



The  
**AQUARIST**

THE  
ORIGINAL  
MONTHLY MAGAZINE  
DEVOTED TO AQUARIUM  
POND AND REPTILE  
KEEPING

VOLUME XIII Number 6  
**September 1948**

ONE SHILLING & THREEPENCE

# The AQUARIST AND PONDKEEPER

(Incorporating "The Reptilian Review")

Founded in 1924 as "The Amateur Aquarist"



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## EDITORIAL

OUR introduction having been effected in so kindly a manner in the last issue, there remains for us but to say "Hallo" to you all and so open our first session in the editorial chair.

Whilst saying "au revoir" to its former occupant we know we can include our readers in the expression of our very best wishes for every success to attend the venture Mr. Fraser-Brunner has undertaken, and all will join us in the hope that we shall be hearing from him soon. Although we know that *The Aquarist*, and all it stands for at home here, will not readily be banished from his ken, we are aware of the large amount of work that his researches will involve, so that his time must indeed be precious, and hence all news from him will be doubly appreciated. The fullest use of the seas and oceans will be an integral part of the solution to the world's food problem, and with regard to the essential scientific work that must first be done, may we put it as our firm conviction that here on this Aden survey is a case of the right man in the right job; few indeed are those who could have taken on the task Mr. Fraser-Brunner is facing, and none with better aptitude.

Apology is made to all our readers for the extreme delay in publication of the August number. This was owing to a combination of difficult circumstances among which may be included the holiday period. (Why should it be that holidays—so desirable to each individual—become intolerable when other people take them?) However, readers may accept our assurance that every effort is now being made to catch up with our advertised publishing date—the 20th of the month. This will require the co-operation of our advertisers, who we are asking to send their material earlier in the month, and the help of club secretaries; reports of club activities

intended for inclusion in the current month's issue must reach us by the 12th day.

To a new editor it was very gratifying to see with just what eagerness the receipt of this magazine is awaited by its readers; numerous phone calls, shoals of letters and two telegrams were received as the days crept past our usual date. To all of you we again express our regret, and in the future, if delay should occur, it will truly be owing to *circumstances beyond our control*.

From the immense number of inquiries made at our stand at Olympia recently it must be inferred that there are many people wishing to install pools in their gardens. The time now being ripe for this, an article on the subject by way of a reminder, and other relevant information, is included in this issue.

Another inclusion in the contents does not strike such a happy note; for the first time since before the war our columns contain an article on TROUBLE—this time in the shape of those arch-enemies, fish gill-worms. The war, during which, of course, all imports of fish ceased, was indirectly responsible for the successful elimination of many parasites from our ponds and tanks, and on its cessation, such stocks of fish as were possessed, were robust and healthy. It was early proposed through the Federation of British Aquatic Societies, to the Board of Trade, that imports of fish should be allowed, under the surveillance of aquarists, so that only healthy and wanted material should be added to our stocks, for study, breeding, and then eventually, for the establishment of exports, to benefit all concerned. Imports in small quantities were at length allowed, with a *but*, and this *but* is that the representative body of aquarists was eliminated. Fishes are now arriving, and with them our old enemies such as these gill-worms. We are waiting in dread of

hearing of yet others, perhaps "White-spot," which must be only a name to so many recent aquarium-keepers. However, there is still time to rectify this situation—by careful examination of all fishes coming in under licence, and by eliminating imports from doubtful sources. This will mean recourse to the original plan; experienced aquarists in contact (through the aquarium societies) with all our British aquarium-keepers, would be the deciding factor on what should be brought in. Since the imports are small enough, should not we all be keen to see that these are what we want, and that they are the best obtainable?

We heard the other day of a fine unsolicited tribute to the work of an aquarists' society which had staged a show in connection with a large garden fete. A visitor, not himself an aquarist, wandered into this society's section with the idea of passing the remaining minutes of his visit in cursory examination. How great was his ignorance—he found himself absorbed, engrossed, and did not leave until all there was to be seen had been covered several times! His conversation later, we were told, was of nothing but the wonders he had seen on that unpremeditated visit.

This, we believe, is one of the prime objectives of such a society successfully attained—for how else can members of the public become aware of the possibility and delights of studying nature in their own homes? Public aquaria subserve a different function, and may also unconsciously tend to convey the impression that aquarium study is a field for the professional alone; whereas in fact, there is room and a welcome for all with the basic requirements—a genuine interest and the will to learn.

In this connection it is salutary that under the auspices of the Council for the Promotion of Field Studies a number of centres have been set up where students, amateur naturalists and school teachers can work during the summer months for short periods on various branches of nature study, including marine and fresh-water biology, with skilled teachers and valuable equipment. Ventures such as this deserve every support, and promise much that is good for the whole community.

In the last issue readers were reminded that we are always pleased to hear of their "doings" and to receive their contributions in the shape of articles and experiences for publication. To this reminder we would add that your criticisms (especially the constructive variety) of, and comments on, what *The Aquarist* gives you are also welcomed. We wish to ensure that this journal continues to justify its long-held claim to be "your magazine."

**STOP PRESS:**—Owing to the short interval between publication of this and the August number and the small number of Club reports received we are suppressing our Notes and News page. It will appear as usual in the October issue.—ED.

## THE AQUARIST

will be sent free for one year to any address for 13/6. Half-yearly 6/9.

All communications for the Editor should be addressed: "The Editor, *The Aquarist*, The Buckley Press Ltd., The Butts, Half Acre, Brentford, Middx." In every case the name and address of the writer must be given.

The Editor welcomes the opportunity of considering original contributions on all branches of the hobby and its allied interests; authentic breeding records, personal experiences and photographs. Contributions should be typed or clearly written on one side of the paper only. Illustrations should be finished in Indian ink. MSS. or prints unaccompanied by a stamped, addressed envelope cannot be returned, and no responsibility is accepted for contributions submitted. Correspondence with intending contributors is welcomed.

**The Editor accepts no responsibility for views expressed by contributors.**

### QUERIES

Postal replies are made to all specialised queries providing a stamped, addressed envelope is enclosed. *This privilege is afforded only to registered readers and direct subscribers.* Registration and subscription forms can be obtained on application. In all cases letters should be addressed to the Editor.

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W. Harold Cotton, F.Z.S. 39, Brook Lane, Kings 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.

Water samples should be sent in a large clean medicine bottle, and contain a little bottom sediment, and a stem or two of typical plant growth.

# AQUARISTS AT HOME No. 1

## MR. R. G. MEALAND

Interviewed and photographed by "HARLEQUIN"

THE first of my visits to see how our well-known aquarists "live," was paid to Mr. R. G. Mealand—well known in the past for the large specimens he breeds, his male guppies, and the London Sword; and more recently, for his activities in show judging and lecturing to clubs.

I found him at home in his spacious and well-equipped fish house. The house, 24 ft. by 8 ft., is glass roofed, with brick walls, and contains over forty tanks; yet others are being made. The average size of the tanks is 24 ins. by 20 ins. by 15 ins. deep, and there are a few longer ones on the third row of staging for spawning.

The tanks are heated by hot water pipes running beneath them. The pipes are 1½ ins. diameter, arranged in four rows under each row of tanks, and are fed from a large boiler (outside the house, for the sake of cleanliness!).

In the centre of the all-glass roof is installed fluorescent lighting, with a "wander" light capable of being used for individual tank inspection.

I noticed that his tanks were "dirty," but as long as they do not get so dirty as to upset the balance, this is a good fault. Plants were growing to a "picture of green," and all tanks were well stocked; the growing medium is a third mixture of peat, mould and

coarse sand, with a layer of sand on the surface. Water was on the green side but fish could easily be seen. Mr. Mealand informed me that he has mostly livebearers, though I noticed Angels, Danios, Gouramies and "cats" in many sizes.

All the metalwork of tanks and the staging is covered with bark, which sets off the aquaria to perfection, helping to remove any artificiality (though at the present time some of the bark is having to be renewed owing to depredations of "silver fish").

Mr. Mealand is now working on a new strain of "red-nosed" platy-swordtail hybrids, though he assures me that this is not being developed by drink or indigestion! Any rate, they are very pretty fish, and those he loaned to *The Aquarist* tank, displayed at the Olympia exhibition, were much admired by visitors.

Lastly, the walls of the house are covered with painted murals of natives scene-ing for fish—a lovely finish to a nice house.

Oh, I forgot a lovely luxury, a radio set and the telephone. The telephone is housed in a drawer underneath the staging, and when pulled out, cuts off the radio. Perhaps not so much a luxury when one calculates the hours spent in such a fish house.

Mr. Mealand inspects a tank  
in his fish-house



# THINKING OF A POND?

**N**OW is the time of year to put that plan of completing your garden with a pond into operation. After the hotter days we may often expect in early September, and before the frosts of November come along, we have a period in which conditions are ideal for working with concrete, and after which the job has a chance to mature and settle down for planting and stocking next spring.

But have you a plan? If the idea has only been circulating in your head try transferring it to paper. Once laid down in the garden a pool is a ponderable affair so we cannot afford to make mistakes.

First and foremost in your mind should be the type of pool you want and its proposed site. The design of it will then be that much on the way. Let us examine in broad outline the scope for our idea. If the general outlay of the garden is formal—with squares, circles, concrete paths or terraces, then a formal pool, is the only possibility here. Of this variety we may choose whatever regular shape best fits the conformity of the garden, and it may be either raised or sunken. For the informal garden the rock pool, with all its surrounding natural adjuncts, suggests itself as a desirable addition. Within bounds the greater the irregularity of outline in this case the more natural the finished pool will appear—but remember that more work and materials will be involved in construction.

The site may be the deciding factor in the shape of the informal pool just as it must nearly always be with the formal type. Try to choose a sunny spot—the growth of plants in and around the pool merits this.

Now we have sufficient data for the paper part of the plan. You will not need to be a skilled artist to draw sectional views, and another good time investment is to sketch roughly the finished article as you visualise it. The depth and general outline of the bottom of the pool will be decided by the types of plants to go into it as well as the well-being of the fish to live in it—winter and summer alike; the obvious solution therefore is to vary the depth from one area to another. This is done preferably by means of shelves or ledges that will retain the growing medium. Since we have touched on the future contents of the pool at this point, if you have the materials available how does the idea strike you of letting a thick glass observation panel into one side of the pond, through which, after descending steps, cut by the side in the case of the sunken pool, you may see what goes on within. Such pools have been constructed and their owners have been very enthusiastic about them.



(Photo: J. Cook)

## A Formal Pool

Built by Mr. J. Fraser of Nottingham, in February, at a cost of approximately £2 this pond is six feet in length, 4½ feet wide and has a depth of two feet. Filled in April, the water is now beautifully clear and healthy and contains goldfish, shubunkins and carp, all thriving. It is well stocked with aquatic plants. The owner is one of our regular readers and a member of the Nottingham and District Aquarists' Society.

The question of emptying the pool must be faced and provision of a waste at the lowest level and of a sump for drainage should be planned. Your plan ready, with overall dimensions, it is a far simpler job to estimate the quantities of sand, ballast and cement required. The work can now be commenced; the hole is dug and bottom and drainage sump laid down, the walls are shuttered and concreted; an average thickness of 4-6 ins. is desirable. Take trouble over levelling the site of the pond, because when the water is in, its level will act as a permanent reminder of any "skimping" of this job!

Watch out for freak weather whilst the concrete is setting—keep it moist by hosing and placing wet sacks in hot weather, cover up well in times of frost with dry materials. For special effects in informal design use sheet tin or old linoleum as shuttering.

When all is dry and ready, the surround may be completed. With informal pools use natural stone if this can be obtained with any degree of ease; its use is well worth any extra cost. Again, this is not a haphazard piece of work—have some idea of the marginal plants you want to put there next year and arrange it with that future picture in view.

Apart from the denaturing of the concrete, over which we need not hurry at this time of year, it will then be possible to retire to your winter indoor pursuits, with (say) bi-monthly emptying and refilling, until with the approach of spring you may start ordering your stock of plants, and a month or so later, the fish.

(Continued on page 203)

JOHN W. DAVIES

describes his experiences with

## MAKE-DO AQUARIA

NOT being a "Spiv" or merely born rich, my funds simply will not run to buying the elaborate aquaria that catch my eye as I visit various dealers in search of the item of the moment. Actually all the time my heart is saying, "Fork out Jack, and hang the consequences," but my head always manages to get the upper hand with "No, no, no, think how the wife will carry on if you do," and so with that I have to pass regretfully on like a "Martyre," all for the sake of peace and quiet in the home, but consoling myself all the while with the thought that "when I win a pound or two on the pools I WILL have that one in old so-and-so's window." But being "Fish Mad," as all my friends (outside the hobby) say, I am not content with waiting for something which probably will never happen, and as I journey to and from my place of work I notice things that would "do me for a while, until?"

I first began with the concrete foundation of an "Anderson shelter," for my pond; what happened and how, I disclosed to readers in a previous issue of this journal. Since then not everything has gone according to plan, but taking things all round I haven't much to grumble about, and my interest in the aquatic world has increased to great proportions in the coldwater varieties, but, although I have liked and admired tropicals, I have not the slightest desire to enter the ranks of their champions, and I don't think that I ever will.

At first, the "shelter pond" was merely to be an asset to the garden, and a rockery was constructed round it to increase the attraction, the result of which I became very proud of, even though as time went by the surroundings had to be constantly altered owing to an ever-increasing need for more space, but somehow, partly by accident and partly by thought, I always managed to achieve a natural look about it all, and the appearance that it had been so for years.

As time went by I began to buy live foods for my choicest fish, and I soon found that the appetites of the fish were far greater than the depth of my pocket, and I had to cut the buying down to a minimum; this made me think in terms of raising my own live food, and the first kind that I chose to try with was our old friend "Daphne Daphnia," bless her dear little heart. So out I went one evening for a scout round the nearby bombed sites, and on one I found an old metal copper, of the type used by mother years ago for doing the weekly wash in. This copper had a

twenty-one inch diameter and a depth of eighteen, so home I took it, to be greeted at the front door by the wife, and an exclamation of "What, more junk!" I buried the copper up to its brim in the ground, put in four inches of soil which I covered with a thin layer of shingle, filled it with water, and planted several pieces of *Elodea* to keep the water well aerated. I then left it for a week, and put in a dozen water snails, and a mass of dried grass, garden weeds and lettuce leaves. After boiling some of the grass cuttings with a handful of old poultry manure, I strained the sediment off and added the liquid to the water in the copper. All this assured me of plenty of food for the *Daphnia* to live on, so now I added a shillings' worth of *Daphnia* that I had bought from a dealer, left it for a few days and hoped for the best. On the third day when I looked, there in between the rubbish that was floating on the surface was quite a number of large fat *Daphnia*, and in amongst the rubbish were thousands of tiny ones. There seemed no doubt now that I had succeeded, as previously, whenever I had put *Daphnia* in anything to try to keep it for a few days, it had always apparently disappeared. I believe the snails provided a lot of the food for the *Daphnia* after the manure water had been consumed; the latter in itself contained enough infusoria, after it had cooled off, to last for several days, and the excrement of the snails replenished it. That is only my belief, of course, but the amount I have at present seems to substantiate my theory. The main snag with this copper culture of *Daphnia* is that the amount that is bred seems to be only enough for about a dozen fish, and if I am not careful and don't feed regular amounts to my fish daily I find that the *Daphnia* multiply so fast that there is insufficient oxygen there to sustain them, and then they die off, but for raising a few fry it is certainly enough, and has helped me greatly; when the fry are larger they need a much vaster amount of food, and that has made me scout around again for another vessel in which to raise something.

On the next bombed site I visited I found a small water tank, measuring eighteen by twenty-one by twenty-four, ideal, I thought, so home it went. Now I have read articles that stated that all galvanised tanks must be coated with a thin layer of cement to be satisfactory as aquaria. I don't doubt that there is a lot of wisdom in that statement, but I did not do so, partly because I am too lazy, and partly because I like to find out the wheres and whyfors myself, as in

# British Water Scorpions

By

IRIS MURRAY

(Photographs by L. E. DAY)

**A**LTHOUGH both *Nepa cinerea* and *Ranatra linearis* are members of the order Rynchotha, and belong to the family Nepidae, they are known as Water Scorpions. These names are rather misleading, as they bear no relationship to the true Scorpions at all, because while the latter possess eight legs, and are related to the spiders, these Water Scorpions are definitely insects with only six legs.

*Nepa* and *Ranatra* are the only British members of this family, and *Nepa* is more commonly found than *Ranatra*. (Fig. 1)

It is a sluggish creature and spends a great deal of its time on the bottom of ponds, and stagnant water. Sometimes it can be seen clinging to weeds (Fig. 2) when it is quite easy to mistake it for a dead leaf. It is about one inch in length, and the body is flat and almost leaflike, while it is a muddy brown in colour, and once again we see Nature as a mistress of camouflage. The only relief to the dingy brown appearance is when the wings are extended, and then a red margin can be seen round the edges of the abdomen.

The antennae are short, and hidden in grooves behind the eyes. They are quite small in comparison with the rest of the body, and are only noticeable because of their extreme blackness.

Small water insects are *Nepa's* chief food, and it would die of starvation rather than exert itself. It usually lies in wait—perfectly camouflaged—until the very unwary victim approaches, then the specially adapted fore legs shoot out, the tiny animal is caught, never to be released.

These fore legs close completely in half, just like a pocket knife, while down the centre of the female a groove runs to receive the tibia and tarsus. On the end of this joint is a sharp claw, and it is therefore a simple matter for *Nepa* to clutch its prey while it proceeds to obtain nourishment by sucking all the poor creature's life blood and juices, and then the unwanted parts are discarded.

The other four legs are rather long and thin and used for walking only.

At the end of the abdomen is a long thin "tube." On closer inspection this is seen to be a pair of filaments, which, when brought together form a channel down the centre, and they are locked by stiff hairs. This tube is the sole respiratory organ, and has access to the whole tracheal system which terminates in two stigmata at the tip of the abdomen, and at the base of the respiratory filament.



Fig. 1. *Ranatra linearis* in the act of respiring at the water surface

This insect does not appear to need a great deal of air during the winter, remaining very sleepy and even when needing a fresh supply of air it climbs up the weeds backwards until the "tail" pierces the surface film.

While submerged it is thought that this insect will often pierce air-bubbles, given off by oxygenating plants, thus obtaining temporary supplies.

The eggs are laid in a string—each egg resting in seven tiny filaments, formed on the end of the preceding egg. (Fig. 3)

The larva is very like the imago except that the breathing tube is absent, and at each side of the thorax is a tiny swelling, which later becomes a wing.

*Ranatra linearis* is in some respects very similar to *Nepa*, but in appearance it is entirely different—whereas *Nepa* could be mistaken for a

# CONCERNING CONCRETE

by F. E. CHILDS

In most spheres of construction work it is highly desirable to possess a good knowledge of the substances employed. Concrete pond-making is no exception to this rule, and it is unfortunate that so many aspiring pond-makers have mis-used concrete, through ignorance of its nature and properties, with the result that in many cases failure and consequent discouragement ensue.

The endeavour of this article is therefore an attempt to focus attention on the salient features governing the production of concrete for pond-making; let it be said at the outset that concrete is ideal for this purpose.

Successful concrete work depends mainly on the inclusion of the right materials for the job in hand, and proper workmanship.

## Materials

The ingredients used in concrete manufacture are water, cement, sand and shingle. Perhaps at this stage the reader should become acquainted with the terms, which are now coming into more frequent use in dealing with sand and shingle, and those generally associated with concrete. Sand is referred to as *fine aggregate*: this is the mass passing through a 3/16 in. mesh sieve. Shingle is the *coarse aggregate*, it being the material retained by the use of such a sieve.

That period of time which elapses between the mixing and solidification of the concrete is known as its setting time. After this period the strength of the concrete increases with age; this process is known as hardening. Let us now consider each of the above constituents in more detail.

**Water:** A certain minimum amount of water is necessary to hydrate the cement. A little more is required in order to lubricate the mix and thus make the resulting concrete workable. Its future density (i.e., compactness), impermeability, and its subsequent amount of shrinkage are properties adversely affected by the use of excess water. The water content should therefore be kept as low as the methods of placing will allow. It is most important that the water used be clean.

**Cement.** Cement is made by burning a mixture of limestone and clay and grinding the resulting clinker to a very fine "flour." In general the finer the cement the better the quality. As far as we are concerned here, three types of cement should be mentioned:

1. Portland cement. This is the usual cement employed in everyday use.
2. Rapid-hardening Portland cement (e.g., "Ferrocrete"). A waterproof cement which attains the strength of the ordinary Portland in about one-seventh of the time. This rapid hardening is obtained without decrease of the setting time, i.e., the period in which it may be worked is not diminished.
3. Cement with high alumina content (e.g., "Ciment Fondu"). This is quick hardening, slow-setting and waterproof. It also gives a concrete with no free lime—all desirable features for satisfactory pond-making. Its initial setting time is about four hours, which gives ample opportunity for mixing and placing the concrete; this hardens in one day and its strength after this period is equal to Portland cement, which has had as long as three months to mature!

**Sand and Shingle.** (or more correctly the fine and coarse aggregates). Here there is a lot of variation in quality. However, the trend in building materials these days is toward standardisation and quite a large amount of work has been done to lay down a specification to cover aggregates. It is recommended that only aggregates which have been certified as conforming to this specification, (British Specification 882, for those interested), be used. Insistence on this will mean that every confidence may be placed in the use of the compounds, since they will be free from harmful impurities and well-graded. By "well-graded" is meant that the sizes of the stones are in the right proportions to give a fully compacted concrete, with no voids that would allow leakage of water in the finished product.

Suggested is "Class A, fine aggregate" for the sharp sand, and "1 in. to 3/4 in. Graded aggregate" for the coarse material. The use of these names when ordering will ensure that the specified products are obtained. If the choice between natural (rounded) and crushed aggregate is available, the former is to be preferred, since with all other factors the same, natural aggregate

possesses greater workability. Under no circumstances should clinker, brick rubble or any porous form of aggregate be used in place of these recommended. The coarse and fine aggregates are kept separate until they are required to be measured out for the purpose of mixing.

## The Mix

Having discussed the materials we now come to the manner of their use, and it is here that the human element can intrude and make or mar the success of the job.

As we have now seen, four materials of varying nature are required to be mixed intimately, namely, a liquid (the water), a fine powder (the cement), and coarse particles and stones (the sand and coarse aggregates respectively). The proportion of these compounds in the final concrete will obviously affect its general qualities, including whether or not it will be watertight. It has been found that the following proportions by volume, coupled with sound workmanship will give a watertight result:

- One part of cement,
- Two parts of fine aggregate,
- Three parts of coarse aggregate.

## Methods of Mixing

As it will undoubtedly be necessary to mix the materials by hand a bucket will be useful as a measure. A clean, level and watertight surface, such as a concrete path, about four feet square, will be necessary for this process. The most satisfactory procedure is to take one bucketful of cement and thoroughly mix this by means of a spade with two bucketfuls of sand until the mass is of even colour. Then three bucketfuls of coarse aggregate should be tipped on and the whole lot remixed. The minimum quantity of clean water should next be sprayed on by means of a watering can and the concrete turned over until such time as all the stones have become coated with the cement. Efficient mixing is most essential.

## Placing the Concrete

The freshly mixed concrete should be placed in such a manner as to ensure thorough compacting, e.g., by rodding, spading, or tamping, according to the position of the work. It is important to see that any shuttering is rigid. Under no circumstances should an attempt be made to place concrete which has exceeded the period of its setting time, and when using ordinary Portland cement, the concrete must be in place within half an hour of the addition of the water. It should not be disturbed after placing.

The finished concrete should be compact and have a smooth durable surface free from "honeycombing."

## Maturing

Concrete made with ordinary Portland cement should be kept moist for at least seven days and preferably longer. The protection of freshly placed concrete from drying winds is as vital as protection against frost. After seven days the concrete will be strong enough for the pond to be filled with water.

With regard to the business of making the pond ready for planting and the addition of fish, the usually advocated lengthy period of washing out the free lime may be considerably reduced by the use of a high Alumina cement in preparing the concrete, (such as "Ciment Fondu," mentioned above under materials) with which no free lime occurs.

It will be noted that no reference has been made to any necessity for incorporating special waterproofing compounds in the mix, as with the use of materials on which we have insisted no useful purpose would be served by such inclusion.

In general it should be remembered that throughout the preparation of concrete, sound workmanship is just as important as cleanliness and choice of materials.

## INDEX TO VOLS. XI AND XII

Separate indexes of these volumes are in the course of preparation and will shortly be issued as a supplement.

## DO NOT TOUCH

A recent law, passed in Czechoslovakia, aiming at "the protection of nature," includes on its list of protected species, lizards, frogs, newts, slow-worms and certain non-poisonous snakes.



# BOX TORTOISES

By ——— J. K. GOODY



THE Box Turtles, as our American friends so often call these species, belong to the largest family of the *Chelonia*, the *Testudinidae*, and the American ones with which we are most familiar, belong to the genus *Terrapene*, of which here are four species—all terrestrial—ranging over North America and Mexico.

These charming, lumbering, rather globular creatures, are characterized by the fact that their plastron, or under shell, is hinged by cartilaginous tissue and attached to the carapace by a similar material. The strength with which these Box Turtles can hold shut their plastron is truly amazing, as I know to my pain, having had a finger trapped between the carapace and plastron by a merciless female of the *Common Eastern Box Turtle* (*Terrapene carolina*) which is the species perhaps most commonly met with. It inhabits the United States as far south as the Carolinas, from the Mississippi to the coast.

The accompanying drawing will give you a good idea as to the shape of the Box Turtle. *Terrapene carolina*, is a dark brown of shell and spotted with yellow stripes, very variable in position. The male of the species has reddish eyes and the female brown. The skin is an olive-brown, blotched with yellow, in an irregular fashion. It lives almost its entire life on land, and is a poor, erratic swimmer. When placed in water the Box Turtle floats well out of the water and swims weakly, and in fashion that might be likened to a struggling fly, on the surface of a pond! An average specimen measures five to six inches in length and three inches in height.

When first captured the Box Turtle is very timid but it soon tames and grows to recognise its master and will often be induced to take food from hand. If annoyed or provoked the hitherto timid little fellow will hiss violently and sometimes strike at an offending finger. I can say from experience that although the "turtle" has no teeth its "beak" is very sharp and can inflict severe pain, biting in a fashion similar to a bad-tempered parrot! Apparently nothing on earth will induce the stubborn beast to loose its vice-like grip. It takes its time, inflicts what it considers suitable chastisement and calmly retires in its slow plodding way. Fortunately for the creature's popularity with vivarium keepers this is a rare occurrence!

The Box Turtle is perhaps the ostrich of the reptile world, for it eats a staggering variety of food. It most commonly feeds on insects, berries and earthworms, and young shoots of woodland shrubs. My specimens showed a fondness for salted crackers

soaked in milk, earthworms, sheep's brain, lettuce hearts, and amazingly enough, young snakes! I found this out quite by accident when a full-grown female was placed in a cage for a few hours with three young *Liopeltis ternalis* (the Eastern *Smooth Green Snake*), about five inches long and about the thickness of a large earthworm. This was on Sunday, June 10th, 1945. To my amazement the Box Turtle suddenly struck at the middle of one of the snakes, bit and clawed the front and hind portions away, devoured it and then ate the two other portions. Meanwhile, a second young snake had been striking viciously at the "turtle" and at the hand of the intruding onlooker. (This is apparently contrary to the peaceful nature of this little snake, which is stated never to bite, however provoked). Having finished its unusual meal the female turned to continue her slaughter, and similarly ate the second snake! It had eaten the first in five minutes, but it took considerably longer to get down the second. Meanwhile the third snake had been wiser than the second and I could not find where it had burrowed. However, on the afternoon of June 11th, at 3.40, I found the gluttonous old lady finishing it off. She blinked twice, gulped, and walked to a shady corner of the vivarium for a rest! Other foodstuffs reported by various American vivarium keepers are: grasshoppers, crickets, cantaloupe, watermelon, peaches, pears, apples, grapes, green corn (i.e., maize), mealworms, strawberries, cherries, meat (raw), pork, berries of various sorts, sliced carrots, beets, clover, tomato, banana, and slugs. Towards autumn the Box Turtles often grow so fat that they are unable to close their plastron. However, they are able to shut up the side which is touched. Thus, if the "turtle" is picked up and poked on alternate sides of the hinge it will keep opening and shutting alternate sides while either fat legs and tail, or a swollen chest, bulge amusingly from between the plates.

Like many tortoises the Box Turtle lives to a great age, some have lived from thirty to sixty years, and there is a report of one having lived for 123 years.

The Box Turtle's are not used for food, though Babcock says that in 1902 some coal miners from Siranton, Pennsylvania, ate some and were poisoned, though it is thought that the Box Turtle's had been

## Aquatic Study in the School :

# Our Paper Pond

By

ELIZABETH CROSS

THESE must be many teachers (and parents, too) who simply cannot manage to begin an aquarium or make organised visits to a real pond, but who do understand the fascination of the subject. Children do so love everything to do with pond work, and in every school class it is possible to find children who have had first-hand experience of watching tadpoles, water birds and so on, and it seems a great pity not to make use of this interest.

I would always urge everyone to aim at an aquarium, but since my last bit of teaching experience I realise just what difficulties many teachers are up against, the chief one often—let it be whispered—"the Powers that Be!" So if you can't have what has been so cruelly labelled as "a nasty smelly water tank," then you can begin, as I did, a Paper Pond.

My pond was made with little five-year-olds, and so had to be very simple. However it could be adapted for any age. Those fortunate enough to have smaller classes than my forty-six infants, could arrange for each pair of children to co-operate over a separate pond.

The basic idea is this: Obtain as large a sheet of stout paper as possible, that may be pinned up, for the term, on a spare blackboard or wall. It may be necessary to paste two or four sheets of white paper on to a stronger backing. This will contain your pictured pond. For very small children it will be entirely pictorial, but for those just beginning to learn to read you may label each inhabitant clearly in the kind of printing favoured by the school.

The first and introductory lesson will discover the whereabouts of local ponds and ditches and also which children have been watching them. We can then encourage the others to look for pools and their inhabitants. We show the children how to write OUR POND (the teacher will write this on the paper for the youngest class) and then ask for suggestions as to how to draw the pond. It is best if the children can now draw their idea of a pond either on paper or their small blackboards. The teacher can then see just what ideas they have and let individual children describe their drawings.

Then the teacher must make a rough drawing on the big paper, using as many of the children's ideas as possible. For instance, you will probably collect the outline of the water, some trees, maybe ducks, rushes, and possibly a toad or some tadpoles, if it is the right season. Don't worry if the children don't mention any of the smaller creatures, these can be discovered later.

The gradual filling up of the picture will best be done in the handwork period, when the children can have the chance to get on with their own projects. Some perhaps, will be using plasticine, or drawing, while others can practise paper cutting. They can take it in turn either to paint or crayon the pond, sky and trees (older children can also print small stick-on labels to mark each object). After this colouring, the younger children can either draw and cut out their own ideas of fish, ducks, tadpoles and so on, or can be allowed to draw round cardboard cut-outs, made by the teacher. (These cardboard templates take very little time to make, but you must have the simplest outlines or little ones can't manage the job.) There is no need to accept all the cut-outs for pasting on the pond; only the very best will do, and the children are perfectly happy to go on trying until their fish is up to standard!

The older group may either make their pond with a very wide margin all around, for notes on the various creatures, or have a strip along the bottom for the same purpose. In any case it is well, then, to number each inhabitant and to have a similar number in the strip accompanied by the correct note. In any case, make sure that the notes are genuinely original and have some reference to actual observation by individual children. For instance, if No. 2 is a caddis, let a caddis watcher write down just where he saw his particular find, such as "Seen by John in Mr. White's pond. Case made of little sticks."

Our Paper Ponds will vary in execution and artistry, but you will find that the children love them. What is more they take an immense pride in their share of the production. One extremely tiresome little boy became far easier to manage after he had, at last, succeeded in getting a fish in the pond. He would gaze at this fish in his spare moments, muttering, "Isn't it lovely. My fish." He even managed to write Fish, fish, Fish, fish, on and on, until he grew quite talented in this somewhat limited sphere! This may sound far-fetched as well as funny, but all teachers know those children who never seem to be able to do anything, and how wonderful it is when they really accomplish the first step.

Older children can make books, while those in smaller sized classes can do many other things, but for those teachers who have very large numbers and also young children who cannot accomplish very much in the way of descriptive drawing, something in the way of co-operative effort is most useful. The actual teaching and guiding can come in the Nature

" Children do so love every-  
thing to do with pond-  
work—"



lesson, or in the Conversation time, when we can say, for instance, " Now what else could we put in our pond, do you think ?" Any suitable suggestion can be dwelt on at some length, the children encouraged to report their observations and others helped to search for further facts.

Even quite little children, who have had small opportunities of using scissors, soon enjoy cutting out simple shapes. It is quite possible for the five-year-olds to cut green paper into leaf shapes, which can then be pasted on to the trees around their pond. Classes vary, of course, in their ability and in how much help must be given, but nearly all can manage to make something—even if it is only a pond full of

tadpoles.

The use of the pond does not end with the making, either ; it affords scope for conversation, for reading and writing, and also for counting, as most of the children soon like to try and count the fish, or other creatures that they have made. As for the older children it can give rise to many useful lessons on habitat, protective coloration, the interdependence of nature, as well as encouraging careful work on each individual object.

A Paper Pond is well worth while for those of us who can't have a real one, and in any case, it does provide a sensible and popular form of work and record-making for children.

#### READER'S LETTER

### MORE STRANGE AFFECTIONS !

Your lady correspondent in the July issue, is not the only one to have strange love matches in her aquarium (i.e., female Guppy and male Flag fish).

In my community tank I have a female Swordtail who thrusts her unwanted attentions on a rather dour Blue Gourami, whilst she in her turn is hotly pursued by a male Barb. In the meantime, her mate having been repulsed so frequently, is in constant attendance on the three or four female Guppies in the tank, much to the disgust of their male escort, who nearly bursts himself trying to provide a counter attraction !

Major S. A. Yates.

#### MAKE-DO AQUARIA

(Continued from page 198)

From what I have told you, you can gather that if you cannot afford that aquarium when you want it, then you can make do with something until you can. But please do not think that I prefer these " make-shift things " to actual aquaria, because I don't, and as soon as I have the cash to spare, then away I will dash to buy what I want, for these " makeshifts " have their drawbacks. For instance, I cannot imagine even the most loving of spouses allowing galvanised tanks in their best rooms, even for their most loving husbands, also, you can see what goes on in a glass aquaria, you can't in the make-do's, only guess. But after having to use the others the proper aquarium is appreciated better I can assure you, and once it is installed it remains an item of beauty for ever.

# GILL WORMS

by R. H. I. READ, F.Z.S.

JUDGING by inquiries made in aquatic circles it appears that heavy mortality of fry, infected with gill worms, has been experienced by many aquarists and that most are ignorant of the cause, and the cure: let it be understood from the outset that it is not intended to deal with the cure in this article, as all attempts on my part to bring about this happy state of affairs have failed dismally.

"How do I know that my fry have gill worms?" is a question many of you will be asking. It will be observed in the early stages that, looking at the fry from the top, those affected will have an enlarged head and will be quite noticeably different in this respect from the others. Having "marked out" one or two in this manner one will notice when looking at the fish side on that there is a small thread hanging from the under part of the head, at the point where the gills join. If inspected through a magnifying glass, or if an affected fish be put under a microscope, it will be noticed that this thread is, in fact, a small worm, the visible part of it in length being about the same as a Micro worm, but considerably thicker. In the more advanced stages it will, in many cases, be found that there are several of these little worms—as many as eight have been observed—sticking out, not only from the point mentioned, but also between the gills and the operculum; a truly sorrowful sight.

"How did this come about?" is surely your next question, and it is on this point that it is hoped that the following experiment will throw some light:—

Four tanks were selected of similar size, perfectly clean and free from disease of any kind, planted in the usual way and filled with fresh tap water. All four tanks were allowed to stand for a fortnight and it was found that all had a small amount of infusoria in them; we will call the tanks "A," "B," "C" and "D." About 100 fancy goldfish eggs were placed in each of the tanks "A," "B" and "C," but only six fertile eggs into tank "D." It was assumed that tank "D" contained sufficient infusoria to be sufficient for six fry without any further addition. At the time of the experiment no artificial heating was used and the water temperature ranged fairly steadily between 70 and 72 degs. F. during the day, and dropped to 65-62 degs. during the night.

The eggs having hatched, and the fish free swimming, infusoria feeding was started forthwith; tanks "A" and "C" were fed from one culture of infusoria and tank "B" from another, tank "D" being left untouched throughout the experiment. At the age of 14 days it was observed that some of the fry in tanks "A" and "C" had contracted gill fever. At this point it is emphasised that the infusoria was drip-fed and that particular attention

was paid to ensure that no contact occurred between any of the tanks.

Every fish in tanks "A" and "C" was carefully caught—here again separate fry catchers were used so that there should be no chance of contact—and all the affected fish—about 30 in each—were removed.

The fry not affected in tank "A" were replaced in their tank and the fry not affected in tank "C" were also replaced in their tank. Both these tanks had meanwhile been once again thoroughly disinfected and refilled with uncontaminated water and new plants. Now, in a further attempt to prove my theory, the fish in tank "A" continued to be fed from the same source of infusoria as that on which they had been fed previously BUT the fry in tank "C" had their supply of infusoria changed to the same culture which had been, and still was, supplying tank "B," all the fry in which were still unaffected.

In another five days practically all the remaining fry in tank "A" were affected, and some very badly but apart from three which were removed from tank "C" (and these it is thought were probably ones which had escaped my notice in the sorting five days previously) NO MORE FRY in this tank showed any signs of the parasite AND CONTINUED TO THRIVE. Tank "B" was still unaffected and tank "D," which had not been touched, flaunted six really robust youngsters.

It would appear, therefore, that the worms or their eggs were introduced with the infusoria culture.

The parasites rapidly infect other fish, as will be seen from the following:—

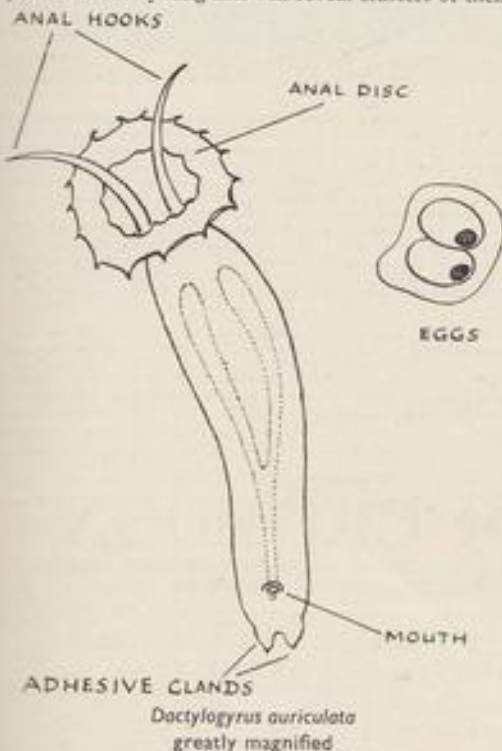
Two affected fry were taken from tank "A" and six healthy fry were taken from tank "B" and these eight fish were all put into a small show tank, 10x8x8 inches, which was filled with water containing infusoria from the source supplying the unaffected fish. Within five days the two affected fry were dead and five of the remaining six were affected, and within ten days all but one were dead, and that one was affected, and died two days later.

It is hoped that the foregoing observations may interest others and stimulate correspondence that may ultimately lead to some light being thrown upon the cure for this parasite.

[Several cases of infestation with this parasite have been reported to us in the past few months, and investigations have shown that it is the trematode worm, *Dactylogyrus auriculata*. Unlike the better-known (or should we say more notorious?) *Gyrodactylus elegans*, this worm confines its attack to the gills of the fish, and lays groups of eggs, which one reader described as about half the size of a pin head, and which he observed to be stuck all over the glass of an aquarium containing infected Shubunkin fry. As seen from the accompanying drawing the eggs are deposited in groups surrounded by a tough capsule, and hence are resistant to ordinary chemical attack. Treatment of infected tanks and ponds must be drastic therefore, and after removal of the fish for separate treatment, we recommend addition of

commercial formalin to high concentration (5 per cent. of formalin). The loss of any plants present with this treatment is, unfortunately, unavoidable. Ponds may be so treated after the removal of the bulk of the water; the sides are then washed down with the remaining formalised water.

Infected fish become extremely restless and attempt to remove the parasites by rubbing their gill-covers against plants and rocks. The use of a microscope will soon identify the worm, illustrated herewith, and in some cases the use of a bright light placed behind young fish will reveal clusters of them



on the gills. Individual worms are only about 0.05 mm. in length, so do not expect to see much with the unaided eye! The hind end of the worm is provided with a ring of small hooks, in the centre of which projects two much larger hooks; these are used to secure a hold on the gill membranes. The anterior end has two protuberances with glands secreting a substance enabling it to affix this end to the fish when it releases the hooks, in order to change its position. Locomotion occurs as with *Gyrodactylus* by the alternate release and refastening of head and hook ends—the body becoming "looped" as the animal progresses.

Experience has shown that the best method of treating the fish is by the use of acetic acid baths—at a concentration of 0.2 per cent. The fish must

not be allowed to remain in this solution any longer than 2½ MINUTES. The acid coagulates the gill mucus and with it the worms. For complete assurance repeat the treatment after an interval of a week; fish will develop a white colour owing to the effect on the body mucus, but this disappears after a time.

It is imperative to trace the source of the infection in each case, in order to avoid future outbreaks. The worm may be introduced with new fish, and its eggs with plants, infusoria and, in short, with anything from contaminated waters. Once traced, leave such sources strictly alone! EDITOR.

### BELIEVE IT OR NOT!



Photo: C. W. Creed

This delightful little rock garden with waterfall and pool, creates an impression of having been established and carefully tended for many years. You will be surprised to know that it was built in one day, had the brief but much admired life of three days, and then was taken up and carted off on a lorry.

Where did this happen?—at the Olympia Flower Show, staged by the *Evening News* in August. The garden and pool formed part of a display by the firm of Ralph Hancock & Son at the exhibition. The trees in the background successfully disguise a row of exhibition stands, including that of *The Aquarist*.

### THE DWARF GOURAMI

In our last issue the article on the Dwarf Gourami was written by Mr. Ian Harman and not by the unknown "Jack He." We regret the slip and apologise to Mr. Harman for any inconvenience it has caused, and also to Mr. Jack Hems, with whose name the article may have been connected.

# Directory of Aquarium Societies

## **Federation of British Aquatic Societies**

Secretary: R. O. B. List, 31, Coronation Court, 31, Willesden Lane, London, N.W.6.

## **Federation of Northern Aquarium Societies**

Secretary: G. T. Iles, F.Z.S., Longlight Lodge, Redgate Lane, Manchester, 12.

## **Balham and District Aquarist Club**

Secretary: A. F. Price, 19, Boundaries Mansions, Boundaries Road, Balham, S.W.12.

Meetings: Every Monday, 8 p.m., at Labour Rooms, Balham Park Road, S.W.12.

## **Belle Vue (Manchester) Aquarium Society**

Secretary: Gerald T. Iles, Longlight Lodge, Redgate Lane, Manchester, 12.

Meetings: Monthly at Belle Vue Zoological Gardens, Manchester, 12.

## **Benhurst Aquarium Society**

Secretary: Mrs. R. Aldred, 30, Benhurst Avenue, Elm Park, Romford, Essex.

Meetings: First and third Tuesday in month, 8 p.m., at Benhurst School, Benhurst Avenue, Elm Park, Romford.

## **Blackburn and District Aquarists' Society**

Secretary: J. P. Eldred, 47, Preston New Road, Blackburn.

Meetings: First Tuesday in month, 7.30 p.m., at the Reform Club, Victoria Street, Blackburn.

## **Blair Aquatic Club**

Secretary: T. Wyber, 85, Richmond Avenue, London, N.1.

Meetings: Each Thursday evening at 7.30 p.m. at Blundell Street Men's Institute (entrance Brewery Road) Islington N.7.

## **Bournemouth and District Aquarists' Society**

Secretary: Vernon E. Poulton, 84, Shelly Road, Boscombe, Bournemouth.

Meetings: First Monday in month, 7.30 p.m. at Whitehall Hotel, Bournemouth.

## **Bradford and District Aquarist's Society**

Secretary: R. E. Briggs, 18, Hill Crest Road, off Medway, Queensbury, Bradford.

Meetings: First Wednesday of each month.

## **Bristol Aquarists' Society**

Secretary: H. C. B. Thomas, 46, Wolsley Road, Bristol, 7.

Meetings: Second Monday of each month at Grand Hotel, Broad Street, Bristol.

## **Cambridge and District Aquarists' Society**

Secretary: R. I. McKay, 103, Cambridge Road, Great Shelford, Cambs.

Meetings: Y.M.C.A. Cardiff, 7.30 p.m.

## **Cardiff and District Aquarists' Society**

Secretary: L. W. Kenyon, 21, Pam-Erw Road, Birchgrove, Cardiff.

Meetings: Y.M.C.A. Cardiff, 7.30 p.m.

## **Chelmsford District Aquarists' Society**

Secretary: Mrs. C. R. Tappenden, 33, Frykes Drive, Chelmsford, Essex.

## **Cleethorpes and District Aquarists' Society**

Secretary: D. W. Chapman, 28, St. Peter's Avenue.

Meetings: Third Monday in each month, 7.30 p.m., at 66, St. Peter's Avenue, Cleethorpes.

## **Cornish Aquarists' and Pondkeepers' Association**

Secretary: Mrs. Howard Spring, The White Cottage, Fenwick Road, Falmouth, Cornwall.

Meetings: First Wednesday in month, 8 p.m., at Millicans Cafe, Market Strand, Falmouth.

## **Coventry Pool and Aquarium Society**

Secretary: R. G. Stock, 45, Irving Road, Coventry.

Meetings: First Wednesday in each month, at B.T.H. Social Centre, Holyhead Road, Coventry.

## **Croydon Aquarists' Society**

Secretary: G. S. O. Saunders, 5, Blenheim Gardens, Wallington, Surrey.

Meetings: First Thursday in month, 7.15 p.m., at Thornton Heath Public Library, Brigstock Road, Thornton Heath.

## **Dagenham Aquarists' Society**

Secretary: D. F. Eyres, 83, Wren Road, Dagenham, Essex.

Meetings: First and third Monday of month, 7.30 p.m., at Dawson School, Ellerton Road, Becontree.

## **Derby and District Aquarists' Society**

Secretary: T. S. White, F.Z.S., 25, Riddings Street, Derby.

Meetings: First Saturday evening in each month, at Prince Charlie Room, Derby Museum and Art Gallery, Wardwick, Derby.

## **East Lancashire Aquatic Society**

Secretary: Harry Loder, 59, Standish Street, Burnley, Lancs.

Meetings: Last Wednesday of the month at 7 p.m., Church Institute, Manchester Road, Burnley.

## **East London Aquarists' and Pondkeepers' Association**

Secretary: T. E. Butt, 25, Humberstone Road, Plaistow, E.13.

Meetings: First Thursday and third Tuesday in each month, 7.45 p.m., at St. Margaret's Hall, Ripple Road, Barking.

## **Enfield and District Aquarists' Society**

Secretary: Mrs. Frances Perry, F.L.S., Bull's Cross Cottage, Enfield, Middx.

Meetings: Third Tuesday in each month, 7.30 p.m., at the Methodist Church Hall, Enfield.

## **Enterprise Aquatic Society**

Secretary: H. R. Holland, 96, Ridgeview Road, Whetstone, N.20 (Phone: Hillside 7123).

Meetings: Third Thursday in each month, 7.30 p.m., at Oakleigh Primary School, Oakleigh Road, Whetstone.

## **Goldfish Society of Great Britain**

Secretary: C. E. C. Cole, 46, Vine Gardens, Ilford, Essex.

## **Grimby and District Aquarists' Society**

Secretary: A. J. Baskcomb, "Kilgertan," 59a, Bargate, Grimby, Lincs.

Meetings: First Monday in month, 7.30 p.m., at Victoria Cafe, Victoria Street, Grimby.

## **Guppy Breeders' Society**

Secretary: Capt. B. T. Stacey, 20, Alverton Street, Deptford, S.E.8.

Meetings: Second Thursday in each month at 7.30 p.m. at the Club Room, Crown Hotel, Prince of Wales Road, Chalk Farm Road, N.W.4.

## **Halifax and District Aquarists' Society**

Secretary: Frank M. Slater, 63, Green Park Road, Skircoat Green, Halifax, Yorks.

Meetings: First Monday in month at the Belle Vue Museum, Halifax.

## **Harrow Aquarists' Club**

Secretary: S. Sanders, 52, Church Avenue, Pinner, Middx.

Meetings: Second Monday in each month, 7.30 p.m., at 1, Cecil Park (Y.M.C.A. building), Pinner.

## **Havering Park Aquarists' and Pondkeepers' Association**

Secretary: A. C. Edmonds, 257, Carter Drive, Romford, Essex.

Meetings: Clockhouse Lane School, Collier Row, alternate Mondays at 7.30 p.m.

## **Hertfordshire Aquarists' Society**

Secretary: J. H. Gloyn, 14, Rooks Hill, Welwyn Garden City.

Meetings: First Monday in each month, 7.30 p.m., at 21, Roundwood Drive, Welwyn.

## **Hornchurch and District Aquarists' Society**

Secretary: V. F. Swettenham, 5, Devonshire Road, Hornchurch, Essex.

## **Ilford Aquarists' Society**

Secretary: S. H. Carter, 13, Kenwood Gardens, Ilford.

Meetings: First Monday of each month, 8 p.m., at Essex House, High Road, Ilford.

## **Kingston and District Aquarists' Society**

Secretary: R. E. Alderton, 25, Park Road West, Kingston-on-Thames.

Meetings: First Thursday in each month, 7.30 p.m., Alexander Hotel, Park Road, Kingston.

## **Leeds and District Aquarists' Society**

Secretary: H. Charles, 113, Ring Road, Cross Gates, Leeds.

Meetings: Second Wednesday of each month at the Lecture Room, Belgrave Youth Club, New Briggate, Leeds.

## **Leicester Aquarist Society**

Secretary: A. Wilson Smith, 56, Hillsborough Road, Blaby, Leics.

Meetings: First Thursday of each month at the Aylestone Road Methodist Church Rooms, Leicester.

**Liverpool and District Aquarium Society**  
Secretary: L. Plant, 66, Ferguson Road, Liverpool, 11.  
(Phone: 1249 Stanley).

**Luton and District Pondkeepers' and Aquarists' Society**  
Secretary: Mrs. P. Saurley, 192a, Old Bedford Road, Luton.  
(Phone 4986.)

Meetings: Third Tuesday in month, 7.30 p.m., at Luton Grammar School.

**Merseyside Aquarists' Society**  
Secretary: K. Baird, 34, Montpellier Crescent, Wallasey, Cheshire.

Meetings: First and third Thursday in each month, 7.30 p.m., at Grenville Cafe, 16, Tithebarn Street, Liverpool.

**Midland Aquarium and Pool Society**  
Secretary: D. E. H. Knights, 58, Frederick Road, Wyde Green, Sutton Coldfield, Warwickshire.

Meetings: First Tuesday in each month, 7 p.m., at Chamber of Commerce, Birmingham.

**Mid-Somerset Aquarists' and Pondkeepers' Society**  
Secretary: D. H. Perrett, 15, Penel Orlieu, Bridgwater, Somerset.

**National Aquarists' Society**  
Secretary: Kathleen Cooke, F.R.H.S., 28, Poulett Gardens, Twickenham, Middx.

Meetings: Gaxton Hall, Westminster.

**Newcastle-on-Tyne and District Aquarists' Society**  
Secretary: C. L. Crighton, 14, Middle Street, Walker, Newcastle.

Meetings: Y.M.C.A., Blakett Street, Newcastle.

**Northampton Aquarists' Society**  
Secretary: Mrs. E. M. Hunt, 19, Windsor Crescent, St. James's, Northampton.

**North Hertfordshire Aquarists' Society**  
Secretary: R. E. Thompson, 76, Strathmore Avenue, Hitchin, Herts.

Meetings: Fourth Wednesday of month, 7.30 p.m., at Hitchin Public Library.

**North London Aquarists' Society**  
Secretary: J. H. Anderson, 54, Crofdown Road, Highgate Road, N.W.5.

Meetings: Every Wednesday, 7.30 p.m., at Holme's Road School, N.W.1.

**North Staffordshire and District Aquarist Society**  
Secretary: G. R. Davis, "Carria," Westwood Park, Leek, Staffs.

Meetings: First Wednesday of each month at the Church Institute, Church Street, Stoke.

**Nottingham and District Aquarists' Society**  
Secretary: A. D. Spowage, 6, Third Avenue, Sherwood Rise, Nottingham (Phone 63465).

Meetings: Last Wednesday of month, 7.15 p.m., at People's Hall, Heathcoat Street, Nottingham.

**Oxford and District Aquarists' Society**  
Secretary: F. Alderton, 35, Phipps Road, Cowley, Oxford.  
Meetings: Third Monday of each month, 7.30 p.m., New Baptist Church, New Inn Hall Street, Oxford.

**Potters Bar Aquarists' Society**  
Secretary: F. D. Willis, South Lodge, Cockfosters Road, Hadley Wood, Herts. (Phone: Barnet 3884)

Meetings: Third Monday in month, 7.30 p.m., Ladbroke School, High Street, Potters Bar.

**Preston and District Aquarists' Society**  
Secretary: M. H. Robinson, 16, Bank Place, Ashton, Preston.  
Meetings: Second Wednesday of each month, 7.30 p.m., at Fox Street Methodist Schoolrooms.

**Reading and District Aquarists' Society**  
Secretary: R. A. Lawn, 27, Chester Street, Caversham, Reading.

Meetings: Every second Thursday, at 139, Oxford Road, at 7.30 p.m.

**Scottish Aquarium Society**  
Secretary: Strachan Kerr, 42, Aytoun Road, Glasgow, S.1.  
Meetings: Christian Institute, 70, Bothwell Street, Glasgow, G.2 (as per syllabus).

**Sheffield and District Aquarists' Society**  
Secretary: B. Chapman, 170, Gibraltar Street, Sheffield, 3.  
Meetings: First Friday of month at Victoria Hall Institute (Chapel Walk entrance).

**Shooters Hill and District Aquarium and Pondkeepers' Society**  
Secretary: N. L. G. Taylor, 89, Blackheath Hill, S.E.10.  
Meetings: First Monday of month, 7.30 p.m., Trinity Church School Hall, Berekford Street, Woolwich S.E.18

**Southampton and District Aquatic Society**  
Secretary: C. C. Parrott, 63, Upper Brownhill Road, Nursing, Southampton.

Meetings: One week in four (Fridays) at St. Peter's Hall, Commercial Road, Southampton, 7.30 p.m.

**Southend, Leigh and District Aquarists' Society**  
Secretary: E. C. Day, 36, Bournemouth Park Road, Southend.

Meetings: First Wednesday of month, 8 p.m., Girl Guides Hall, Westborough Road, Westcliff.

**South London Aquarists' Society**  
Secretary: R. H. I. Read, F.Z.S., "Beverley," Wilbury Avenue, Cheam, Surrey.

Meetings: First and third Wednesdays in month, 8 p.m., at Wimbledon Merton & Morden Ex-Service Men's Club Ltd., 241, The Broadway, Wimbledon, S.W.19.

**South Ruislip Aquarists' Society**  
Secretary: W. Lilley, 1, Ferryhead Gardens, Greenford, Middx. (Phone: WAX 3066).

Meetings: Second Tuesday of month, 7.30 p.m., "Old Tauntonian Pavilion," Long Drive, South Ruislip.

**South-West London Aquarists' Society**  
Secretary: Mrs. Bulmer, 6, Kelvin Court, Spencer Road, Chiswick, W.4.

Meetings: Second and fourth Wednesdays in month at 861-3, Fulham Road, Parsons Green, S.W.6., at 7.30 p.m.

**Suffolk Aquarists' and Pondkeepers' Association**  
Secretary: F. Brinkley, 267, Colchester Road, Ipswich, Suffolk.  
Meetings: First Wednesday in month, 7.30 p.m., at Lecture Room, Ipswich Museum.

**Tottenham and District Aquatic Society**  
Secretary: T. W. Tiffany, 38, Talbot Road, Tottenham, N.15.  
Meetings: Second and fourth Monday in each month, 7.30 p.m., at Ruskin House, West Green Road, N.15.

**Tropicaid Aquatic Society**  
Secretary: D. F. Kerrison, 26, Georgiana Street, Camden Town, N.W.1.

Meetings: Every other Tuesday, 7.30 p.m., at 29, McKerrill Road, Peckham, S.E.15.

**The Twenty Club**  
Secretary: G. Frier, 29, Melrose Avenue, Wimbledon Park, S.W.19.

Meetings: Second and fourth Wednesday in month at 28, Redgrave Road, Putney, S.W.15.

**Ulster Aquarium Society**  
Secretary: G. E. Crisp, 31, Lismoyne Park, Belfast.

**Walsall and District Aquatic Society**  
Secretary: S. Mills-Clarke, 54, Walstead Road, Walsall, Staffs.  
Meetings: Second Tuesday in each month, 7.30 p.m., at the Club Room, New Inns, Park Street, Walsall.

**Watford Aquarists' Society**  
Secretary: C. J. Darby, 76, Fuller Road, Watford, Herts.  
Meetings: Second and fourth Friday in month, 7.30 p.m., Watford Civic Centre, Watford Field House, Watford.

**Welling and District Aquarists' and Pondkeepers' Club**  
Secretary: H. F. Starnes, 36, Cornwall Avenue, Welling, Kent.  
Meetings: Third Monday in month, 8.15 p.m., at Falconwood Social Club, 1, Falconwood Avenue, Welling.

**Wembley Aquarist Society**  
Secretary: D. Yansley, 9, Abbots Drive, Wembley.  
Meetings: Tuesdays, at Park Lane School, Wembley.

**West Middlesex Aquarists' Society**  
Secretary: A. H. Charles, 91, Uxbridge Road, Hanwell, W.7 (Middx.).

Meetings: Second Tuesday in each month, 7.30 p.m., Methodist Church Hall, Windsor Road, Ealing, W.5.

**West Surrey Pondkeepers' and Aquarists' Club**  
Secretary: R. FitzGerald, 8, Orchard Way, Aldershot.  
Meetings: Second Wednesday in month, 7.30 p.m., Guildford House, 10a, High Street, Guildford.

**Willesden Aquarists' Society**  
Secretary: R. O. B. List, 31, Cocoon Court, 31, Willesden Lane, N.W.6 (Phone: MAIDA Vale 8742).

Meetings: First and third Wednesday in month, 8 p.m., at Salusbury Road School, N.W.6.

**Wolverhampton and District Aquarists' Society**  
Secretary: T. S. Pick, 44, Green Lane, Tettenhall, Wolverhampton, Staffs.

Meetings: First and third Fridays of each month, 7.30 p.m., Eastfield Road, Primary School Hall, Walsall Street, Wolverhampton.

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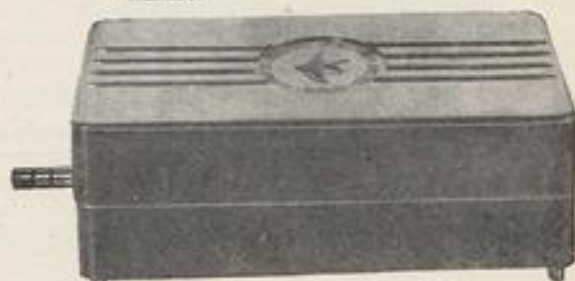
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