution with that seen in minnows kept in an untreated aquarium.

In the normal tank fishes which had been there since January showed, in June, the scarlet body coloration and head tubercles which are developed in the breeding season. The males contained active sperms and the females contained developed eggs. After the same period the group of thiourea-treated minnows presented a different picture, however. They lacked body colour, had only minute head tubercles; the males were devoid of sperm and showed no signs of sperm-forming activity. The females of this group only contained immature eggs, egg stages which would normally be found in a minnow in the winter, out of the breeding season. Thus, when the thyroid hormone is reduced or absent in minnows breeding development appears to be retarded; the supposition is, therefore, that normally the thyroid gland plays some part in initiating formation of sperms and eggs. Experiments with guppies, swordtails and platys among other aquarium fishes by other scientists have demonstrated that this gland also influences rate of development in the young fish.

German Aquarists' Methods ^{with} the Neon Tetra

by WALTER BERTHOLDT

In the year 1936 the neon tetra was discovered by a French collector of orchids, Monsieur Rabaut, in a little brook in Brazil. Natives had caught the fish in that brook in the midst of almost impenetrable virgin forest. The light there was so shaded that it was almost impossible to make out the fish in the rivulet.

M. Rabaut was surprised at the dazzling beauty of the fish which the natives showed him. He saw immediately that it would find an enthusiastic welcome among American and European aquarists. He caught several hundred of the fish, but only very few reached their destination in Europe alive. But other large and successful importations followed and were immediately disposed of at fantastically high prices. Here was a fish unrivalled up to that time by any other tropical!

The enthusiasm with which the neon tetra was accepted by aquarists finally gave way to a sort of disillusion, because all efforts to spawn the fish successfully proved a failure. I well remember those last years before the last war, when we aquarists in Germany puzzled our brains in vain to solve the problem of breeding neons. All the successful formulae for the breeding of tropicals did not work with this fish. No wonder therefore, that the price for a pair of these outstanding fishes did not fall, and only few aquarists could afford to keep it in their aquaria.

The First Success

It was after the last war that the first successful results in breeding neons were reported from several parts of Europe and the United States. Up to that time neons were almost exclusively propagated in the province of Saxonia in Germany. And here they were bred in simple tap water! How was that possible, so much the more as tap water in the other parts of the world had never brought the desired success? The tap water in some regions of Saxonia is extremely soft. This fact, and water tests of the native waters in Brazil and Peru revealed the interesting observation that this characin prefers extremely soft water.

The water in those Brazilian and Peruvian brooks is generally rain water. As the grounds of those districts in Brazil and Peru are extremely poor in lime, the water of the streams there is so soft that it is practically distilled water. But the soft nature of the water of those jungle brooks is not their only characteristic. Tests showed that the water there was acid as well. The masses of leaves, fruits and stumps of virgin trees that fall into the water decay quickly owing to the high temperatures. In this way humus (degradable mould) acid is produced—hence the acid character of the water.

These statements and water tests, which were published in the most interesting book of the German ichthyologist Dr. Werner Ladiges, *Der Fisch in der Landschaft*, gave the key to the successful propagation of the neon tetra. It was now evident that this fish lives in soft and acid water in its native haunts. We had therefore to try to give the neon the same conditions in our tanks. Following these indications we finally had the first success in breeding this most beautiful characin. I have devoted much of my spare time to the study of the neon tetra, and after innumerable negative results, and in close co-operation with my fellow aquarists, I have developed a method which has finally brought the desired offspring of this fish. We proceed as follows.

A three-gallon, all-glass receptacle is used. Such a tank is carefully cleaned with hot salt water. Then it is filled with rain or distilled water. (Rainwater collected in industrial districts is generally not suitable as it is laden with too many impurities. In such areas it is better to take distilled water.) Use only rain which has been collected after many hours of rain, when it is quite clear. Collect the rain in well-seasoned wooden or cement containers. Avoid metal tubs. The rainwater is stored in green glass carboys and allowed to stand until the last impurities have settled, and the water has turned crystal clear. This generally takes one to three weeks. The addition of one level teaspoonful of salt to every two gallons of rain or distilled water is desirable.

Making the Water Acid

Such rainwater has a pH value of 7.0, i.e. neutral. Now we have to give the water the necessary acid character. The best results have been obtained with the addition of peat water. For this purpose bale peat, which does not contain any fertiliser, is slightly washed in a sieve under the tap. Take one handful to one gallon of rain or distilled water and allow this mixture to stand in glass jars for three to four weeks. Repeated stirring is recommended in order to allow the peat to give off its acid and colour particles to the water. Slowly the peat water turns yellow. In the last week it is better not to stir the peat and then the mixture turns quite clear and amber in colour.

Now the peat water is ready for use in our breeding receptacle. Siphon it off carefully and let it flow through a piece of cloth in order to keep out any particles of peat. In case it is not crystal clear, allow it to stand for a further two days. Then mix the peat water with the rain or distilled water. Add sufficient rainwater to give a pH value of 6.5 to 6.0. Generally a third to one half of the total has to be peat water to develop this acidity. Repeated tests with pH paper are necessary to obtain the desired pH level and in order to avoid turning the water too acid.

Harmful Organisms

It is desirable to give the breeding water the acid character in order to avoid harmful bacteria or Infusoria from developing in the breeding receptacle. We have seen again and again that these organisms are responsible for the destruction of the spawn. One kind of Infusorian, the flagellates, destroy the neon eggs, and also attack the young fry during their first stage of life when they are feeding on their yolk-sacs and are still unable to swim. When examining such dead youngsters under the microscope they are found to be covered completely with flagellates. Flagellate Infusoria can be seen in the tank by means of a good magnifying glass. It has typical swimming movements, like rotifers.

Acid water does not allow the development of bacteria and Infusoria and as the neon spawn and young neon fry are so extremely sensitive to bacteria and flagellate Infusoria, I recommend the use of the peat water. (Peat water is preferable to chemical methods of turning the water acid, as the acid of the peat kills off bacteria and Infusoria to a high degree—we all know the preserving qualities of peat.)

No sand is used in the neon breeding tank, because the development of the fry can be observed much better than in tanks where gravel is used. The youngsters are so transparent that it is almost impossible to see them on a layer of sand. Many an aquarist has completely overlooked them. As spawning plants we take a bunch of willow moss, *Fontinalis gracilis*, or *Myriophyllum* which,

prior to putting them in the breeding tank, should be immersed for five minutes in an alum bath (the dose is four heaped teaspoons of alum to one gallon of tap water). After the bath the plants should be carefully rinsed in cold, boiled tap water.

Of utmost importance for a good result is the selection of the breeding pairs. This is done as follows:—a school of young neons is watched. When they are mature, in age 10 to 12 months, you will see that certain fishes will have paired themselves. Separate such pairs, put them in the breeding tank after having conditioned them on a rich diet of live food—*Daphnia*, brine shrimp and, twice a week, white worms. When the females are well filled with roe they are ready for spawning. (It is important to keep neons already in the community tank in soft water. Neons that are raised in hard water are unsuitable for mating.) Better spawning results are obtained if the fish are kept in comparatively moderate temperatures. An ideal breeding temperature is 72° F.

The breeding tank should be well screened, as only in comparatively dim light does the spawn develop. In tanks exposed to the daylight you run the risk that eggs become decomposed by fungus. Generally, spawning takes place on the next day after putting the pair in the breeding receptacle. The breeders swim in a side by side position in the bunch of spawning plants, and with tremb-

ling movements three to ten eggs are extruded in each spawning act. Within two to three hours 150 to 200 eggs are expelled.

Remove the pair immediately spawning is finished as they are extremely fond of eating their eggs. If spawning has not taken place after the fourth day try it with another pair. It happens often that the females are egg-bound, caused by fluctuations of temperature, especially by a sudden drop. Such females, generally, are unsuitable for mating. During the time the pair is in the breeding tank do not feed them. Only a very slight cloudiness of the water, caused by feeding, is sufficient to decompose the spawn.

Hatching takes place after 24 to 36 hours. Then the tiny transparent fry are seen hanging in the plants or at the glass sides of the tank, or lying on its base. After five to seven days they have absorbed their yolk sac, and only then have they reached the free swimming stage. During all this time keep the tank well shaded with paper to cut down the light.

As soon as the fry have absorbed their yolk they look for food. At first give them newly hatched *Cyclops* nauplii which are just as small as Infusoria and which are preferable to this food, I have found. The youngsters develop quickly when they are well fed. In time, larger nauplii, and later on sifted *Daphnia* and *Cyclops* are taken, not to forget micro worms. After nine months the fishes are fully grown.

IN THE Water Garden — by Dr. W. E. SHEWELL-COOPER

I DO not believe that there is any advantage in trying to grow a plant that is just too difficult for words. Some people may not like my choice of plants, but then I always believe that "one man's meat is another man's poison."

Again and again I plead with readers to include plants which give fragrance; one can do this in a herbaceous border and in the shrub border as well as in and around the water garden. Take for instance the bee wort or sweet flag. It cannot be said that the flowers are particularly beautiful or outstanding, because they have a greenish shade, but I like them because they are aromatic. The plants grow to a height of about three feet, produce broad strap-like leaves and are herbaceous and perennial. I always find they do best in moist, loamy soil near the pool, or even in very shallow water.

Another that could go into the aromatic list is the chamomile, and particularly *Anthemis cotula*. This is really an annual, but there are many people who do not realise this because the plants seed themselves quite happily each season and the seedlings appear the following spring. The plants are upright in habit; they produce small flowers in June, having rather pretty, narrow leaves. The species I have chosen has double yellow flowers, grows about 10 inches high and prefers wet soil or very shallow water.

Some of the American cowslips have a little scent to them. They are, of course, members of the Primula family and are spring flowering as a whole. Most of them have rosettes of narrow leaves and cyclamen-like flowers. One of my favourites is *Dodecatheon meadia*. This grows only 18 inches in height and has long green leaves freely spotted with purple. The flowers are magenta and have reflex petals; they are produced in clusters drooping down towards the ground. There is a variety called "Brilliant," which is said to be an improvement; actually it only grows 15 inches high, and the flowers as near as I can describe them are a deep rose crimson.

There is one plant that needs to be kept in control by occasional thinning, say at least twice a year during the

growing season. It is the *Glyceria*, commonly known as manna-grass. It is a perennial waterside plant and one of the rampant types, but there is no harm in that. I am particularly fond of *G. aquatica variegata*. This is very pretty indeed, and it grows about two feet high; the foliage is regularly striped with green, then yellow and then white, and it is suffused with a rosy tint in the autumn. There is another one, *G. canadensis*, which is commonly known as the rattlesnake grass. Some claim that this is the most handsome of the species—anyway, it grows about three feet tall.

The only fault I have to find with the frog bit is that snails are very fond of eating its soft spongy leaves. However, it usually gets established fairly quickly and so the snails do not do much harm. It is one of the good floating aquatics and so it does not have to be planted; it just grows on the surface of the water. It produces masses of bright green, small, kidney shaped leaves which are one and a half inches across, and then, often it seems very suddenly, the small three-petalled white flowers appear.

We talked earlier on of pleasant scents but there is one plant whose owner I just do not know, yet its presence always fascinates me. I never can believe that it is as bad as it is until it starts to flower; it has a long name—*Lysichiton camtschatcense*, and looks rather like an arum when it is growing. It loves to grow in really wet soil and ought to be included because it is so striking. The best of the bunch (and in smell the worst of the bunch!) is *L. americanum*; this produces huge leaves and yellow flowers. The smell is really skunk-like.

We must turn now to plants that have a more pleasant odour, and we will go to the mints. There is the water mint, *Mentha aquatica*, which usually grows about three feet tall and produces egg-shaped, serrated leaves and whorls of lilac flowers. The leaves are hairy and are very strongly scented. *M. canadensis* grows usually about 20 inches in height and has lanceolate-leaves three inches long, with

(Please turn to page 116)

Pond Building and Designing

Practical recommendations and advice on building ponds with glass viewing panels given by an experienced coldwater fish-keeper who has specialised in this type of garden pond.

WHEN members of the Croydon Aquarist Society visited the home of one of their founder-members, Mr. L. H. Hounsfield, at his invitation this summer, the experienced coldwater fish-keeper gave a talk on pond-making and maintenance. Mr. Hounsfield's practical advice was based on his experiences with his own fine water-garden, which would delight the eye of any aquarist.

There are five irregularly shaped ponds arranged around a hexagonal observation chamber about five feet below ground level. One side of this chamber is the entrance, gained by steps leading down from a lawn, and the other five sides contain plate-glass windows in the walls of the ponds. Through these windows views are caught of many kinds of coldwater fishes in condition seldom seen in tanks. Some very fine large specimens of mirror carp excite admiration, but in addition to these and goldfish varieties, there are minnow, dace, tench, bitterling, minnows and stone loach, and the beholder feels that this is the only way to become aware of their real beauty.

Circulated Water

Low "weirs" connect the ponds, and water is circulated by the agency of a pump, which is set in operation by a constant level device in an elevated reservoir pond. Here water lilies are reared, and some circulate with the water around the ponds for as long as the fishes allow them. In his talk, Mr. Hounsfield said that if he were laying out his garden again he would favour a more formal arrangement of them (depicted in the accompanying plan view). His choice would be rectangular ponds for the following reasons: (1) they are easier to shutter during construction; (2) marginal walls for the growth of sub-aquatics are easier to construct round them; (3) fishes are most easily netted in rectangular ponds; (4) if it is required to sub-divide a pond by means of boards this is easily done in a pond with parallel sides; (5) such ponds are easy to cover with canvas mounted on a wooden frame in severe winter weather.

The lowest part of a garden should not be selected for the pond site, said Mr. Hounsfield, because of the danger of flooding. When a series of closely adjoining ponds is to be made, the simple way is to dig out and concrete the

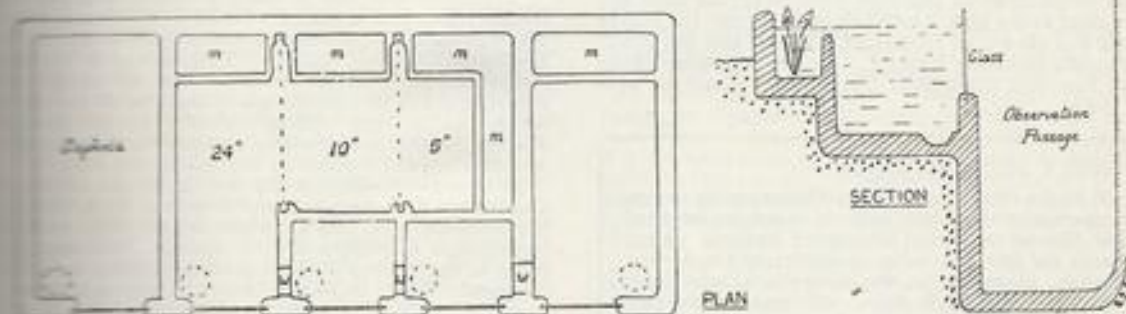


The turret-topped hexagonal observation chamber in the midst of Mr. Hounsfield's ponds

entire area, so that the dividing walls which are built in later need not be perfectly water-proof. The pond base should be flat, with steps to receive pots for submerged plants, and then the pond can easily be walked in at pond cleaning time. Four-inch walls were recommended, and they should be carried up four inches above water level to defeat angling cats; "crawl-outs" are necessary at intervals, however, to provide egress for frogs and small mammals which are liable to fall into the water. Wire mesh should be used as reinforcement for the concrete, and Mr. Hounsfield particularly emphasised that it is a mistake to lay a foundation of hard core on the base before concreting; this he said, promotes cavitation beneath the concrete and consequent cracking.

The Observation Chamber

An advantage of the observation chamber alongside the ponds is that they can then be readily emptied by siphoning and, to facilitate complete emptying, sumps can be made by using a basin as a mould in the fresh concrete close to the sites of the observation windows. In addition, should a glass break at any time, so that a pond empties, the hemispherical depression will hold enough water for the fishes to find temporary refuge. The glass is mounted in a V-shaped slot in the concrete; a hard setting cement such as plaster of Paris mixed with thin glue or gold size is placed on the outer side of the V, and the glass is pressed into this. On



Mr. Hounsfield's recommended arrangement of observation ponds. In the plan view of the ponds the glass windows are at the bottom of the drawing; M indicates marginal planting areas. The sectional diagram is not made to scale

the inner, pond side of the glass, the slot is filled with a resilient bituminous cement.

If the ponds are to be connected, the weirs between each should have a fall of at least three-quarters of an inch. Metal parts of pumps etc. in the pond, e.g. brass or copper alloys, must not be used unless protected with coats of bakelite varnish—most easily applied after the article has been warmed. Only straight runs of piping should be present, so that they can be cleared with canes pushed through them. Detachable rubber hose is satisfactory. An ideal refinement for garden ponds is to embed beneath them pipes which can carry away the waste household hot water in wintertime to reduce the severity of winter frosts.

Pond Pests

Mr. Hounsfield has found that if the marginal areas to the ponds are separated by low barriers fishes will jump these to spawn in the shallow water thus provided. He recommends that one pond in a circulatory system be used for *Daphnia* cultivation, for they keep the circulating water clear and free from suspended algae. In reply to questions about common pond pests, Mr. Hounsfield recommended the common water snail *Limnaea stagnalis* for elimination of *Hydra*, and said that the viviparous snail *Paludina* will help to keep blanket weed in check. To catch planarians, which will eat the eggs in snail spawn, he uses raw meat bait in a stainless steel gauze container lowered into the pond in the evening, and takes this out with the planarians just after dark.

In the Water Garden

(Continued from page 114)

purple flowers. I have used this, incidentally, on occasions as a substitute for peppermint. *M. silvestris* is fascinating in that the leaves are absolutely white on the undersides. It produces slender spikes of lilac-like flowers in addition. "Forget-me-not is all I ask"—you know the old rhyme, but why not include some of the *Myosotis* or forget-me-nots that like shallow water? I love blues at any time and that is why I always insist that two of these friends are included. The first one is *M. palustris*, which grows in shallow water and produces masses of light-green leaves and blue flowers with yellow eyes. There is another, *M. p. semperflorens*, which is a much broader species and is of neater habit too. I prefer it on the whole because it has a prolonged flowering season and only grows eight inches tall.

Lastly, I want to mention a Chinese plant which should be grown at the waterside. It grows three feet tall and produces large shiny leaves which are often 20 inches across. The rich orange flowers that it produces in profusion are borne on stout stems and they seem to appear quite unannounced at any time at intervals between, say, the middle of July and the end of September. I think that this is well worthwhile including because there are few other plants which have just this colour. Anyway, try it and see what you think.

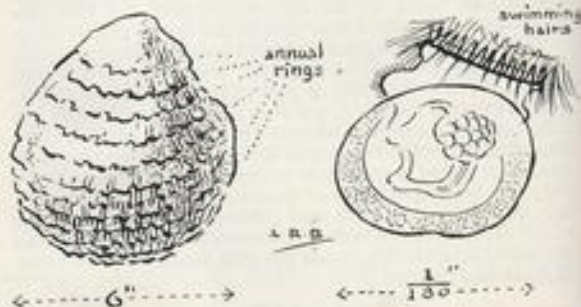
NEXT MONTH'S ISSUE—

With the close of the pond and water garden season increasing emphasis will be given in coming issues of *The Aquarist* to tropical fishkeepers' interests. Next month the first of a series of articles by Dr. Myron Gordon, Geneticist to the New York Aquarium, explaining heredity in fishes, will appear—the first lucid detailed account of this important subject to be offered to the aquarist.

AQUARIUM NEWS

Star of Southsea

ATTENTION settles upon Southsea Aquarium, which now has its own pipe-line direct from the sea, so that a future of really useful work should be assured. This aquarium now ranks as second only to Plymouth on the south coast. Plymouth, the mother of all British aquariums, is naturally in a class by herself. As regards Brighton, this column apologises for its rash optimism of a few months ago. Until Brighton can once more enjoy scientific directorship, the less said the better, and we shall give the place no more publicity.



Southsea's oyster and how it began

Southsea's star to date is an oyster that is making many mouths water. The shell is six and a half inches long by nearly as many across, some three inches thick, and weighs four and a half pounds! Everybody knows it is a century old, though one fancies a conchologist might deduct fully four-fifths of this age. Any oyster is liable to be carried by currents into deep water, where it must put on weight to withstand a myriad foes. Normally an oyster comes to table when about two and a half years old. Victorians loved giant "wild oysters," to put into their dark steak and kidney puddings, concoctions appealing to the gourmand rather than the gourmet.

L. R. Brightwell

Book Notice

TWO new booklets are added to *The Aquarist* series this month. The first is of special interest to the practical herpetologist and is called **Keeping Reptiles and Amphibia**. It is written by Ernest J. F. Pitman, late of Hastings Aquarium and now Assistant to the Director of the Zoological Gardens, Chester. This booklet is the most comprehensive work on practical care of reptiles and amphibia yet to be published, and it covers all the species which can be kept without difficulty by the amateur. *Keeping Reptiles and Amphibia* contains many photographs and drawings and is priced 2s. 6d. (2s. 8d. post free).

The second booklet, in the new handy pocket size, is **Coldwater Fish-keeping**, and is written by A. Boarder, the coldwater pond and aquarium authority who needs no introduction to readers of *The Aquarist*. Containing 56 pages of text dealing with the goldfish varieties and all the commonly kept coldwater fishes, their maintenance, breeding and rearing in ponds and aquaria, this book is illustrated throughout and will meet the real need for such a work. Both booklets will be stocked by dealers or can be obtained from *The Aquarist* (each 2s. 8d. post free).

Assessing the FURNISHED AQUARIUM

The following questions concerning the Federation of British Aquatic Societies pointing system for exhibited furnished aquaria were collected from society members in the Federation of Northern Aquarium Societies by Mr. R. E. Legge. The Editor of "The Aquarist" has put them to a well-known F.B.A.S. judge, who in his answers, which are printed below, endeavoured to give the views shared by the majority of his fellow judges.

Editor: In spite of the easy and generally helpful points system for show furnished aquaria formulated by the F.B.A.S., there have been a number of questions raised by aquarists in the north of Britain, where F.B.A.S. judging standards have only comparatively recently been adopted. Some of the questions may be thought to be aimed critically, others raise controversial issues, but in general they are from people who have had no chance as yet of ascertaining the views of "southern judges," and specially require help because of next month's British Aquarists' Festival at Manchester.

Judge A: Well, the points system for judging furnished aquaria was never intended to give definite, standard directions for all possibilities, neither could such a system be expected to do so. After all, if there were hard and fast rules it would only be necessary for competitors to comply exactly and there would be no need to judge! For one thing, each judge has his own ideas about harmony and design, and whatever system of pointing was in force much would have to be left to the judges.

Editor: Yes, I think that most of Mr. Legge's questioners realise that. But with regard to queries concerning judges' interpretations of the headings of some sections of the F.B.A.S. system, do you think it will be possible for answers to be given which can—well, be taken as gospel?

Judge A: I have judged with many different judges and have noted their different approaches to this task, and I will certainly try to give briefly what I consider general reaction to the questions would be. Concerning the actual interpretation of the sections, most judges agree in the main on most of the points, but there are and always will be some divergence of opinions on the more contentious definitions.

Editor: Here are the first two questions then. They deal with the fishes. Is any preference shown for exhibiting a single variety or species, a community of fish from the same family or a mixed community, and is the rarity or otherwise of the exhibited fish taken into account? Would an exhibitor lose points for showing a perfectly matched shoal of half to three-quarters grown fish whatever the variety chosen?

Judge A: I do not think that any general preference is shown for single varieties in a tank. I have seen mixed species obtain firsts in some shows and single species have done so at others. Fishes mixed unsuitably, for example where a carnivorous type was placed with fish on which it might prey, would be down-pointed. I know that some judges expect fully grown fishes in furnished aquaria. Where small species of fish are concerned I think adult-sized fish would be preferred, but this is not possible always in midwater aquaria of course.

Editor: Now for the plants. Will a wide selection in a tank gain more points than a more conservative lay-out in which only three or four kinds are used? Is there a maximum number of varieties which it is advisable to use and can points be lost for too many varieties?

Judge A: I have seen judges count the number of plant species and varieties and point them accordingly, and some judges favour suitability of the plants before actual numbers of types. I do not think there is a maximum number of



Show judging is an exacting task. A large number of factors has to be considered when an exhibit is assessed

varieties except that if a competitor used so many plants that there was only a small piece of each, the whole would not gain so many points as if a typical bunch or clump of each kind were used.

Editor: Although geographical relationship is normally only considered in the event of a possible tie, would indiscriminate mixing of a dozen or more varieties from all parts of the world lose points under the heading "realism"?

Judge A: No great notice is taken of the natural habitats of all the plants in a tank. What is considered important is whether they are likely to grow together in harmony or not.

Editor: How about the permanency of the furnished aquarium? Is this judged from both the "mature, old-established" point of view and the "how will it look in a few weeks" aspect? Most exhibitors seem to consider that the appearance of permanency is the most difficult part of the task of setting up a competitive furnished tank. In view of this, are the five points allotted to this sufficient?

Judge A: Permanency is usually judged from the aspect "will it last?", not so much as to whether the tank looks as if it had been made up a long time. As the idea is not to make the tank look old, I think the pointings for this are fair.

Editor: Is it possible to use an entirely original design without losing points in other sections? Since a study of the score sheet of any of the big shows reveals that the judges have given a more or less flat rate of points for originality, even where no originality existed, would it not be better to allot only five points for this section?

Judge A: All the essential features of the set-up aquarium must be taken into consideration when originality is looked for. Originality without common sense would not get an exhibitor far! Some aquaria show some attempt at being

original but so many follow the set lines of previously successful tanks. Here again you will always find difference of opinion among judges as to what is original and what is not.

Editor: How do judges interpret this term "realism" under design? It is generally accepted that aquarium lay-out may be approached from the "slice out of a natural setting" viewpoint or from a purely imaginary conception. In this latter approach it is suggested that the exhibit cannot be pointed for realism when the intention may be pure fantasy.

Judge A: Well, most judges I have worked with have interpreted realism to mean approach to the natural, whether such an aquatic condition or state could be found in nature.

Editor: The first of these questions about rockwork I think has wandered away from the general query to the specific instance. However, it is, why do judges often fail to penalise the frequent use of lime-stone in tank lay-out when the use of this over a long period is most unwise?

Judge A: No, I cannot read minds! I do not know why the judges of the questioner's acquaintance did not penalise the use of incorrect rockwork. Most judges I have worked with down-point for this fault.

Editor: Why are judges so afraid of natural water-worn holes in rockwork when these features, provided they are accessible to siphon tube, can do no harm and add much character to the lay-out?

Judge A: Some judges do not like to see too many holes in rockwork as they have in mind that smaller holes can prove a source of trouble, but I have seen tanks well placed by judges when fairly large holes have been shown.

Editor: The last three questions concern technique. Under the heading "planting," do judges disapprove of the use of immature plants and young shoots (not nipped

off heads) in conjunction with mature plants, to suggest a well-established tank, or should all plants be well grown?

Judge A: No. I have never noticed judges down-pointing for use of small pieces of plants together with larger plants. Such natural-looking planting is generally rewarded by judges—the use of nothing but fully-grown plants does not give a natural effect.

Editor: Are points ever deducted for the grossly over-planted tanks frequently exhibited?

Judge A: Yes, points are often deducted for heavily over-planted tanks. They are, for instance, down-pointed on the score of permanency alone.

Editor: We are now at the bottom of the tank and the bottom of the bag of questions too. What qualities do judges look for in awarding points for compost, and are the "pea-sized siphon-tube stoppers" frequently seen scattered on otherwise excellent compost, suitably down-pointed?

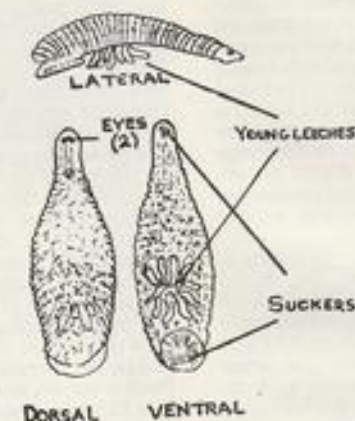
Judge A: Opinions vary greatly as to what is a good compost. My own personal opinion is that the compost should show some resemblance to the rockwork. I doubt very much whether many judges consider whether the stones are likely to stop up a siphon or not—a siphon correctly wielded by an expert can work wonders even among small stones. You know, a tank with vermilion coloured sand on the bottom could win if everything else in the tank were awarded maximum points, and I think that too few points are allowed for the overall beauty of a tank. Under the pointing system it is sometimes noticeable that the tank gaining the most points has not always looked the best tank. I consider that first and foremost the tank should look attractive, but although, as you see, judges occasionally have their own ideas about interpretation, on the whole the pointing system works fairly for all.

FRIENDS & FOES No. 6

LEECHES—2

MEMBERS of the Rhyncobdellae differ in several important details from those of the Arhyncobdellae. All are true bloodsuckers and are equipped with proboscides which are inserted into their victims. None of them can swim, progressing by stretching their bodies to the utmost, gripping with the anterior sucker, and bringing the rear one up to it, the body momentarily forming a loop between the two organs of attachment. Eggs are laid into a brood pouch on the lower ventral surface, and the baby leeches remain attached to their parent for several days after they have completed development, sharing the blood of its victims.

They are usually introduced into aquaria upon plants or snails, and can become a nuisance. Apart from *Hemiclepsis marginata*, however, which will be dealt with next month, they are little more, confining their attentions to snails or "bloodworms." *Helobdella stagnalis*—the "marsh leech"—grows to a maximum of five-eighths of an inch, and at rest appears rather like a pinkish or greyish, pear-shaped piece of jelly. It possesses only one pair of eyes, and

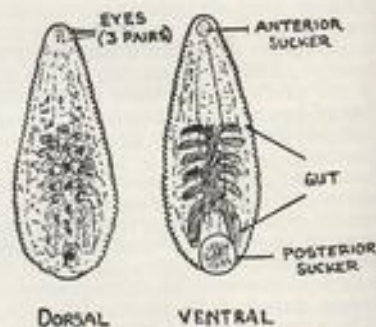


Helobdella stagnalis.

the members of this are placed so close to each other that the creature appears to squint.

Glossiphonia complanata—the "flattened tongue-murderer" is a pale-greenish leech with several rows of cream and brown spots running down its dorsal surface. This leech reaches just over an inch in length. It has three

British Leeches



Glossiphonia heteroclita.

pairs of eyes, one pair quite often being unpigmented. *Glossiphonia heteroclita*—the "tongue-murderer with a different lower part"—is smaller, seldom exceeding three-fifths of an inch, and clear amber in hue. It, too, has three pairs of eyes.

C. E. C. Cole.

THE AQUARIST

AQUARIST'S Notebook



by John Green

I have blindly followed their predecessors, potassium permanganate is often recommended as a solution for "sterilising" aquaria. It is useless for this. In fact, although the directions are often given to "sterilise" an aquarium after disease has been present, this is no easy matter.

To kill all forms of life within a tank, as the term sterilise would indicate, is quite possible, but the aquarist does not mean to do this at all. He will remove his fishes but likes the sterilising procedure to leave his plants unharmed when the tank is treated. This makes the difficulty, and I believe that adequate treatment can only be given by dismantling the set-up, scalding the sand and rocks with boiling water and dealing with the tank itself and the plants separately. The empty aquarium can be filled with a solution of Lysol or similar antiseptic fluid and then washed with plenty of water before using it again.

For the plants, and for lazy chaps like myself who risk treating the tank whilst it is set up (but without fishes) chlorine-containing solutions are the best "near-sterilisers." There are several proprietary solutions but it is cheaper to use chloride of lime (bleaching powder). Dissolving one level teaspoonful in every five gallons of water gives a solution containing 20 parts per million of chlorine. Plants will not live long in this of course, but it rapidly kills surface algae and disease organisms and a good measure of safety is given by alternately dipping plants in the solution and washing them under a running tap. Plants collected from natural waters which are suspect can be given this treatment too, and I always allow them to have a quarantine period of a week in a tank of water, after chlorine washes, to see that no viable pests emerge.

Sorry to remind you, but winter fast approaches and it is now a good idea to check thermostats that have been in use for some time, to avoid costly failures. The chief trouble to look for once the mechanism has been removed from its glass tube is corrosion or pitting of the two contacts (one on the strip and another at the end of the adjusting screw). Clean these with a piece of knife emery cloth, or on badly affected contacts a nail file can be used gently. Do not forget to adjust the instrument again after doing this so that it gives correct temperature control. Examine also all electric wiring insulation and make sure that all junctions are tight and see that there are no frayed or corroded wires. These operations do not take long and are well worth while.

I shun the very thought of including mermaids, submarine towers and castles, divers and sunken galleons (with or without bubbling devices) in aquaria, but from the number of these things on the market I suppose quite large numbers of people find them attractive.

Because there is this interest in aquarium novelties and ornamentation and only because of this I pass on an idea from a friend for a floating decoration: in his tropical tank my friend placed a large flat cork (sliced down from a pickle jar bung). On top of this he scattered lawn grass seed. In two weeks he had a floating green island—quite attractive if you like this sort of thing. It occurred to me that this might be an amusing way to try to propagate seeds from aquatics and bog plants.

I came across the following in a new book called *Ambassador's Wife*, the memoirs of Mme. Elisabetta Cerruti. She tells of a meeting with Eva Braun under shopping for a birthday gift (a glass-topped table incorporating an aquarium) for Hitler. Eva Braun says "... it is his special desire to have a tea-table with small goldfish swimming under its glass top. I am supposed to serve him tea dressed in a diaphanous, green garment."

This interest in aquaria (?) does not endear to me the memory of the little man who plunged the world in chaos, but I do hope that Mme. Cerruti's comment in her book refers only to the diaphanous garment: "It was just one more illustration of his erotically sick mind."

Post-Mortem Examination of Fishes:

W. Harold Cotton, F.Z.S., 99, Brook Lane,
King's Heath, Birmingham, 14.

Specimens should be sent direct to Mr. Cotton, with full particulars of circumstances, and a fee of 2/6.

It is important that the following method of packing fish be adopted:—Wrap fish, very wet, and loosely in grease proof paper and then in wet cloth. Re-wrap in greaseproof or wax paper and pack around with cotton wool in tin box. Despatch as soon as possible after death, with brief history of aquarium or pond conditions.



September, 1952



Aquarium in the Picture

An aquarium set-up by expert tank furnishers (it was the winning furnished aquarium entry by Hendon A.S. in the Scottish Aquarium Society's Show last year). Containing a shoal of rosy tetras (*Hyphessobrycon rosaceus*) it is based with coarse sand and sandstone rocks. The plants are *Ludwigia*, *Ambulia* (*Limnophila*), *Cabomba*, *Vallisneria*, *Myriophyllum*, *Hygrophila*. In the centre are *Cryptocoryne* and to the left of these *Acorus*.

Photo: Annan, Glasgow

Journal of a MARINE AQUARIUM

by L. R. BRIGHTWELL



THE way of the virtuous marine aquarist, like that of the wicked man (see Holy Writ) is hard. But not so hard as to be discouraging. It is a constant challenge to vigilance, patience and ingenuity, rewarding with unexpected delights and discoveries. It is always to be remembered that, not only is the sea's population infinitely vaster per acre than that of the most densely crowded lake or river, even a tropic one, but the water itself is highly complex in its constitution, and does not remain static, being subject to seasonal changes quite unknown in fresh water. Marine aquarium-keeping cannot possibly, then, be "easy," or allowed to take care of itself.

This July brought brisk October weather, and if unkind to holiday-makers on the coast, had its advantages for the aquarist. A brief heat-wave in June sorely tried my three tanks set in a window facing east, but sunblinds and cover-glasses faced with green and blue cellophane saved most of the animals. The tanks enjoy an average of 15 hours' aeration a day. One tank is kept under inland conditions, but as regards the other two I avail myself of every advantage incidental to living on the coast. It amazes me that there is as yet not one sea-water aquarist society in the country. What a show such a body, with its competitive spirit well roused, could present.

As I have often mentioned, the plumose anemone (*Metridium senile*) is easily the most beautiful of our 40-odd native species, and is remarkably abundant. Not long ago I shoveled more than 300 over the side of a Newhaven trawler, after only 2½ hours' haul. I put one of the largest in a bucket of sea water and, when fully expanded, it measured quite eight inches high and as much across, to the amazement of the crew, who had never before seen one displayed. I started with seven of these anemones, and at the end of six months had 11, one of its means of multiplication being by fission. I keep them well and vigorous by changing the water three times a week and am sometimes able to give them a tumblerful of plankton. An anemone can survive a surprising amount of starvation, weeks, and in some cases—years.

In this same tank is a bevy of hermit-crabs, toddlers in top and winkle shells, constantly revealing fresh aspects of their restless, pugnacious character. Lately I put a six-inch rag worm in the tank. At once a hermit, nothing hampered by its heavy winkle shell, attacked the worm and after a lagoon struggle bit off half-an-inch or so, and thereupon became the centre of a furious dog-fight with five companions all determined to claim the prize. A more placid member of the company is *Pilumnus hirtellus*, looking like a miniature edible crab in a heavy coat of long hair. This crab has annexed a big tropical murex which it uses as a kennel, only leaving it for a nightly forage. Normally

this crab is fond of hiding in empty *Pholas* borings, favourite retreats of the blenny, carpet clam and many worms.

Happy the cold freshwater or tropic fan living by the sea. He can nearly always get mussels, ideal raw for crabs and anemones since they leave little waste, whilst if steamed, to give them a little firmness, and then chopped fine, few of the larger "trops" or goldfish varieties can resist them. Summer often sees the beach-pools filled with little darting opossum shrimps (*Mysis*). These make fine fish food, and a batch of nursing mothers, each with her loaded brood-pouch, will supply provender for plankton feeders, the opossum shrimp being a livebearer.

Not long ago an occasional writer in an aquarium journal repeated parrot-wise the old exhortation of the earliest aquarists . . . "Never introduce weeds into a marine aquarium." But as we live we learn, or at least should, and recent experiments at Millport and elsewhere are causing us to revise our ideas regarding this matter. At the station mentioned, for example, *Gigartina* has been found to do well for 18 months or more in static sea-water. In January 1952 I placed in a pound jam jar of seawater small clumps of a rather coarse red weed, *Rhodochorton*, and a little fluffy brown or olive green weed, *Polysiphonia nigrescens*. Both weeds are found high up in the tide range and to-day, in mid-summer, they are alive and flourishing, and the water



topped up as evaporation dictates, is crystal-clear. Further, it is full of minute worm larvae (*Phylodoce*) hatched from egg masses, looking like finger-nail-sized globes of green glass—another tip for marine aquarists in search of plankton on which to rear young fish. Crawling about amongst the weeds are numerous specimens of a minute sea-anemone (*Rissoa*) introduced with the weed and sharing its abundant vitality.

In conclusion I would seriously suggest that on the south coast at least, rich in towns and townlets, well linked by excellent bus services, an effort should be made forthwith to found a marine aquarists' club. It is only by team work and the free interchange of ideas and discoveries that worthwhile progress can be made in aquarium-keeping, and marine aquaria in particular open up illimitable possibilities for the, as yet, much too small a company of pioneers.

ROAD SAFETY Taught to Surrey C

Reported by CHARLES TOMS Photos



Somewhat over one half of Mr. van Hoorn's garden is shown in this view from the terrace of his bungalow. In the foreground is seen one end of the ornamental pond and beyond it the small "Walton Bridge" replica spanning the river from the garden swimming pool. This pool lies between the bridge and the summer house pictured in the centre background



The large bridge over the ornamental pond bears plaques dedicating it to Mr. Winston Churchill, and all the blocks and pillars for its four spans were made in moulds by Mr. van Hoorn. It is strong enough to take the weight of a motor car. The rockery, fountain and waterfall are those visible in the picture at the top right of these pages



Children practising the highway code recommendations as traffic lights are automatically operated. Mr. van Hoorn's novel scheme

Children in a Water-Garden Setting

Photographs by VALERIE LILLEY STUDIOS

Mr. P. H. C. van Hoorn, a motor engineer, has set up a safety training school for schoolchildren aged five to ten. The school is situated in a garden which contains a 1,000-gallon ornamental pond and round over 600 feet of road. Children learn to cope with all the hazards of main roads, roundabouts and zebra crossings. All this was built by Mr. van Hoorn. The school and garden will be given instruction in road safety.

The garden is landscaped with rockeries and having a fountain and a waterfall at one end (pumping 1,600 gallons an hour), the garden contains an imitation swimming pool. A small bridge—a replica of the Walton Bridge in London—crosses the central, small island. Water pumped through the garden reaches the river. At night the whole garden is lit up by hidden floodlights.

Many goldfishes, etc.) live in the ornamental pond, which has a small island in the middle.



View from the 10 feet wide bridge over the large pond planted with water lilies and irises, and stocked with fishes. Steps from the bungalow on the right lead to a small lawn and thence to a sunken path which surrounds the pond. One of the waterfalls and fountains is shown at this end of the pond.



Another general view of Mr. van Hoorn's garden shows the portion to the left of the Walton Bridge replica, between this and the end of the Churchill Bridge. Concealed floodlights beneath the arches of the bridge and lights on its pillars transform the whole scene at night. In the small doorway set in the rockery (centre foreground) are housed the pumps for the waterfall.



The "cross-roads" at one end of the Churchill Bridge. The garden hopes to induce local councils all over the country to adopt similar measures to promulgate road safety.



Stepping Stones

(Continued from page 121)

fry, when they first hatch, seem thinner and weaker than goldfish fry. Once the fry get over a week old they appear to make better progress, but before that they are so feeble that I am sure that many are devoured when young. Tench are very fond of all types of molluscs, and crushed water snails are one of their favourite foods in captivity. Earth worms are a good substitute and almost anything in the live food line will be taken by them. They can be reared with Bemax and will learn to take most types of food given to goldfish.

Pond Minnows

The minnow, *Phoxinus phoxinus*, is a small, handsome and popular fish. It is generally found in running waters and appears to prefer a gravelly bottom. It shoals well and in fair numbers makes a fine addition to the pond. Minnows rarely exceed four inches in length and so you need never fear that they will grow too large for your pond. Minnows may be spawned in a pond but it is well to have clear water with a stony bottom and a fountain playing or a water-fall in action occasionally will help towards this end. Minnows feed on small water insect larvae but can be fed on most of the usual smaller types of pond foods.

The gudgeon, *Gobio gobio*, is another small fish which can be kept in a garden pond. It is however, a bottom feeder, as its two barbels denote. In a fairly shallow pond it can be seen, usually in shoals, feeding on the bottom. When hungry, gudgeon will sometimes come to the surface for food. One of the favourite foods, gentles, will be taken with avidity and small worms will make a good substitute. It would be a very interesting performance to be able to breed these fish in a pond as there is not a great deal known about the young stages of the gudgeon.

The pike, *Esox lucius*, is sometimes referred to as the freshwater shark, for it is a very voracious feeder. It can take other fish more than half its own size and usually will disdain anything which does not move. If one is kept, it should be by itself, as in a garden pond even with another pike the same size, one day a tragedy might occur. If well fed the pike can soon grow to a large size and some over 40 pounds have been taken. You are not likely to get one to grow to a good size unless you are able to provide it with plenty of live fish as food. They will take earth worms quite well but would require a large number if no other food was available.

The dace, *Leuciscus leuciscus*, is a slender fish of the roach type but a better fish for the pond. It is very lively and will do well among others of its size. Although it prefers

running water in nature it can be kept in a pond if a fountain can be worked for a time each day, especially in hot weather. Although it feeds mostly on insects, worms and small crustacea, it can be fed on ordinary goldfish foods. Strangely enough small ones can be kept for considerable periods in an aquarium. The dace does not grow very big, and is not likely to reach over a pound in weight.

The bleak, *Alburnus lucidus*, is a fish somewhat similar to the dace and makes quite a good fish for the pond, and, when small, for the tank. It will take food which is suitable for the dace and is a very lively fish, often feeding at the surface.

Another river fish, the chub, *Leuciscus cephalus*, can be kept in the pond when fairly small, but as this fish grows to a good size, only the larger ponds should be used. Chub have been caught weighing over eight pounds, but you are not likely to be able to keep one anything near this size unless the pond is a big one. It is an omnivorous feeder, eating frogs, fish, larvae and worms as well as plant life in the shape of buds and shoots.

The common carp, *Cyprinus carpio*, is a good and long-living fish for garden ponds, but as it is rather dull in colour it is not as good as the goldfish. In a large pond where there is plenty of food, carp can grow to a very large size, over 20 pounds for an old specimen. They are very prolific breeders and can be bred under the same conditions as goldfish. Their food can be as varied as that for common goldfish and they are quite hardy in this country.

Other British freshwater fishes are not as useful for pond-keepers and the following are types not recommended for the average pond:—the bullhead (miller's thumb), *Cottus gobio*; ruffe (pope), *Acerina vulgaris*; the eel, *Anguilla vulgaris*; the trout, *Salmo trutta* and the barbel, *Barbus barbus*.

Line-caught Fishes

When stocking a pond with any of these fishes it is better to catch the fish when young with a net, as fish caught with rod and line are often damaged, and some do not thrive. This is especially the case where large specimens are concerned. The larger the fish the harder is it to get them reconciled to the confines of a fairly small pond. When introducing any fresh fish into the pond it is essential that they be kept in quarantine for a week in case they bring any disease with them. A good plan is to give all new fish a bath in Dettol, one teaspoonful to a gallon of water, and leave the fish in for about 10 minutes. This will rid the fish of any fish-lice or other parasites. To be successful at keeping and breeding British freshwater fishes I consider that it is essential to give the fish as much space as possible and to feed on the natural foods in preference to artificial ones.

Covers for Aquaria

THERE are two main types of aquarium covers, viz.: (1) Those which cover the whole of the top of the aquarium, and (2) Those which only cover half the surface.

The former are naturally more expensive but are much better in the long run because:—

1. Fish are quite unable to jump out when the cover is down.
2. Heat is more easily conserved, with a consequent saving in electricity charges.
3. The surface is kept much more free from dust, etc.
4. No light reflections from inside the tank are thrown upwards, thereby spoiling the appearance of a lighted tank.

5. The lamps are well clear of the water. In some types of half covers it is impossible to fill the aquarium with water to the top of the front glass because the cover lamps would then be partially immersed. Before purchasing a cover it is advisable to make sure that there will be sufficient clearance for the lamps over the water surface.

The best covers are made of aluminium and are usually given a spray finish in green or cream. Alternatively, they may be painted any colour desired to match the colour scheme of a particular room. Some shades look as if they were made of aluminium at first glance, but these are merely tinned over, and become very rusty in the course of a single week. It is wiser to have all wiring outside the cover, a feature of the more expensive shades.

Raymond Yates

THE AQUARIST

ANSWERS TO READERS' QUERIES

Please could you tell me the cause and possible cure of cysts or raised ulcers which have killed several of my fish? I feed the fish in my aquarium with Daphnia and Tubifex obtained from local ponds.

In most cases, cysts or ulcers such as you describe are brought about by bad living conditions, though a few species seem to develop them without any apparent cause. It is possible to introduce all sorts of mysterious complaints with live food taken from stagnant or smelly waters. We suggest you stop feeding live food obtained from the usual sources and treat the ulcers with mercurochrome dabbed on them while the sufferer is held in a net. It might be worth your while to empty the aquarium, wash it out with a germicide such as Dettol, and start up afresh with baked sand and newly purchased plants.

I live nine miles from the nearest dealer in tropical fishes and I wonder whether you could tell me the best way to get my purchases home?

Carry the fish in a large Kilner type jar with a rubber sealing ring. Wrap the jar in flannel or felt and cover this with the usual brown paper. Unless the weather is very cold, the jar will keep warm. Six small fish of neon tetra size can exist for four or five hours sealed up in a quart of water.

We wish to breed tropical fish for profit. Will we find a market for mollies, Siamese fighting fish, angels, swordtails and other popular species? How should we set about contacting dealers? We should also like to know the best food to feed to fry during the winter.

There are fashions in fish just as there are fashions in clothes, dogs and fancy mice. But the species you mention are not the sort to lose their popularity and fall out of favour. Naturally, the prices offered for fish vary with supply and demand. All the same, good fish usually command a good price and are readily snapped up by reputable dealers. The best way of disposing of stock is through the advertisement columns of *The Aquarist*. During the wintertime, you can hatch brine shrimp eggs for your fry, or breed micro worms in quantity in shallow dishes filled with cooked oatmeal.

I am thinking of making some dried food based on the following recipe; $\frac{1}{2}$ lb. each of dried Daphnia, dried shrimp, Bemax, fish roe, Chappie and two eggs. Can you suggest any other ingredient to improve it?

The addition of one heaped teaspoonful of powdered fish bone or precipitated chalk would improve the value of the food, for both provide calcium which encourages skeletal growth. You do not indicate the sort of roe you intend to use. We can recommend cod's roe, which is highly nutritious.

When my angel fish spawn I cut away the leaf holding the eggs and place it in another tank. After two days most of the eggs have developed fungus and the few fry that hatch out fall to the bottom where they also contract fungus and die. Can you tell me the reason for this?

The eggs of most cichlids develop fungus unless the water is kept moving around them. We suggest you supply artificial aeration which will circulate the water. As unclean conditions are very conducive to fungus spreading among eggs and fry, the bottom of the aquarium should be kept scrupulously clean.

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.

The plants in my aquarium look healthy, but they do not seem to grow. They get a fair amount of daylight and electric top light every night. The aquarium has been established about seven months. During the last few weeks an angel fish and three fighting fish have died. Before they died, these fish kept close to the top of the water. About how many fish will my 24 ins. aquarium support in comfort?

If your plants look healthy and are green, we do not think you need worry about them. Plants will sometimes go for a long time before showing any new growth. As for the fish that died, have you checked on the heating arrangements? A sudden drop in the temperature can quickly kill some fish. Overheating will also kill fish. If the other fish in your aquarium are alive and well and are not haunting the top of the water, your angel fish or fighters were probably not killed by lack of oxygen. For one thing, fighting fish breathe atmospheric air and can stand no end of punishment in really bad water, while it is customary for angel fish to spend a lot of time near the surface on the alert for live food. Your aquarium will support about 50 fish of guppy size. For larger fish up to three inches long, it is best to allow each one of them about 10 square inches of surface area. Artificial aeration will enable you to keep more fish in a confined space.

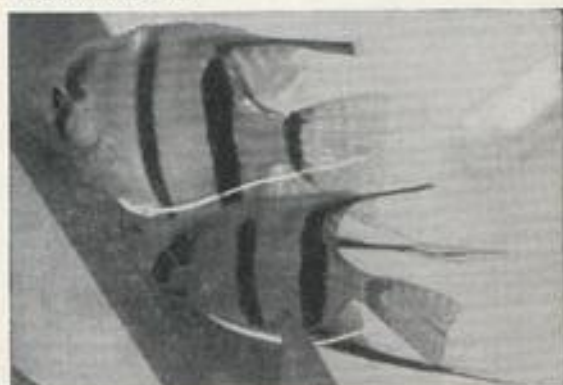


Photo:

V. E. Scoffin

Movement of water around angel fish eggs is achieved by fanning motions of the parents' fins

My fish are suffering from swollen gills and diseased gill-plates. The edges of the latter just rot away and disclose highly inflamed membranes. Sometimes the mouth becomes diseased and the soft portions rot away. Is there anything I can do to help the fish get better?

Badly infected fish are best removed from the aquarium and the diseased parts swabbed with a strong solution of salt and tepid water. For the rest, try adding four drops of a two-and-a-half per cent. solution of methylene blue to the aquarium water. Although methylene blue will stain

the plants and the sand, these will regain their former appearance after a few days. In the meantime, siphon away a lot of water from the bottom of the aquarium and make good the loss with fresh. If the trouble still persists, the wisest thing to do is to destroy the plant life, clean out the aquarium, disinfect it with a germicide, bake the sand, and start up afresh.

I wonder whether you could tell me the name of a book that covers practically every aspect of tropical fishkeeping?

Of all the books we have seen, perhaps the one most useful to you would be *Freshwater Tropical Aquarium Fishes* by Hervey and Hems. This book is not so lavishly produced as some American publications, but it covers more ground than any other book published in this country or abroad. It must be added that the possession of a small library of aquarium books is a valuable asset, for useful information appears in most of them, even the cheapest.

COLDWATER FISHKEEPING QUERIES *answered by* A. BOARDER

My lily pond is porous and is losing water. What can I do to stop it?

A concrete pond does not become porous after some time unless it develops a crack. During the warm weather the pond may have been losing a good deal of water through evaporation. If losses from the pond are heavy I advise that you empty it and leave it for a few hours on a sunny day to dry out. When it is almost dry you will see signs of cracks if any are there. These remain wet after the rest of the concrete has dried. With small cracks it is well to dry them with a blow lamp and force one of the bitumastic preparations into them.

If you can find no signs of cracks and feel that the concrete is actually porous you could thoroughly clean and paint all over with silicase, which is silicate of soda. It is no use floating over with a fresh thin coating of cement as this will not join up with the old and after a time will flake off. One way to treat the pond if porous would be to float all over with a good mixture of fresh concrete, three of clean sharp sand to one of new cement. Well mix and lay on at least half an inch thick without any breaks.

Perhaps the pond was not made correctly in the first place. The cement must be fresh—it is no good if it has partly hardened through dampness, and the sand must be clean. Also, if, when mixing, the concrete was left too long before being placed in position it may have started to set, or go off, and then its strength will be lessened. Unless ponds are made at least three inches in thickness, cracks may develop through severe frosts.

I have always kept goldfish outside in a pond but have now bought a 24 ins. tank and have one four inch and two three inch goldfish. What equipment is necessary for coldwater tanks, what types of plants, and if I add more fish, how many and what types do you suggest?

There is no special equipment necessary for a coldwater tank. Perhaps you have in mind an aerator and filter. It is quite possible to do without these. The only time they are likely to be of assistance is if you try to overcrowd the tank. I use neither for my tanks and they keep in good order. As soon as you try to keep too many fishes in the tank you will have to resort to these artificial means to keep the fish alive; even then they will not grow if there are too many. Your maximum amount of fish will be about 12 inches of fish excluding the tails. You have already almost enough fish, and one more about three inches long would complete the quota. Plants can be chosen from *Vallisneria spiralis*,

Egeria densa, *Myriophyllum*, *Fontinalis*, *Ceratophyllum*, *Elodea canadensis*, *Lagarosiphon* and hairgrass. You had better stick to the one type of fish in your tank and do not attempt to keep more than I have suggested.

During the past two seasons I have bred hundreds of fry but try as I may I cannot rear them. After about 10 days I lose the lot. I use two tanks 20 ins. by 10 ins. by 10 ins. with about four or six inches of water and an aerator. How can I rear some fry?

The cause of the death of your fry may be due to overcrowding. Once they are free swimming and start to grow it is absolutely essential that they get more space. Your tanks are not large enough to rear many fry, and the depth of water can also be increased once the fry are a week old. You say the temperature has been 70° F. in the rearing tanks; at this temperature the water would soon become foul if you had been giving too much food. These small fry eat only small quantities of dried foods and the rest sinks

to the bottom to pollute the water. You could not rear more than a dozen fry in each of your tanks and if you try to accommodate more you may lose the lot. Of course you may be losing them by gill fluke attack, but their death appears to me to be too sudden for this complaint. Give much more room and you will be more successful. Fry will grow on their own without any attention from you if in a large enough tank and not crowded.

I am making a fish-pond in my garden and someone has told me that the lime in the cement will kill the fish. Is this true and can I paint the pond to make it safe?

You can paint the concrete with silicate of soda to seal in the lime but I think that it is quite sufficient to scrub the surface thoroughly and wash it out well two or three times before putting in the final water. When concrete is first dried there is always a coating of free lime. If this is well cleaned off I do not think that there will be much more trouble. The free lime will appear as a form of white powder and can easily be cleaned from the surface. There is one very important point about making a pond which many people lose sight of; it is that the smaller the amount of water in relation to the surface of concrete then the heavier will the concentration of lime be. A large, very deep pond may not contain a heavy enough concentration of lime to harm fishes even if it had only been rinsed out once, whilst a very shallow pond would be far more dangerous to fish.

Last summer we reared some goldfish fry in an outdoor pond away from the parent fish. By autumn they were well grown. We left them in the pond but none survived the winter. Should we have removed them to indoor tanks?

The fish were large enough to go through the winter outdoors only if the pond was not too small. They would probably have been safer in tanks unless you tried to keep too many in too small tanks. Last winter as an experiment I kept a few late hatched fantails in an outdoor tank. They were only about an inch and a half over all in size, and although the tank froze over very thickly on two or three occasions the fry came through safely. It does appear to me that the size of the fish is not as important as many writers would have us believe for them to winter safely out of doors. The purity of the water alone is to me the point of utmost importance. Also, a very shallow pond is not as safe a place as one which is at least two feet in depth.

Can you please tell me at what age female shubunkins are likely to spawn, and is there a way to tell their age easily?

The age at which a shubunkin can spawn depends a great deal on the way it has been cared for. I have bred from fantails of at least 14 years, and they had spawned on an average four times a year for at least 12 years. There is no easy way to tell the age of a fish. Some aquarists can grow a fish so fast that it will be three times as large in two years as another which has had the wrong treatment. It is possible to grow a shubunkin to five inches in three years with plenty of space and food, but another fish of the same age may only be two inches long if it had not been well treated. The look of the fins is not always a good sign. I have known quite old fishes look in perfect condition as to finnage and I have also seen young fishes show such ragged fins that they have appeared much older than they actually are. There is another point to consider and that is the difference in the rate of growth among fry of the same spawning. Some make rapid headway whilst others appear never to grow up.

I have seen my shubunkins driving well but I cannot find an egg afterwards. Is there something the matter with the female?

You may not know what goldfish eggs look like and so are not able to find them. Goldfish eggs are small round beads of jelly laid singly, adhering to the water plants. When in the water they are hardly visible to the unpractised eye, but if the bunch of water plants be raised from the water the eggs show up clearly, appearing pale amber in colour. Your female may be badly constipated through feeding with the wrong types of food. This may have some effect on the laying of the eggs. You should feed almost exclusively on live foods such as earthworms prior to breeding time.

My aquarium has had a perfect bill of health for the past year. I have lately introduced a young comet, and now all is going wrong: the comet has died and a shubunkin is going wrong. Should I disinfect the aquarium, and if so, should I remove the weeds first?

I so often hear this story of trouble after placing a fresh fish in a tank. If aquarists would only treat all newcomers as suspects for a time there would not be half the trouble. Whenever a fresh fish is obtained it should not be placed with your other fishes but should go in quarantine for about a fortnight. Many people are having trouble with white spot disease, and this I feel sure, is only through introducing the disease with new fish. Disinfect the tank by all means. Dettol will do quite well at one tea-spoonful to the gallon. Leave for an hour or so and then siphon off and put in fresh water. The plants may not be harmed by this treatment as long as they do not have to put up with too strong a solution for too long a period.

My pond is an iron tank, 5 feet by 2 feet by 2 feet, sunk in the ground. It contained four rudd, one golden rudd, three Prussian carp, one golden tench, one minnow; average size three to four inches, maximum five to six inches. At the commencement of the fishing season I introduced at intervals, two gudgeon (small), a five inch Prussian carp and two green tench, six to seven inches long. None survived for long: one, the gudgeon, fed ravenously at the surface almost up to the day it died. There was no sign of causes of death but some had patches on the backs which looked blotchy: what was the disease?

From the description of your happenings in the pond I think that your main trouble was over-crowding. Your pond is very small, especially for British freshwater fishes

which had been caught with rod and line. Most of these fishes require more space than do goldfish. These latter have been bred for many generations under artificial conditions and have become used to rather confined surroundings. Fishes taken from natural waters, especially if they are of a good size, are bound to feel the difference. You had enough fish already in your pond and when you put the fresh ones in there was not enough oxygen for them all and the newer arrivals, having been used to purer water, were the first to succumb. I expect that the water in your pond was over 70° F. and this would tend to drive out more of the oxygen.

The marks on the backs of the fish were probably not signs of disease at all but may have been caused by you holding the fish whilst you removed the hook. Whenever fish die in a pond without visible signs of injury or disease it can be taken as almost sure that lack of oxygen was the cause of death. The gudgeon which was at the surface was probably gasping for air, not feeding. It is well to realise that many fish are injured when caught by hook, and the dragging through the water can damage the gills. Where this happens the fish may not recover.

Can you give me information on the following referring to the bleak?—feeding, sexing and breeding

The bleak, *Alburnus lucidus*, is a British freshwater species which shows a preference for running water. In natural waters it feeds on worms, water snails, *Caddis* fly larvae and most kinds of live foods. In captivity it will take most types of food as given to ordinary aquarium fishes and takes Bemax well. It is very difficult to sex these fishes. Almost all of the egg laying species show no indication of sex and the only real sign is that when they are in breeding condition the females will be plumper in the body than the male. The eggs being larger than the sperms of the male they take up more room in the body of the fish. This swelling can sometimes be seen more plainly if the fish are examined from above, when the rounder outline of the female will be more prominent. Their breeding habits are rather similar to those of the goldfish.

I have a pond about 11 feet by 4 feet with varying depths from 18 inches to 33 inches. There were 17 goldfish, three tench, eight roach, three Crucian carp, three bitterling, 36 minnows and some small goldfish. The pond is well planted and I have been feeding well with packet and other foods. One morning in July, all the fish were at the surface with their mouths half out of the water apparently gasping for air: they hardly left the top. Now some of the minnows are dead. What was the trouble?

Your trouble was lack of oxygen or a surplus of carbon dioxide. This was partly caused by the warm weather and the fact that at night the plants in the water do not give off oxygen but carbon dioxide. If you had immediately played the hose on the pond you could have saved all the fishes. You have a large number of fish in the pond and as soon as the water loses some of its oxygen the fishes will die. The minnows, being essentially river fish, would be among the first to feel the lack of oxygen. You may have been over-feeding with dried foods. These are very good in moderation, but remember that fishes in a well-established pond are able to find a considerable amount of food and so do not need too much artificial feeding. Uneaten foods in the pond will tend to cause foul gases to form.

One of my shubunkins in the pond has its eyes popping out of its head. What can I do about it?

The fish is one bred from a strain of telescopic-eyed fish. These develop protruding eyes sometimes after they are two or more years old. There is nothing you can do to stop it.

OUR READERS

Write—

Readers are invited to express their views and opinions on subjects of interest to aquarists. A selection from queries received will also be answered here. The Editor reserves the right to shorten letters when considered necessary and is not responsible for the opinions expressed by correspondents.



Too Much Coddling

AT the May meeting of our society a member reported an unusual experience with a spotted danio. This fish spawned one Monday, and was transferred with the male from the spawning tank, or rather this was the intention, for on the following Friday this female was not to be seen in the aquarium.

On going to a cupboard where the jar used to carry the fishes was kept our member found the missing female, in very little water. Thinking she was dead, but giving her a chance, he placed her in a tank and in a very short time she was swimming around merrily, apparently none the worse for being kept nearly dry in a cupboard for four days at a temperature of 58° F. Now our member gives it as his opinion that we coddle our fish too much!

T. H. COTTON, Secretary,
Burton-upon-Trent Aquarists' Society.

Marine Aquarium-keeping

I MUST confess to reading Mr. Gordon Elliott's article "An Aquarium from the Sea-side" (*The Aquarist*, June) with some amazement. Every marine biologist of account stresses the difficulty of keeping sea-water aquaria, and the wider one's experience the more readily does one agree with them.

How does Mr. Elliott keep the plumose anemone (*Metridium*)? Using a blunt spade to remove anemones is fantastic, and the statement that all weeds will rot and foul the water is inaccurate. What is a pebble crab? If the shore crab, then to keep more than one in a tank is simply asking for trouble. As for keeping sponges and corals . . . !

L. R. BRIGHTWELL,
Peacchaven, Sussex.

Correspondents Wanted

IT was with great interest that I read my first issue of *The Aquarist*. It surprised me a great deal to learn of your numerous societies and the great number of people who actively enjoy keeping tropical fish. Would any of your readers be interested in exchanging notes on tropicals?—Siamese fighting fish and angel fishes occupy the greater part of our time and interest.

MRS. P. E. PFEIFFER,
11, Vine Street,
Pittsburgh 23 (Etna) Pa., U.S.A.

BEING home a great deal I find the study of fish a wonderful thing. I wonder if there is a young man in your country who would find it interesting to correspond with

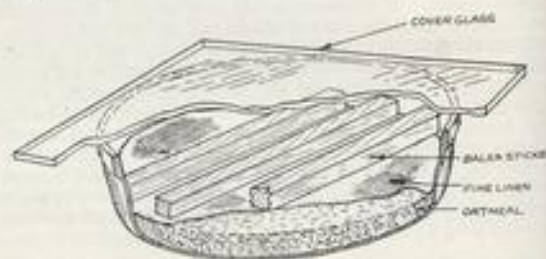
me (I am 25 years old). We could exchange ideas about our hobby and also about our countries.

J. W. GILLETTE,
851, Fry Street, St. Paul,
Minnesota, U.S.A.

Micro Worm Culture

AFTER reading the article on micro worm culture by D. Joel in *The Aquarist* (June) I was struck by the rather lengthy method described to collect the worms from the culture, i.e. "scrape them from the sides of the container with a razor blade." I used to do this myself until I developed the following method.

The culture is started in the usual way but over the top, in contact with the surface of the oatmeal, is placed one thickness of fine linen, previously soaked in water (an old handkerchief is suitable). On top of this some pieces of water-soaked wood are placed; I find balsa wood (about one-quarter inch square in section) the best as it is soft and soaks water up well. I then place a sheet of glass over, but clear of, the culture, and place the whole thing on top of the aquarium cover to obtain gentle warmth.



Moisture condensing on the underside of the culture cover glass drops back into the culture, keeping it moist. In a matter of a day or so the sticks are one mass of clean micro worms. All I do then is to take one of the balsa sticks out of the culture with tweezers and drop it into the aquarium with the young fish. This releases a cloud of micro worms, cleans the stick and re-soaks it. It can then be returned to the dish to collect another supply. By taking the sticks in rotation a constant supply of very clean micro worm is available and no messy collection is necessary.

K. C. BROWN,
Ickenham, Middlesex.

THE AQUARIST

Mysterious pH

WITH reference to a recent book review I note that the reviewer is disturbed by the fact that pH is described as an abbreviation for "percentage of hydrogen." As the leading expert, W. T. Innes, in his *Exotic Aquarium Fishes* gives exactly the same definition, can you spare a little space to enlighten beginners like myself on the true meaning of this very mysterious term pH?

D. GILBERT,
Charlton, London, S.E.7.

A full interpretation of the meaning of pH demands such full treatment for the benefit of readers not "chemistry-minded" that it is apt to assume an apparent importance out of proportion to its value in aquarium-keeping. It is as meaningless to define pH as percentage of hydrogen as it would be to describe a thermometer reading in °F. as percentage of heat. The percentage of hydrogen in water, steam or ice is a fixed quantity. What does vary in natural waters under the influence of substances dissolved in them is the amount of water which is "ionized" into hydrogen (H) and hydroxyl (OH) ions. The concentration of hydrogen ions in any solution determines its strength as an acid; in pure water acid properties are masked because each hydrogen ion (positive) is negated by an hydroxyl ion, and so it is said to be neutral.

Now the actual concentration of hydrogen ions in pure water at 72° F. is 0.0000001 gram per litre. To avoid having cumbersome notes of noughts when expressing these concentrations which, as can be seen, are very low, the system of using the negative value of the logarithm of the hydrogen ion concentration was developed by chemists. In this way the above figure becomes 7 (minus log. 0.0000001). This manipulation, well known in mathematics, is indicated by the symbol *p*, and when used for hydrogen ion concentrations it is denoted as pH. Its use gives a relatively simple scale with pH 7 as neutral (as in pure water), pH figures below 7 for acids (e.g. pH 3.1 for vinegar) and pH figures above 7 for alkalis (e.g. pH 10.7 for a one per cent. washing soda solution). Methods for obtaining the pH figure for any solution really measure its hydrogen ion concentration; the "mysterious term pH" is a convenient way of recording this value. But it is not in any way a percentage—a drop from pH 7 to pH 4 means, for example, that the hydrogen ion concentration has increased a thousandfold. Healthy aquarium waters do not give values much removed from pH 6.5 to pH 7.5.

Flowering Aquarium Plants

IN a previous issue of *The Aquarist* you published a photograph of a rare occasion—the actual flowering of a *Vallisneria spiralis*. Recently I visited a friend, the very proud possessor of a single aquarium, and found much to my amazement that in his tank were a number of *Cabomba* plants in full bloom. Each plant carried at the nodes a small delicate white flower and there were several on each plant.

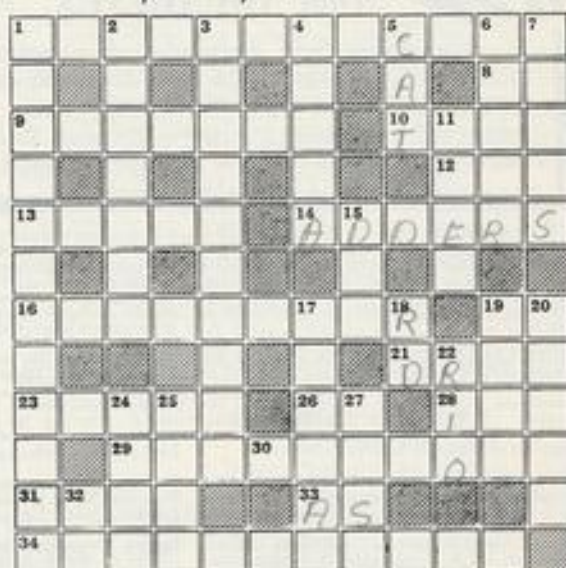
When I mentioned this to the beaming enthusiast, he laughed and said "Oh, that's nothing. You see those three *Vallisneria spiralis* var. *torta* at the rear? Each of them has flowered." I was aghast. Needless to say, he would not place the occasions on record for the interest of your readers so I felt I must write for him. In the same aquarium are several *Cryptocoryne*. I fully expect to see them in full bloom when I next visit him. Some people certainly have all the luck.

FRANK METCALFE,
Leeds, 6.

If you are about to form a new society, if you have a shop or if you are the secretary of a society putting on a public show, write to us for a free supply of our pamphlet "Why not have an Aquarium?" Space is provided on this for your name and address.

The AQUARIST Crossword

Compiled by J. LAUGHLAND



CLUES ACROSS

- | | | | |
|----|---|----|---|
| 1 | Junker fish (8-4) | 19 | Head of dogfish (2) |
| 8 | Plaice is excellent at heart (1, 1) | 21 | Marine crustacean (4) |
| 9 | Mob a cab (anagram) (7) | 23 | This water is not salty (5) |
| 10 | The mountain lake will rant if disturbed (4) | 26 | Nickel plate (1, 1) |
| 12 | End of the streamlet (3) | 28 | Water below 32° F. (3) |
| 13 | Egg-like (5) | 29 | Quite nice (anagram) (9) |
| 14 | Vipers (6) | 31 | Water snail eventually comes to the point (4) |
| 16 | Instrument for determining specific gravity (9) | 33 | Aquatic service (1, 1) |
| | | 34 | Fish cans (7, 4) |

CLUES DOWN

- | | | | |
|---|--|----|---|
| 1 | Piscine equivalent of front legs (8, 4) | 11 | These naturally upset the seal (6) |
| 2 | A sciaenoid fish (mostly salt water) (7) | 15 | Famous salmon river (3) |
| 3 | The pupae of insects which do not fully metamorphose (4-6) | 17 | Rue net (anagram) (6) |
| 4 | <i>Aequidens</i> (5) | 18 | Religious denomination (1, 1) |
| 5 | May have nine tails, but not if it is fish (3) | 19 | Penny on the ace (4) |
| 6 | These species are more valuable (5) | 20 | Abnormally fat (5) |
| 7 | Eighths of aquarists' standard measure (5) | 22 | Tetra from — (3) |
| | | 24 | Mire upsets the ruler (4) |
| | | 25 | It's a deal! (4) |
| | | 27 | This is the tail of the terrapin to a T (4) |
| | | 32 | Motoring body when the car leaves 4 down (1, 1) |

PICK YOUR ANSWER

- The first fish show to be held in Australia was in: (a) 1927. (b) 1929. (c) 1931. (d) 1933.
- Harlequin catfish is the popular name of: (a) *Microglanis paralyshae*. (b) *Pimelodella gracilis*. (c) *Pimelodus ciliatus*. (d) *Sarabim lima*.
- Synodontis nigricentris* (upside-down catfish) is native to: (a) Abyssinia. (b) Belgian Congo. (c) Mozambique. (d) Nigeria.
- Hydra* is represented in British freshwaters by: (a) Three species. (b) Six species. (c) Nine species. (d) Twelve species.
- A golden variety of the medaka (*Oryzias latipes*) was developed in 1895 by: (a) Chinese breeders. (b) Dutch breeders. (c) German breeders. (d) Japanese breeders.
- Cichlasoma meeki* (firemouth) was named by: (a) Brind. (b) Fowler. (c) Jenyns. (d) Myers.

G. F. H.

(Solutions on page 131)

News

from AQUARISTS' SOCIETIES

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

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

THE name of the Aqua-Art Club, Southport, has now been changed to the **Southport and District Aquarium Society**. Meeting place of the society is now the Y.M.C.A. Buildings, Eastbank Street, Southport, and members meet there on the first Thursday in each month at 8 p.m.

WHEN Mr. R. E. Legge gave a talk on his experiences in India he surprised members of the **Blackpool and Pyrlde Aquatic Society** by producing a live lizard and snake from his pockets. A visitor from California, U.S.A., has given the society an account of his home society's activities for its 2,000 members.

CARLISLE and District Aquarists' Society members recently spent an evening at the home of a fellow-member, Mr. A. Stephenson, who showed them his collection of aquaria. The society wishes to arrange other visits and the secretary, Mr. S. Crosby (120, Borland Avenue, Carlisle), will be pleased to hear from any aquarist within 50 miles of Carlisle willing to receive a party.

FIRST exhibition of the **Chester and District Aquarist Society** was held this summer and over 1,000 people visited the show. Organised parties of school children totalling 300 were taken round the exhibits. A stand exhibiting many specimens of pond life grouped with reference to the animals' use or danger for the aquarist attracted much attention.

SOUTHSEA Aquarium was visited by a party from **Clapham Aquarists' Society** earlier this summer, and was conducted around the aquarium by its curator, Mr. H. Sinclair. Some novelty aquaria which at one instant appeared to contain fish and at the next appeared bare of fish made an original form of diversion for the younger members of the society and were not without interest for the senior members as well.

Aquarist on Holiday

OPEN invitation to visit, for readers of *The Aquarist* who may be holidaying at or close by the following towns this summer, have kindly been sent from the addresses listed:—

Cheltenham

Gloucester and Cheltenham Aquarists' Society meetings—first and third Thursdays of each month, 7.30 p.m., at the Spa Medical Baths lounge, Bath Road, Cheltenham.

Devon

Valetta Fish Hatcheries, Culmleigh, N. Devon, can be visited by aquarists at the invitation of Mr. F. Hamlyn.

Eastbourne

Mr. D. L. Cann (secretary to the Platy Breeders' Association), 44, Westham Drive, Pevensey Bay, Sussex (Tel.: Pev Bay 383).

Falmouth

Falmouth and District Aquarists' Society meetings—third Tuesday of each month, 7.30 p.m., at Belmont School, Woodlane, Falmouth (or contact Mr. N. J. F. Storey, Rosslyn Hotel, Kimberley Park Road, Falmouth (Falmouth 699) or Mr. A. J. Lanyon, Ingestre, Agar Road, Truro).

London

Willesden and District Aquarists' Club meetings—second and fourth Wednesday evenings each month at the Court Restaurant,

AT this year's show staged by the **Doncaster and District Aquarist Society** over 100 tanks of tropical and coldwater fishes were displayed, in addition to pond life exhibits and a collection of reptiles. The Hammond Plaque awarded for the exhibitor obtaining the highest number of points was won by Mr. O. Wright.

JUDGES at the annual table show of the **Falmouth and District Aquarists' Society** were Mr. R. Mealand and Mr. A. Harvey. Black mollies shown by Mr. J. Storey were awarded the cup for the best exhibit. First prize winners were Messrs. Hammill, Storey, Lanyon, Uren, Jeffrey and Col. E. Bamfield.

FULL news of the component sections (Eastern Counties, North London, East Midlands, West London, South London, Thames Valley and Provincial Members) of the **Federation of Guppy Breeders' Societies** is given each month in the Federation's Bulletin. In the latest issue of this it was reported that F.G.B.S. members gained 25 awards at the National Aquarium Exhibition this year.

THE two-year-old **Gravesend and District Aquarist Society** held its first inter-club show in July, at which 180 aquaria containing 80 different varieties of tropical and coldwater fishes were exhibited. Mr. A. Boarder judged Mr. E. Noden's (Gravesend) fancy goldfish as best fish in the show and the promoting club also won first prize in the furnished aquaria section. **Medway Aquarists' Society** gained two points more than Gravesend.

MR. E. CHAPMAN of Sheffield entitled his talk to members of the **Halifax and District Aquarists' Society**, "Faults, Failures and Misfortunes of the Aquarist". At a society table show last month Mr. D. Collingwood took first in the cichlid's class and Mr. A. J. Rashley was similarly successful in the A.O.S. egg-layer (excepting labyrinth fishes) class.

74, High Street, Harlesden, N.W.10 (secretary, Mr. F. W. Keen).

Plymouth

Plymouth and District Aquarists' and Pond-keepers' Society meetings—first Tuesday each month at 50, Ebrington Street, Plymouth. Information from Mr. W. Nichols (press secretary), 35, Kingswood Park Avenue, Peverell, Plymouth or Mrs. V. Coslett (secretary), 2, West Hoe Terrace, Plymouth.

Portsmouth and Southsea

Portsmouth Aquarists' Club meetings—first Wednesday and third Tuesday of each month, 7 p.m., at the Northern Parade School Hall. Information will be supplied by the secretary, Mr. J. Errington, 10, Wimbledon Park Road, Southsea, Hants.

Swansea

Swansea and District Aquarists' Society meetings—first Tuesday each month, 7 p.m., at Swansea Central Library (or phone secretary, Mr. W. Hal Jones, Swansea 4296—day; Swansea 57332—evenings).

Torquay

Torquay and District Aquatic and Pond-keepers' Society meetings at the Belgravia Club, St. Marychurch Road, Torquay, on the following dates: 8th, 25th August; 12th, 22nd September; 10th, 27th October. Information will be supplied by the secretary, Mrs. H. R. Brooking, 25, Belgrave Road, Torquay.

FIFTH place in the furnished aquaria class at the National Aquarium Exhibition in June was gained by the **Hounslow and District Aquarist Society's** entry, in competition with societies from all over Britain. Members of the society had a talk on cacti given by Mr. T. Rawlings at a recent meeting.

RECENT activities of the **Lambeth Aquarist Society** include a table show of plants and water plants, a lecture on plants and aquarium planting, a "quiz" contest with Mitcham Aquarists' Society and an outing to McLynn's Aquarium at Ewhurst, Surrey.

SHURUNKIN and fancy goldfish breeding was the subject of a talk given by Mr. A. Atkins to the **Leicester Aquarist Society**, and the speaker also judged a table show of coldwater fishes. The society has also recently held an evening film show.

AT the show of characin fishes, which was also a social evening for members of the **Wolverhampton and District Aquarists' Society**, the cup for the best fish was awarded to Mr. W. L. Mandeville's black widow. Other awards were won by Messrs. H. Heath, F. Fisher, C. Simkin, F. Mason, F. Finch, F. Woodall; the show was judged by Messrs. H. Heath, A. Beardsley and J. Brady.

A CLUB show of swordtails has been held by the **West Bromwich Aquarists' Society** at the club's premises—Y.M.C.A., St. Michael Street, West Bromwich. Members have also had outings to Shirley Aquatics and to Belle Vue, Manchester.

CHAIRMAN of the **Welsh National Aquarists' Society**, Mr. K. Barker, gave a talk to members on angel fish breeding, and this was followed by an interesting discussion. An outing to Dudley Zoo was held in June.

"Guppies Only" Show

FIRST Open Show to be held solely for guppies is being staged by the Eastern Counties Section of the **Guppy Breeders' Society** on Saturday, 20th September, 3 p.m. to 8 p.m., at Fairbairn Hall, Barking Road, Plaistow, London, E.13. Classes for each standard guppy type will be included, and in each a special plaque is to be presented as first prize, with prize cards as other awards; there is also a two guinea prize for the club gaining the highest number of points. Show secretary is Mr. L. J. Wilson, 208, Nisbet House, Homerton High Street, London, E.9.

B.A.F. Show Schedule

AN amendment has been made to this schedule. In Section 1, Class 33, the qualifying words "not scheduled in any other class" after "Rare and unusual species of fish" have been deleted.

New Societies

Barnsley and District Aquarist Society: Secretary: J. Ryiah, 29, Rowland Road, Barnsley, Yorks.

Bridgnorth and District Aquatic Society: Secretary: (Mrs.) A. W. Edwards, Claremont, Victoria Road, Bridgnorth, Shropshire.

Dumfries Aquarium Society: Secretary: J. Murphy, 128, Glasgow Street, Dumfries, Scotland. Meetings: Second Tuesday of each month.

North Derbyshire Aquarist and Pond-keepers' Association: Secretary: D. A. Stiff, 2, Manse Avenue, Creswell, nr. Workcap, Notts. Meetings: Fourth Monday each month 7.30 p.m., at the Barrowhill Hotel, Barrowhill, nr. Chesterfield.

Warrington Aquarist Society: Secretary: D. Shepherd, 21, Green Street, Warrington, Lancs. Meetings: Second and fourth Thursday each month, 8 p.m., at the Crown and Sceptre Hotel, Warrington.

AQUARISTS in the **Dronfield, Sheffield** area are invited to communicate with Mr. R. A. Cartwright, 68, Cecil Road, Dronfield, nr. Sheffield, who is interested in forming a society there.



Aquarist's Calendar

1st-6th September: **Preston Scientific Society** combined show of furnished aquaria, microscopy and natural history at Ellesmere Chambers, Church Street, Preston, Lancs.

4th-6th September: **Accrington and District Aquarist Society** Annual Show. Details from Mr. J. Pettifer, 44, Fountain Street, Accrington, Lancs.

4th-6th September: **Midland Aquarium and Pool Society's** 9th Annual Open Aquarium Exhibition and Show at Bingley Hall, Birmingham.

5th September: **British Herpetological Society** (London Group) meeting "Tortoises and Turtles (Chelonia)" at the Linnaean Society's Rooms, Burlington House, Piccadilly, London, W.1.

6th September: Exhibition of Aquaria at the **Borough of Wandsworth Horticultural Show** by Wimbledon and District A.S., Balham and District A.C., Streatham and District A.S., and Clapham A.S., at the Town Hall, Wandsworth, opening 2.30 p.m.

10th-20th September: **Nottingham and District Aquarists' Society** Annual Aquarium Show at Regent's Hall, Nottingham.

11th-13th September: **Royal Leamington Spa Aquarists' Society** show of aquaria in conjunction with the Leamington Horticultural Show.

13th September: **Swindon and District Aquarist Society** display of furnished aquaria at the show of the Swindon Allotments and Gardens and Fur and Feather Societies in the Swindon Drill Hall.

17th-20th September: **Kingston and District Aquarist Society** open show and exhibition at the Y.M.C.A. Hall, Eden Street, Kingston. Details from Mr. K. H. McNeill, 55, Lower Hill Road, Epsom, Surrey.

20th September: **Walthamstow and District Aquarist Society** Annual Show at Hawthorne Road Hall (off St. Luke's), Walthamstow, London, E.17.

20th-21st September: **Burnley Aquarists' Society** Open Show of Furnished tropical and coldwater aquaria and fishes. Details from Mr. F. Taylor, 21, Hogarth Avenue, Burnley, Lancs.

20th-27th September: **King's Lynn Aquarist Society** Annual Show in the Society's rooms at 26, Beoad Street, King's Lynn, Lines.

20th-27th September: **Workshop and District Aquarist Society's** Annual Show and Exhibition in the Workshop Public Library and Museum. Admission free.

24th-27th September: **Blackburn and District Aquarists' Society** show of aquaria in the Jubilee Hall, Market Hall, Blackburn.

24th-27th September: **Halifax and District Aquarists' Society** Annual Show at Harrison Road Congregational Sunday School, Harrison Road, Halifax, Yorks.

25th-27th September: **Paisley Aquarist Society's** First Annual Show of tropical and coldwater fishes, reptiles and aquaria in the Town Hall, Paisley.

27th September: **Chingford and District Amateur Aquarist Society's** Annual Show in the County High School, Nevin Drive, Chingford, E.4.

1st-4th October: **Oldham and District Aquarists' Society** Second Annual Show in the Regent Street Schoolroom, Oldham, Lancs.

3rd-4th October: **Bristol Aquarists' Society's** Annual Open Show in the Y.M.C.A. Hall, Bristol.

11th-18th October: **British Aquarists' Festival, 1952.** Large scale show of aquaria and fishes in the Exhibition Hall, Belle Vue Zoological Gardens, Manchester.

BRITISH AQUARISTS' FESTIVAL, 1952 The Aquarist's Event of the Year

NEXT month, from 11th to 18th October, the British Aquarists' Festival will be open in the large Exhibition Hall at Belle Vue Zoological Gardens, Manchester. This event, which made a triumphant debut last year at the same venue, is being organised by the Federation of Northern Aquarium Societies in collaboration with *The Aquarist*.

Last year's Festival proved that entries of fishes could be sent successfully by aquarists from all parts of Britain, and the Show Secretary, Mr. G. W. Cooke (Spring Grove, Field Hill, Batley, Yorks.) expects that the previous record of over a thousand entries will be again reached or even exceeded. Entry forms and show schedules are obtainable if application is made to him before 11th September, 1952.

The unsurpassed trophies include the Messrs. Customs Silver Model Aquarium for best furnished aquarium; the D. Hands (N.Z.) Silver Rose Bowl for best junior furnished aquarium; Messrs. Belle Vue Ltd.'s Silver Cup for finest Goldwater fish; the Goldfish Society of Great Britain Trophy for best veiltail; the Guppy Breeders' Society Open Challenge Trophy for most outstanding guppy; the Fraser-Brunner Cup for best pair of livebearers; *The Aquarist* Challenge Trophy for the outstanding egg-layer pair; the F.N.A.S. Trophy; the National Aquarists' Trophy; the F.B.A.S. Challenge Trophy for most outstanding breeders' effort; the *Daily Dispatch* Trophy for best tropical fish; *The Aquarist* Cup; the Whitwell and Smykalis Challenge Cup; the Island Trophy. These are supported by numerous prizes and awards and the coveted *Aquarist* award cards. Judging will be by F.B.A.S. Standards and F.N.A.S. clubs will provide stewards.

Entries Invited

Bristol Aquarists' Society Annual Open Show. Schedules obtainable from Mr. R. Woodbine, 18, Grantham Road, Kingswood, Bristol. Date: 3rd and 4th October.

British Aquarists' Festival, 1952, to be staged at Belle Vue, Manchester, by the Federation of Northern Aquarium Societies has classes for furnished aquaria and all fishes. Schedules and entry forms from Mr. G. W. Cooke, Spring Grove, Field Hill, Batley, Yorks. Date: 11th-18th October.

Huddersfield and District Aquarists' Society Annual Show. Show secretary: Mrs. M. Beaumont, c/o 44, Wasp Nest Road, Farnworth, Huddersfield. Date: 25th October to 1st November.

Scottish Aquarium Society. 18th Annual Show (Glasgow). Details from Mr. Strachan Kerr, 42, Ayrton Road, Glasgow, S.1. Date: 21st and 22nd November.



The "*Daily Dispatch*" Trophy with its present holder, Mr. R. R. Brough. It will be awarded to the best tropical fish at the B.A.F. next month.

Crossword Solution

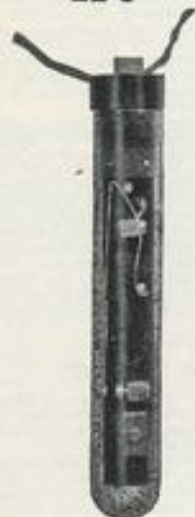
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1 (c). 2 (a). 3 (b). 4 (a). 5 (d). 6 (a).

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