

# The AQUARIST AND PONDKEEPER

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Photo: E. Egan  
Tadpole of the clawed toad nearing the end of metamorphosis. Further pictures of this interesting amphibian are on pages 58 and 59

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1950

## Editorial

FEW children can resist the lure of ponds and streams, and most of us can count memories of childhood escapades in early aquatic investigations among our happiest recollections. The value of introducing children to aquarium-keeping has frequently been stressed in this magazine and it is always pleasing to hear of fresh efforts made by senior aquarists in this direction. This month brings news from Sheffield of a scheme that is being successfully operated in the schools of that city. This is the formation of the Sheffield Schools Aquarists' Society.

Teachers from the schools have together arranged meetings and practical classes at which aquaria have been made for the use of the children, and the interest aroused has been a rewarding feature of their work. So far has the scheme progressed that an inter-schools aquarium exhibition and show is planned this month. The benefits which accrue from pooled resources when funds would not otherwise permit such ambitious projects are obvious ones, and not the least is the valuable contribution of the joined energies and experience of the enthusiastic teachers concerned.

The number of ways in which aquaria can be of educational use in and out of the classroom is only just beginning to be appreciated. Many are the subjects that can be broached from the starting-point of the attention-holding aquarium, and more and more teachers are coming to use this living text-book in their classes.

School summer holidays are coming along, and the care of an aquarium is a holiday task that town school children will enjoy. Those more fortunately placed within easy reach of the countryside need only to be told a little about the animals and plants they can find for themselves to set them hunting. Schools in other cities and towns will probably wish to follow Sheffield's lead in organised educational aquarium-keeping, and we know that they can rely on full help and support from their local aquarium societies. We shall be pleased to lend our pages to publicity for these ventures, and to supply information and help to interested teachers in any way possible.

**WE** had rather feared that it would happen. As soon as large importations of goldfishes from the continent arrived, so that their price here fell, some of the old exploitations started up again. On our readers' letters page a correspondent draws attention to the resumption of the pre-1939 practice of itinerant rag-merchants offering goldfishes in exchange for old clothes. That many of these fishes find their way into the hands of people without sufficient knowledge and enthusiasm to give them proper care is one matter, but it is also unfortunately true that the fishes so offered are kept under terrible conditions by the rag-merchants concerned, who care little about the animals; their sole interest is in a rapid turn-over from the pernicious chain, goldfish-rags-money. What an outcry there would be if pekingese were offered from street barrows in exchange for left-offs!

Britain's regard for animals is a world-renowned quality, but public opinion in this country makes some rather queer (to the biologist) distinctions between living creatures. Whereas there are large organised bodies which, mainly through misrepresentation of the facts and misplaced sentiment, exhort sums of money from the public in disgraceful efforts to stop the use of animals in medical research, wantonly inflicted cruelty all too often passes without attention. The further removed the animals are from the cuddly fur and fluffy types, the greater is the disregard. Although aquarists are sometimes thought by the ignorant to have rather peculiar interests, we fancy that they have a far more balanced outlook on animal life, and evidence a far more intelligent approach to nature, than does the great majority.

This issue includes an article and photographs by Dr. Edward Elkan on some new observations concerning the development of the clawed toad, *Xenopus*. Dr. Elkan is an authority on this subject, and he carried out some of the early experimental work when *Xenopus* was first introduced as a test animal for diagnosing early human pregnancy. So heavy has the demand for the toads become from laboratories all over the world, it was announced in the *Transactions of the Royal Society of South Africa* last year, that natural waters in that country are becoming depleted. Accordingly, *Xenopus* hatcheries have been instituted at Jonkershoek, where the toads are raised in artificial earth ponds.

The adults are placed in these ponds during the summer, males and females in equal numbers—200 to the acre, and are returned to stock tanks in the autumn. Young toads remain in the ponds until they are two to three inches in length, in their second year, when they are sorted and graded in concrete tanks before being sent off to medical scientists in all countries.

Our recommendation in the April issue that the Federations should give the matter of lecturers' fees their consideration was a little behind the times. The secretary of the F.B.A.S. tells us that since last December the rate of payment for lecturers has been increased as far as the financial position of member societies will allow, and that travelling expenses are now paid as well. Several new lecturers have joined the panel, and the success of the Federation's policy can be inferred from the fact that engagements made during the first quarter of this year have far exceeded the total bookings for the whole of 1949.



**H. A. Day**

**WE** regret to announce the death of Mr. H. A. Day, for many years a contributor to *The Aquarist*, well known to readers as writer of "Concerning the Water-Garden." His death on the 22nd April, at the age of 78, was a peaceful one but quite unexpected. Living as a boy by the riverside, he developed early a strong interest in natural history and in aquatic life in particular, and later he became recognised as an authority on water-gardening and horticulture. He was a Fellow of the Royal Horticultural Society and contributed articles to a good many periodicals on these subjects; right up to the time of his death he was working on the editorial department of a weekly newspaper. Mr. Day leaves a widow and son and daughter, to whom our deepest sympathies are extended.

**D. C. Freeman**

**WE** regret to announce the death of Mr. D. C. Freeman, proprietor of Garden Aquatics and Aquaria Co. Mr. Freeman died suddenly on the 2nd May; he was well known throughout the aquarium trade and was a personal friend of many aquarists. He set up as an aquatic supplier thirty years ago after his return from army service in World War I, and his business was carried on for many years under the name of the Waterloo Goldfishery Co. Mr. Freeman leaves a widow, who is now conducting the business. Our deepest sympathies are extended to her in her loss.

# FEEDING THE YOUNG FRY

by

A. BOARDER

**D**URING the month of May you will find that your young fry will grow very well indeed providing you make sure that they have plenty of room. The long days will enable the youngsters to feed nearly twenty hours a day. See that there is enough food at most times as the fishes are not able to make a large meal at any one time. They have no large stomach like most animals and so have to eat little and often. Although you may not give food at frequent intervals the youngsters will be able to find plenty of food if the tank is of a fair size, containing plenty of growing water plants. If you watch the fishes you will notice that they are continually browsing on the water plants. These are as a rule, covered with algae and filmy filament weed and amongst it is a host of small animals which you can only see with the aid of a microscope. If the temperature of the water is in the region of 70° F. the young fishes will feed and grow quickly but it is noticeable that as they grow they take less notice of such small foods as Infusoria. They are mostly greedy feeders and take the largest food that they can see.

## Dietary Changes Beneficial

Once the young are a month old they can be given a larger range of food. I think that a change of diet occasionally is very good for the youngsters and there is very little in the food line that will be unacceptable to them. You can feed with chopped small worms as well as the usual live foods such as *Tubifex*, white worms, *Daphnia*, gnat larvae, small maggots or gentles. I cannot give a full list of the dried foods which you can use as it would take too much room. I suppose that Bemax or the similar foods are as good as anything. These foods are made with the germ or embryo of the wheat kernel and contain proteins, carbohydrates and important vitamins. Dried foods such as dehydrated whale meat, dried liver etc., can be mixed with dried shrimps and fine Bemax to make a good general food for young fishes from three weeks old. Once the fry have reached the age of a month there is no need to soak any of the food before giving it to the fishes. Any of the usual



This young fantail, bred in June 1949, still carries the last traces of its black coloration

cereals will be good for the fry and cooked oatmeal is quite a good food. Cooked potato, chopped lettuce, shredded spinach, dried brown bread, can be given as well as the various prepared foods which are sold by dealers. Most dealers sell good mixtures containing some or all of the foods I have mentioned. If you are a flat dweller and have no garden from which to obtain earth-worms, the fish-store dealers usually have a good supply of live foods for sale.

You will find that it will help to keep the youngsters healthy and growing if you are able to change some of the water in the tank each day. I cannot stress this point too strongly as I have noticed many times that where the water, or part of it, has been changed fairly frequently the fishes have always made good progress. If you have a pond as well as your tanks containing the fry, you will find that if you take some water from the tank first you can fill up with water from the pond. The pond can then be filled up from the tap. I find that it is better to do this than to put tap water straight into the tank, as it may contain too much lime or chlorine.

## Picking the Best

The sorting of the fishes should now be completed. At a month old it should be possible to see which will be of no use, and then you can concentrate on the best types. Do not imagine that the larger fishes are always the best. If you wish to get some show specimens you will find that often the larger fry are not the best, and some of the smaller ones often develop into very good specimens later on. If you are breeding any type of fancy goldfish it is important that you are able to place the best fishes in a tank where you are able to give them fairly frequent observation. Many will appear good at the first inspection but you may notice an undesirable feature which was not apparent at first. The shape of the body and fins will be the most important points to look for initially, as those which change colour after at least three months cannot be finally sorted until they have almost completed the colour change. I have mentioned before that you must not keep large youngsters with much smaller ones even if they are from the same



Photo by L. C. Mandeville  
One of the author's fantails, two years old, a fish in first-class condition

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spawning. There are always some which make more headway than the others and they soon start to bully or even eat the smaller ones. If the young fishes have made good growth they should be about an inch long over all when they are just over a month old, and if so you may start lowering the temperature of the water. There is no doubt that you will raise healthier fishes quicker in a warm temperature, say about 70°F. This need not be constant as a fall at night will help to keep the fishes healthy. There should not be much need to give artificial heat towards the end of June unless the fry are very small.

You may get another spawning from the pond fishes this month and it is a good plan to look after these June spawnings; I do not think that it is wise to depend on spawnings later in the year than this. I find that fry hatched after June are not as likely to make good fishes as those hatched earlier. Apart from the fact that you may have to provide some form of heat most of the autumn, and sometimes winter, the days are getting short before late-hatched fry are very large. Do then concentrate on the earlier spawnings.

#### First 1950 Spawning

In my article last month I mentioned some reasons for non-spawnings and the following description of my own first spawning this year may be of interest. It took place on 4th April, which is earlier in the year than is usual. It occurred in an unheated greenhouse, which helped the early spawning. My adult fishes usually spend the winter in the open pond but I had kept four 1948 youngsters in a tank in the greenhouse so that they were readily available if I wanted to take them to a show or a lecture. (I find that if I keep the fishes in the pond it takes so long to catch one or two up and I can rarely catch the particular fish I require!) The fishes in question were kept in a sixty gallon coldwater cistern. This had been floated over with cement and had been partly filled in first with brickbats etc., so that the water was only about eight inches deep. Fishes do better in these shallow tanks than in deeper ones. The surface of the tank was 28 inches by 23 inches; there is no sand or earth in the bottom of the tank and the weed used was *Myriophyllum* and hornwort.

On the 3rd April, I noticed that the fishes were following one another as if likely to spawn soon. The weather was fairly bright but there was a cool wind. The temperature inside the greenhouse soon rose during the day although the water was not very warm. As I expected, the fish spawned the following day with the temperature of the water at 51.5°F. The greenhouse was at 54°F. in the early morning, but it warmed up slightly later on although there was little sunshine. There were many eggs laid and the subsequent hatching proved that the eggs had been fertilised. This was one of the earliest spawnings I have had, but of course, it took place inside the greenhouse whereas my previous spawnings had taken place in the open pond. The fish continued spawning until after 4 p.m. which was later than I usually expect outside. The spawning at such a low temperature as 51.5°F. greatly surprised me and it just proves how impossible it is to lay down any hard and fast rule where goldfish are concerned! As I have had spawnings from this low temperature up to 75°F. or over it does appear to me now that the temperature of the water plays a very small part in the causes of particular spawnings. I warmed the tank up to about 70°F. with an immersion heater and some of the fry hatched out on the evening of 7th April.

I thought that I would make an experiment with one of my pond fishes and so I placed the two best 1948 male fantails in a tank similar to the one above; after a few days I introduced a 1947 female fantail from the pond. This fish was as full of eggs as any fish I had ever seen and was a very fine specimen. This was on 14th April, and on 17th April, spawning took place. The temperature of the

water was 54°F. and the weather was very bright early in the morning. Later in the day it rained hard and there was a cold wind—of course, the weather had little effect inside the greenhouse but it is of interest to note all these conditions. The female laid hundreds of eggs, so thickly in the hornwort and blanket weed that it was only possible to make a rough estimate as to the number. As a fair estimate I should say that there were over three thousand eggs laid. Although the males had fertilised eggs in the spawning thirteen days earlier they chased well and the hundreds of fry which hatched out proved that fertilisation was successful. All these happenings seemed so different from what I had experienced before that I was not very surprised when the fishes in the pond spawned on 23rd April, with a pond temperature of 55°F. The weather was dull and showery early but turned brighter in the afternoon. I had arranged to go out for the day (as usual when my fishes spawn) and when I went to take the eggs from the pond on the following morning I found that the fishes were spawning again. There were countless thousands of eggs, which I removed to tanks inside the greenhouse.

My first spawnings in the two previous years took place on 15th May, and so I looked for possible reasons for the early spawning this April. Most years my fish spawn throughout the summer and in 1948 had spawned as late as 28th September. In 1949, however, I had no spawnings in the pond after June and so it may be that the spawners had many partly undeveloped eggs in their ovaries which matured early this year. I have been feeding on chopped earth worms as often as the fishes would take them—generally once a day, and had been doing this for at least three months except when the weather was very cold. I have gone into detail about these early spawnings as it does help to prove that one never knows what goldfish will do next and the keeping of records only seems to complicate matters instead of making things clearer! All we can be sure of is that they are "Sure 'Ornerly critters."

In my next article I hope to deal with the colouring of young goldfish and what can be done to help this process.

## Body Shape Worth Keeping?



Photo

L. C. Mansville

Members of the Goldfish Society of Great Britain are now choosing the standards for the proposed basic varieties to be officially approved by the Society. The outline drawing of the "twinstail," one of the varieties, has a body shape very similar to that of the 1948 bred fantail shown above; the fantail is not one of the Goldfish Society's four proposed varieties.

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## Glow Light Tetras (*Hyphessobrycon gracilis*)

by W. J. van der KOLK

THE glow light tetra was discovered by chance by Mr. A. S. Pinhus, who as collector of birds and fish, made trips into the jungle from Georgetown, British Guiana. Sailing up the River Magaruni, as far as Kurupung, the last outpost of this district of gold and diamonds one day in 1938, he happened to come across the fishes in one of the abandoned and flooded diamond mines which he investigated. He found some small fishes, about two inches in length, which had been left behind and trapped when the Magaruni had returned to its old bedding.

With an improvised net he caught 180 glow lights. They turned out to be hardy, for two months later he arrived with 150 of them hale and hearty in New York, where they fetched good prices. As is the case with all new species, amateurs and specialists alike tried to breed them and as with the neons, up to a few years ago their breeding habits were shrouded in mystery; little was known of their natural habitat. The first breeding successes, although small ones date from 1939, and again the German breeders were the first here to have good results.

The glow light tetra is, like the neon, a striking fish. Of an all-over silvery colour with a slight greenish sheen, the most outstanding mark in this fish is the "glow-light" side line, from which it derives its popular name. This line is broken up, about halfway along the body, by a bluish spot, which can only be noticed when the fish are in prime condition, when kept in a darkish tank with overhead lighting. From this spot, the red line broadens slightly towards the tail. Except for the dorsal fin, which has the same red glow in the first rays as the body line, all fins are colourless and transparent, whilst the caudal, ventral and anal fins have a milky-white border. The top-halves of the eyes have the same red glow, which shows strongly in a well-shaded tank.

Glow lights tend to lose colour, however, when the lights over the tank are suddenly switched on, or when they are frightened in other ways and when put into a tank after a long journey; then it takes a good deal of time before they get their old beautiful colours back. Although a fish suitable for a community show tank, it is most beautiful when kept in a smallish shoal in a special glow light-cam-neon aquarium.

### Preparing for Spawning

Different methods have been adopted to induce this fish to spawn. As is usual when one has only two or three fishes available, they were put in a tank arranged in the old fashioned manner, with sand, fine-leaved plants and so on, trusting to luck and hoping for good results. When a pair is together in a breeding tank, there will come a time, especially when the female is "ripe," that mating takes place, but this will not always mean that good results will be obtained. First of all, we want to know as much as possible of the fishes' natural habitat, the nature of the water, the kind of plants that grow there, whether a dark bottom and background exists, etc. Then we have to try and find two fishes which by all appearances, seem most suitable.

Never take just any two *gracilis* from your show tank, putting them in a breeding tank to wait for results, for this is inviting failure. Study your fishes to see which are always together and which will not fraternise with others.

The first results were poor: the fish did mate and eggs were fertilised, but all, or most, turned white and seemed to dissolve. Any youngster that was hatched, disappeared after a few days. They were not strong enough for the struggle for life, coming from poor stock. Old tank water, fresh tap water, pond water, all sorts of waters were tried and yet if one knows how to breed them, it's so simple—as with all things that we have mastered.

First and foremost do not breed with glow lights unless they are about two years old and fully mature. When buying young glow lights for breeding purposes, buy at least six, for sex determination at an early age is very difficult; here you have to trust to luck. Feed them well on live food, *Daphnia*, *Cyclops* and especially red worms and the best of dry food. Give white worms very occasionally, for overfeeding with white worms has a bad effect on all egg-layers.

### The Breeding Tank

Keep the temperature on the low side, till you have decided to breed them, and then only raise the temperature by two or three degrees. When the fish are fully grown (about two inches) and the female is full of eggs, arrange your breeding tank in the following manner. Take a tank of approx. 24 ins. by 12 ins. by 12 ins. (a somewhat smaller one will do as well), clean it thoroughly with hot water. Do the same with the sand, rinse your plants, preferably fresh green *Myriophyllum* and *Ambulia*, in warm water with a small dash of vinegar in it to kill bacteria, planarians and the like.

Make a thick bunch of your plants and place this in the middle of the tank, which should be three-quarters full of water, so that the fish can dart in and out of the bunch from all sides. Take a good quantity of peat-litter—the sort used in gardens in winter time to cover plants as protection against frost. Wash this peat-litter several times in cold water, till no more cloudiness appears in the washing water. Then kill any bacteria by scalding the litter with hot water and make from this well-soaked peat an imitation layer of mulch in your tank. The bottoms of the glow lights' natural pools are dark, covered with a mulch of decayed leaves and plants. Have plenty of floating plants, and last but not least put your breeding tank in a darkish place in your room or fish-house.

Cover the tank on three sides with green paper; do the same to the top and then only put in that pair of fish which by all appearance has selected itself. Keep the temperature at a constant 74° F. The higher the temperature the poorer the results, for the eggs then do not hatch in the natural way but are "steamed out." In my opinion most breeders have their temperatures too high. This speeds up the hatching but weakens the young fry considerably. Be careful to remain at a good distance from your breeding tank, for if the fishes see anybody moving about they will not start mating. The best is to put them in the breeding tank on a Friday or Saturday evening, when we have opportunity to watch them on our free day.

If it was the female who chased the male in the show tank, in the breeding tank the tables are turned and it is the male who darts and dances about around the female with

wide-spread fins. He darts away into the plants time and again, as if to invite the female to follow him; a few prods follow, and when the female is at the stage that she has to spawn, not earlier, she'll follow the male into the *Myriophyllum*. Their long and slender bodies are tightly pressed together, they lock fins, embrace, and roll round on their backs. At that moment between five to ten eggs are expelled, immediately fertilised by the male. The eggs, which are slightly adhesive, sink between the plants or float down to the bottom, where they come to rest on the layer of peat-litter.

I noticed many a time before I used this imitation layer of mulm, that eggs resting on sand, turned white within a few hours. Whether this is because there are still bacteria about or because the sand is too light in colour, I could not say, but it was proved beyond doubt, that a layer of this mulm seemed to keep the eggs in good condition. When spawning is over, remove the parents before they start eating their own eggs, and also cover the front window of the tank so that the interior is now in complete darkness.

#### Spotting the Fry

Now leave things like this for about twenty-four hours, when the eggs should have hatched. Then, very carefully, seeing that no strong light can shine into the breeding tank, remove part of the covers and look for the youngsters on the bottom. They have an extremely bad habit of hiding in plants and in the mulm, but when you wait patiently for a few minutes, you will see the fry lift themselves from the bottom and "hop" about over short distances in the manner of a water flea. After three to four days the eyes develop and before this time the youngsters live on their yolk-sacs. Now feeding starts, the most difficult time if one has not the right kind of food. Make, or have ready made, a net of fine parachute silk and try to catch the finest possible pond Infusoria.

Beware of *Cyclops*, for these attack the youngsters. Feed Infusoria for a week, also pressed-out *Daphnia* and blood worms, then give brine shrimps, finely sifted *Daphnia* etc. See to it that the fishes swim in plenty of food all the time. In this manner they will grow quickly the first four weeks; suddenly it seems as if all growth comes to a halt. To overcome this and speed up growth again carefully drain off a quantity of the old tank water and replace it with fresh tap-water of the same temperature. Not only has this a good effect on their further growth, but also on their colouring. From four to five weeks the glow-light line on their body and in their eyes appears and from then onwards it is "plain swimming." Well-matured parents can produce between 200 and 300 youngsters in one spawn, for the eggs are very tiny, and it is a grand sight to see them all swimming about in a tank.

The best breeding time is from the beginning of April till the end of May, when there is plenty of pond Infusoria about, although my first batch of glow lights was hatched in February 1949, so it is possible to start quite early in the year. After many failures and disillusion, many trials and errors, I developed the method I have described. It gives in my opinion, the best results, but I will not pretend that it is the one and only way to breed *gracilis* successfully. If you bear the main points in mind, i.e. a good, fully grown and self-selected breeding pair, a clean, well-shaded tank with a layer of mulm on the bottom, fresh, fine-leaved plants, not too high a temperature etc., no doubt good results will be forthcoming. If not, don't blame me, for the *gracilis* is and will always remain, a fairly difficult fish to breed, rather finicky in its habits and choice of mate. If things don't always turn out as we should like them to do, there may be some causes not accounted for and further experiments may help you to succeed.

## HUXLEY'S Crayfish



SEVENTY years ago, T. H. Huxley wrote a book which he called *The Crayfish, an Introduction to the Study of Zoology*. It was published by Kegan Paul & Co., in an edition limited to 250 copies, of which I purchased No. 180 the other day. It had been advertised in the catalogue of a London bookseller for the princely sum of five bob. During the decade following 1880, six editions were published as Vol. XXVIII of the old *International Scientific Series* (Kegan Paul, Trench, Trübner & Co., London), and copies of these can usually be bought for about half-a-crown at most second-hand scientific bookshops.

*The Crayfish* can be recommended for the aquarist's library. It is neither a zoological monograph, nor a treatise on the English crayfish. Huxley's intention was to show how the careful study of this common invertebrate could, by gradual steps, lead to wide generalisations about fundamental zoological and biological problems. Besides the morphological, histological, and embryological descriptions at which 19th century zoologists were adept, there are a number of chapters on physiology, and natural history, of which the author's knowledge was extensive. So we read that "not content with killing or mutilating their spouses, after the fashion of animals of higher moral pretensions, they descend to the lowest depths of utilitarian turpitude, and finish by eating them." The book contains such wealth of information that it is invaluable to all who are interested in crayfishes, and it is frequently referred to still.

Not does the author fail to mention some of the interesting myths that surround the crayfish. For example, in summer a pair of calcareous masses, known as "crab's eyes," or gastroliths, are found on the side of the stomach, and were at one time valued as a remedy for all sorts of maladies. The word crayfish itself is a phonetic spelling of the old English word "crevis," which may be a modification of the French "écrevisse," or of the Low Dutch name "crevik." Thus it either dates from the Norman conquest, or has an earlier Saxon derivation.

Ecdysis (moulting), is described in some detail in the book, and Huxley quoted the observations of Réaumur. In reading his account I am reminded of my irritation, some years ago, on finding that my crayfish had moulted unobserved, in an aquarium beside the chair in which I was revising for my Tripos zoology examination. In view of the recent research on the hearing of invertebrates, Huxley's description of the auditory sacs is of particular interest, whilst his analysis of the crayfish "mind" is a fine example of his mental integrity. The book is illustrated by some woodcuts which are beautiful specimens of xylographic art.

J. L. Cloudsley-Thompson

THE AQUARIST

## Gobio, the Gudgeon by JACK HEMS

(Photograph by W. S. PITT)

**T**HIS rather sad-looking fish, technically known as *Gobio gobio*, usually inhabits shallow waters with a gravelly bottom. Moving slowly over the pebbles, the yellowish-greenish-brown tints of which combine with the brownish colours of the fish's body to make it almost indistinguishable from its surroundings, it stops every so often to push its snout into the interstices of the stones to seek food. The fish searches for tiny crustaceans and worms as assiduously as some human wrecks drag themselves over the pavements in search of cigarette ends. And like the flotsam of human society, the gudgeon does not confine its scavenging to one sort of place only: it is as likely to be found inhabiting some placid rush-fringed lake set in idyllic parkland as in the dark, slow-moving waters of a gasometer-shaded canal.

*G. gobio* is widely distributed over Europe and some parts of Asia. It is not found in Cornwall or the Lake District in England. It is absent from Scotland and the western half of Wales. The species has a fairly wide temperature range and specimens are known to inhabit certain Continental waters fed by warm springs.

The general contours of the gudgeon are fairly typical of most bottom-living species: long in the body and rounded on the back with rather compressed sides and flattened underparts. The eyes are large and dark and placed high up on the head. The mouth is long with the upper jaw longer than the lower jaw and admirably suited to obtaining food from the bottom of the water. A short barbel projects downward from each corner of the mouth. The tall dorsal fin, almost as tall as the body is deep, is soft-rayed, and speckled with small brown blotches and spots. The caudal fin is forked, and has rather pointed lobes. Like the dorsal fin, it is speckled with different sized brown markings. The

other fins are mainly clear, though the anal fin has some dark earthy markings.

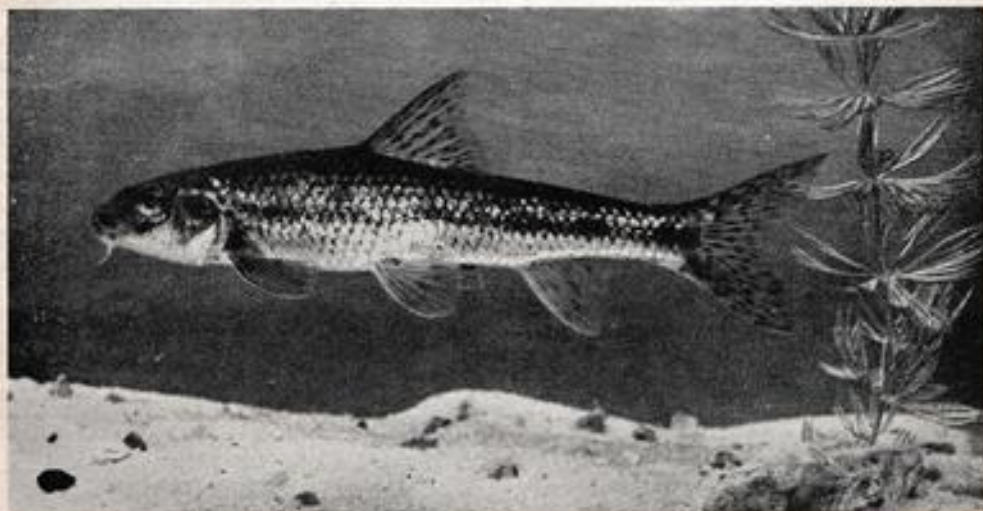
Looked at in an aquarium, it will be seen that a number of the dark markings on the yellowish-green to light olive sides of the gudgeon form a distinct band or line which extends from behind the gill plates to the root of the tail. This band separates, as it were, the pale underparts from the darker, brown-dappled sides. Most authorities give the maximum size reached by the gudgeon as anything between six to eight inches. The scales are large, and number between 39 and 45 along the lateral line.

The species is gregarious and very large shoals may sometimes be observed during the summer-time in clear water. In the winter-time, the gudgeon deserts the icy shallows for deeper and therefore warmer water. With the return of spring, the fish makes its way back to its fine-weather haunts.

Spawning usually takes place between April and May though sometimes egg-laying may continue well into the summer, say until about the middle of July. The eggs are small, clear and adhesive, and are deposited, a few at a time, at irregular intervals, on the stones. As a rule, the eggs hatch out within 28 days after being laid by the female.

Except for its usefulness as a scavenger—the gudgeon will eat vegetable as well as animal matter—the species has little to recommend it as a garden pond fish. It will almost always remain out of sight unless the pond is a sparsely planted one—and even when it can be picked out from its surroundings, its colours are much too sombre to add any sparkle or gaiety to its home.

It is, however, an easily tamed fish, and will, with a little encouragement, learn to come towards the surface of the water for tit-bits such as earthworms or scraps of meat provided by its owner.



June, 1950

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# Aquarist's Notebook

Seasonal notes on pond and aquarium interests

**N****A**TURAL ponds are now teeming with the tiny water fleas and insect larvae so greatly relished by aquarium fishes as living food. If you live anywhere near such waters, an afternoon's pond-hunting is time well spent; for yourself it means a spell in the country air, for your fish a rejuvenating change of diet.

A much looked for catch is the water flea (*Daphnia*). Although it is often rather local in occurrence, I think it safe to say that most duck ponds will provide a good supply at this time of year. In really good *Daphnia* ponds you may see patches on the surface that are quite red in appearance from the thousands of jerking crustaceans. A few turns with a close mesh net in such waters will give sufficient fleas for carriage home in a can—they soon die off if overcrowded too much. In some ponds you will find the giant water flea, and this is greedily eaten by all adult fishes.

What chances are there of keeping a stock of water fleas in the garden? Well, as long as you do not expect to be able to breed enough to be the sole source of food for your tanks it is easy enough to keep a small culture going. I have an old iron butt that holds about fifty gallons of water, into which I am in the habit of throwing unwanted plants and cuttings from ponds and tanks. It has a thick layer of decomposing vegetation on the bottom, but the water is quite sweet, and during the summer I can get from it sufficient water fleas to give one weekly feed for a large community tank of tropicals.

If you have a water butt that is not too clean, try introducing some water fleas to see how they take to it. A very small amount of rotted manure added to the water will probably help to encourage the fleas to establish a colony. Mosquito larvae and blood worms (the larvae of midges) are almost certain to be found there in any case, and these are also foods that are very useful. Incidentally, if you have never seen how quickly a few *Daphnia* placed in a tank green with suspended algae—not the blanket weed type—can clear the water, just try the experiment.

Do not be surprised if aquarium tanks situated near windows are now developing heavy green growths of algae on the glass. The brighter days and longer hours of light are responsible, and it is advisable to screen the outside of the glass to reduce the amount of light reaching the tanks. This can be done by distemping the side nearest to the window, and the two end panels, or by pasting sheets of coloured paper in these regions.

To cut down the light penetration at the top of the water you can use floating aquatic plants. These are often considered rather a nuisance in aquaria for they cling to hands, nets, planting sticks and siphons or anything else used in the tank at servicing time, but some of them are really attractive and tropicals appear to welcome the extra browsing area that they provide. The lesser duck weed is one floater that is easily obtained but far less easily controlled, for it grows rapidly in the summer.

Crystalwort (*Riccia*), is a tiny branching plant that does well in the cooler tropical tanks (not above 72° F.) and when it takes to aquarium conditions it forms a thick green top layer tunnelled with tiny gaps in which many young live-bearer fry will escape their prolific parents. Gouramis like to include it in the structure of their bubble nests, too. The lesser bladderwort, (*Utricularia*) is another top plant, light green in colour, and its delicate growth prospers in the tropical tank. *Salvinia* is a larger floating plant whose beauty is seen only from the top: it is a most effective light

screen. Fairy moss (*Azolla*), a really pretty surface plant with green and reddish-brown colour varieties, will grow in warm water, and a top carpet of it gives an unusual effect.

Freshwater mussels, although interesting animals well worth studying on their own account, are not good subjects for aquaria stocked with fishes. Neither do they often do well in ponds, for that matter, and in both situations they are liable to die suddenly and cause water-fouling. Aquarists trying to breed bitterling, when it is necessary to have one or two mussels in the tank (and they must be Painter's mussels by the way, and not the more common swan mussels) will find that it is not wise to keep the animals in the aquarium once spawning and hatching of the young fishes is accomplished.

Mussels are filter-feeders, and the confined spaces of aquaria and small ponds cannot provide enough free-swimming microscopic foods to satisfy them; most of their deaths are I believe, the result of starvation. How can you tell when a mussel is dead? The strong muscles that normally hold the valves of the shell together relax after death and the shells gape open. Such an open mussel that does not close when it is touched is out of this world and must be removed from the water at once. Mussels live longest in ponds with a thick mud bottom layer, but do not try to keep more than one or two specimens even then.

Take advantage of a day when the kitchen oven is fairly hot after a baking to prepare some of your own dry food. Prawns and shrimps make very good foods and if they are "topped and tailed," so that only their fleshy bodies with the thinner parts of the shell remain, these can be dried in the oven. Chop them with a razor blade and spread on a large plate or metal sheet. Adjust the heat of the oven so that they are not charred, and do not try to hasten the drying.

The shrimps can also be dried in the sun on a hot day, but then they must be covered with a gauze screen to stop flies laying their eggs on them. When properly dried the food can be further chopped and rolled under a rolling-pin to give particles of the right size for the fishes you plan to feed with it. The particles can be graded with the aid of a sieve or muslins of varying meshes. Store the dried shrimp in glass screw-topped jars and never allow it to become damp. For carp and goldfishes one-third of the food can consist of chopped rolled oats, but with such mixtures it is advisable to soak portions in water before giving it to fishes.

John Gunn

## Book Notice

*The Home Vet* by "Andreoles." 106 pages. Illustrations in line. Crosby Lockwood & Son, Ltd., 39, Thurloe Street, London, S.W.7. Price 5/-.

**T**HIS book is written under a pen-name by a qualified veterinary surgeon, and deals with the care and treatment of a number of animals commonly kept as pets, in health and sickness. Its four parts are entitled *Animals, Birds, Fish, and Odd Pets*. There are thirteen pages on aquaria and fishes, both coldwater and tropical; some of the more common diseases and parasitic infections are listed and treatments briefly mentioned. Three pages in the *Odd Pets* section deal with land and water tortoises. A handy book to have around in a household keen on pet animal keeping.

THE AQUARIST

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## A Spawning from the Penguins

by A. E. FALKUS

WHILE in the local pet shop last October I noticed a couple of penguin fish in one of the tanks. The dealer said they were reputed to be a true pair of young adults and, certainly, one looked deeper in the body than the other, so, as the price was reasonable, I took them home with me.

I tried putting them together every couple of weeks during November and December without result. On Friday, 13th January, I tried again, as before using a ten-gallon all-glass tank with eight inches of water fresh from the tap at 80° F., and a bunch of *Ambulia* at one end. The tank was prepared on the Thursday evening and the fishes, which had been kept apart and fed mainly on white worms with occasional doses of *Daphnia*, were introduced on the Friday evening.

During Saturday I noticed once or twice that they seemed a shade more lively than usual, but no actual chasing or spawning was observed. On the Saturday evening I had occasion to go into the fish-house (an unheated greenhouse), after dark. After the electric light had been on a few minutes I noticed the penguins were executing some very wonderful "trick swimming." Keeping formation side by side and practically touching each other, they were swimming round the tank, under and over the heater wire and in and out of the plants, all at tremendous speed, finishing up, still side by side, resting on the bunch of *Ambulia*. The lights were left on for an hour and the fishes then removed.

On the following morning at 10 a.m. I was delighted to see a newly hatched fish struggling off the bottom towards the plants. That afternoon I obtained some green water from a pond, strained it through muslin, warmed it up to 80° F. and added a quart to the tank, together with a pinch of fine fish food. The straining, however, proved sadly inadequate because a few days later the tank was full of baby *Cyclops*!

On Monday, 16th January, there was no trace of any fry. On Tuesday I had to go away on business for a couple of days. On my return on Thursday evening I was pleased to see four tiny fry darting about beneath the plants. These were fed on cultured *Infusoria*, until at two weeks they were large enough to take micro worms; their progress on this food was noticeably better. At three weeks the beginnings of the dorsal and anal fins could be seen, but no trace of the prominent black stripe of the adults. Instead, they were colourless except for some tiny black specks dotted over the body, and were still very difficult to see. At four weeks the fry were a little larger than newly born guppies. The beginnings of the black stripe were visible and the fishes could often be seen resting in the oblique position. At this stage they began to take white worms avidly and, as a



Photo B. & F.  
Penguin or oblique fish (*Trayeria obliqua*)

result, grew rapidly until at six weeks they were sturdy little fish about three quarters of an inch long.

In the mean time I had put the penguins together again on Friday, 27th January. An all-glass tank was prepared the night before with eight inches of tap-water at 80° F. A clump of *Ambulia* made up of twenty-four sprigs each four inches long, cleaned of snails and held together in bunches of four by strips of lead, was put in at one end. On the Saturday this tank was surrounded with brown paper and gentle aeration turned on but the fish showed little interest in each other. At 5 p.m. the lights were turned on and at 8 p.m. the fish were seen spawning as before. They were removed at 10 p.m.

The next day, Sunday, 29th January at 3 p.m. a number of newly hatched fry were seen on the bottom trying to swim up towards the plants. Newly hatched penguin fry are different from other fry I have seen, and appear as little dark brown balls somewhat less than a thirty-second of an inch in diameter with tiny, completely transparent, heads and tails at one side. At first all one can see is these little brown balls rising in a jerky fashion from the bottom and a magnifying glass and a good light are necessary to identify them as fish fry.

On Monday no fry could be seen but on Tuesday evening several were observed making short trips near the plants. The brown balls had by this time shrunk and the fry had developed large black spots on the abdomen and large black eyes. About half a pint of cultured *Infusoria* and a little dried egg powder shaken up in water were now added to the tank. This was repeated daily.

On Wednesday evening twelve fry were counted free-swimming near the surface. The black abdominal spots had now disappeared and from above they looked very much like fighter fry of the same age. This spawning grew rather faster than the first, perhaps because, having omitted the green water this time they were not embarrassed by numerous *Cyclops*. At ten days they were eating micro and at three weeks white worms. At four weeks a count gave some eighty youngsters, the majority of which had already assumed the bold oblique stripe of the adults.

Having observed the rather unusual colour of the yolk

sac of the young fry I thought I would spawn the adults once again, and take especial care to notice the colour of the ova and the fry's development. Three weeks after the second spawning therefore, I tried again. An all-glass tank was scrupulously cleaned, and prepared as before. Every care was taken to ensure that the bottom of the tank was free from particles of sand etc. which might be mistaken for ova. This was done on Sunday morning 19th February. The fish were put in an hour after setting up the tank but up to 9 p.m. showed no sign of spawning. They were then removed and separated for twenty-four hours, and replaced in the breeding tank on Monday evening. On Tuesday afternoon there was bright sunlight, and towards sunset the fishes were seen to spawn as before, ova being scattered over the bottom of the tank. Each egg spherical in shape, a little smaller than the ova of the black widow, and of a colour between dark grey and brown.

On Wednesday evening, twenty-four hours after spawn-

ing, the eggs had all hatched and the fry could be seen lying motionless on the bottom in all positions as little brown balls, a little darker in colour than the eggs, with almost invisible heads and tails.

By Thursday evening all the fry had struggled up into the plants. By Friday evening, three days after spawning, the yolk sac had shrunk to a large black spot on the abdomen and the fry had large black eyes. On Saturday evening the fry were seen at the surface hiding among the plants. The black abdominal spot had now nearly gone but the eyes were still noticeable. On Sunday evening, five days after spawning, the fry were observed to commence to swim about and feed. The abdominal spot had now quite gone and the eyes were much less prominent; each large black eye was changing into a gold ring with a central black dot. At this stage the fry are extremely difficult to see with the naked eye, but this third spawning gives promise of being equal to the second.

## Cacti Go well with FISHES!

says G. T. THOMPSON



Mr. Thompson in his fish-house

FOR anyone interested in the exotic and the unusual I know of nothing more interesting than the cultivation of cacti, succulents and aquarium plants, and this can be combined with the fascination of fish-breeding, all under one roof! I have noticed when visiting other aquarists that many have already acquired these additional interests—some having just a few odd cactus plants around their breeding room, others having quite an impressive collection.

In spite of the extremely different growing conditions of cacti and underwater plants my own experience of raising the dry soil plants from seed for many years is that they get along very well together in the same house or room. Many people still have the idea that cacti have to be kept bone dry at all times. This is wrong: as long as the soil is open and porous they need regular watering except during winter months, and then the moist atmosphere of your fish-house will keep them healthy.

Cacti will live for many years without water but will give no signs of life or growth, and will seldom flower unless access to a certain amount of water is given. In their natural living conditions they sometimes grow into huge specimens, and they experience periods of extremely heavy rainfalls, and heavy dews. They also have plenty of depth for root growth of course, and this is not possible in a pot. My own specimens are watered once a week during the summer and once every six weeks during the winter.

I used to think myself fortunate with a twenty or thirty

per cent. germination of cacti and succulents' seed when I grew them in a separate green house, but last year, with the plants in my fish-house I had ninety per cent. success in germination. So it may be seen that the plants are quite happy growing in the moist atmosphere. The seedlings also seem to grow with amazing vigour; I have had *Opuntia* break the earth in March and be eleven inches high by October; *Echinopsis* I have grown as large as tennis balls in their second year, and I have had *Mammillarias* in bloom at twelve months. *Cereus* grow very easily as also do some of the *Sedums*.

My fish-house is L-shaped, one wing being tropical and the other for coldwater aquaria, but the cacti do well in both under the top lighting. When I fitted more aquaria last year to extend my fish breeding operations, I had to dispose of several hundred cactus plants to make room, but I hope soon to have room again to get more seedlings going. The plants are very useful, when, as sometimes happens in summer, one aquarium becomes green through excess light; a few plants placed on top of the aquarium soon reduce this to the right amount.

Plant growing in general will add to the interest of your fish-house, and if cacti do not appeal to you, there are the cyclamens, begonias, ferns and many other types of potted flowering plants that will do well in this situation.

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## AQUARIUM SCIENCE Blue-Green Algae Sense of Smell in Fishes

**B**LUE-GREEN algae growth is unsightly in an aquarium and a most difficult pest to eradicate. It is also the cause of many fish deaths in natural lakes, where it develops rapidly during the summer months, spreading a thick surface layer over the water that soon begins to decompose.

In the lakes of north-west Iowa the growth of vast expanses of summer blooms of blue-green algae has been followed by heavy loss of fish life, and examination of the fish showed that death was not caused by disease or suffocation alone. This led officers of the Iowa State Fish and Game Commission to suspect that the algae poisons the water for fishes, and experiments were carried out that proved this.

Fishes kept in large aquaria in which sufficient oxygen was provided from a supply of the compressed gas to the water, began to die within an hour after some of the decomposing blue-green algae was added. Direct analysis of the water showed that its oxygen content was quite high and yet the fishes died. Chemical examination also showed poisonous concentrations of compounds such as hydrogen sulphide and hydroxylamine and these, originating from the rotting algae, were the cause of death.

Where the lakes provide drinking water for towns the algal contamination is noticed as a "fishy" taste to the water, and in their report on this nuisance the American investigators have discussed the use of copper to control the algae. Copper is poisonous to fishes as well, but tests in the laboratory proved that most fishes can withstand copper sulphate concentrations that are greater than those sufficient to finish the algae; so although technical difficulties in treating lakes by this means are very great, and the possibility of the copper adversely affecting other animals

that may be important links in fish "feeding chains" must be considered, it may yet be possible to keep the noxious growth within bounds in lakes without harm to their aquatic fauna.

**C**an fishes smell? Last year *Aquarium Science* reported that some American scientists had found that aquatic plants gave off odours which could be perceived by fishes, but there is also evidence from German sources that their own fishy odours can be picked up by their fish companions. These odours enable fishes to locate one another and help them to aggregate in shoals. The European minnow has also been demonstrated to give off a substance (called Schreckstoff by the Germans) when its skin is injured, and other minnows in the aquarium show fright when this substance is smelled by them. All the experiments were specially designed to eliminate any possibility that these odours were received by any other sense in the fishes than that served by the olfactory epithelium—the smell organ in land animals.

SULPHAMERAZINE given with food is used successfully in American fish farms as treatment for the bacterial disease furunculosis in trout. Three weeks is the treatment period during which six grams of the drug is given each day for every hundred pounds weight of fishes.

STUDIES of fishes in the southern part of the Aral Sea in Russia have shown that maturity of pike is reached there in two years; perch take three years and golden orfe four years to mature.

### Why They Died—

(Extracts from post-mortem examination reports on readers' fishes, supplied by W. H. Cotton)

**M.D.R. (Fife):** Your fish died from thrombosis, clots being present in the blood stream, caused by bacterial infection of the liver and kidney and accentuated by acute indigestion . . . . The bacterial infection probably came in with food, but may have been present in the original feeding source. The indigestion was caused by failure of the internal organs to cope with the immense numbers of carapaces and filamentous antennae of a minute form of water flea (*Chydorus*) which had been consumed in very large numbers and choked the alimentary canal. There was no trace of contagious disease or parasite which could be a source of trouble to other fishes in the tank . . . .

**A.H. (Shipley, Yorks.):** The guppy died from live-bearers' equivalent of spawn binding—decomposing embryos within the fish giving rise to morbid products which poisoned it. The probable cause of this was the presence of Entozoic thread worms in the intestines. These worms may result from live feeding from infected sources, *Tubifex* being an offender in this respect. *Tubifex* is a good food if kept for several hours in clean water before feeding to fishes, thus minimising the chance of introducing threadworm parasites . . . .

**B.H. (Devizes):** The orfe died from asphyxiation caused by an acute gill infection with *Chilodonella cyprini*. This parasitic Infusorian locates itself in the gill-leaves and its rapid propagation causes coagulation of the mucus. The more oxygen sensitive types of fishes such as orfe seem rather prone to Chilodoniasis in the early spring, especially in the comparatively narrow confines of the garden pond. Run a hose at a fairly high rate of flow into the pond for an hour each day. This should enable the orfe to flush out their gills and would be preferable to the chemical treatments which can be given to the hardier carps . . . .

#### Post-Mortem Examination of Fishes:

W. Harold Cotton, F.Z.S., 39, 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. Dispatch as soon as possible after death, with brief history of aquarium or pond conditions.

#### Water Analysis:

Water samples may be sent for analysis to Mr. Cotton at the above address. Each sample must be accompanied by a fee of 2/6.

Full analyses cannot be carried out unless a large clean medicine bottle full of the water is provided; the bottle should also contain a little bottom sediment and a stem or two of typical plant growth from the aquarium or pond.

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QUARIST

June, 1950

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Summer Pond Visitors:

# Great Water Beetles

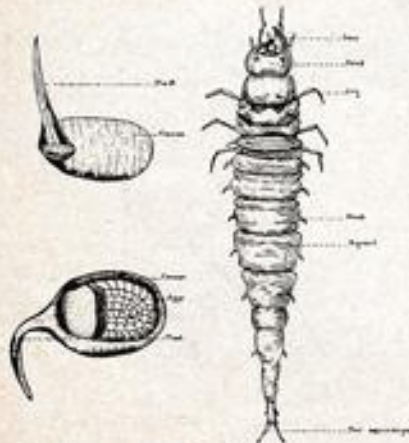
## (*Hydrous piceus*)

by IRIS MURRAY

**H**YDROUS *piceus* is known by at least three names, the great water-beetle, the silver beetle, and the harmless water-beetle. It is an inch and three quarters in length, and lays claim to being the largest in Britain. The beetle is quite capable of flying, and possess strong wings which consist of a thin membrane on a nervure frame.

It is herbivorous, and when in a tank it must be kept well supplied with *Elodea* or other fast growing weed, as this beetle has a large appetite and strips the plants very quickly. If choice aquatic plants are kept in the aquarium it is extremely unwise to put *Hydrous* in with them, as it would not be long before they would be destroyed. The tanks should always be kept covered as they are likely to escape, particularly just before they lay their eggs.

The wing cases are very dark green, and the abdomen is black with yellow spots on the margin. Short thick hairs also cover a large area of the underside, and these are



Left, above, cocoons containing the eggs, exposed in the sectional view below. The larval stage is shown at the right



Photo:

Lionel E. Day

impervious to water. It is because a layer of air gets trapped in these hairs that the insect has a very silvery look when it is submerged, hence the name silver water-beetle. At the base of the metasternum is a very sharp projection, similar to the point of a needle. It points backward, and if the insect is handled carelessly, is liable to give a very sharp prick. Although this spine would make an excellent form of defence, the insect never uses it, and seems unaware of its existence.

When a fresh supply of oxygen is needed, the insect clammers up the weeds, and then swims to the surface, and turns slightly on its side. The clubbed portions of the antennae are covered by the same kind of hair as the thorax and the margins of the wing cases. It is all impervious to water, and the insect pushes the antennae and side of the thorax through the water-film. Thus they are in direct contact with the air. The whole body and the wing cases move up and down with a bellows movement, and the layer of air is thinned out accordingly, and trapped on the underside. When sufficient air has been obtained, the insect tries to descend, but often it has taken in so much fresh air, that this is almost impossible, and the excess has to be released from the base of the hind-legs when the wing cases are depressed.

### Reproduction

As in *Dytiscus*, and *Nepa* the fore-legs of *Hydrous* have the tarsus dilated to form a triangular pad or sucker, but this only occurs in the males; therefore they are easy to distinguish from the females. These legs are short, terminating in two large claws. They are used for prehensile purposes, and also for crawling about. The middle and hindlegs are longer, and are used mostly for swimming. This beetle is much slower in its movements than *Dytiscus*, and seems to prefer creeping about to swimming. When it does swim, it is rather unsteady, owing to the fact that it uses its "oars" alternately, and not simultaneously as does the *Dytiscus*.

When the female is ready to lay her eggs, she spins a cocoon shaped very much like a retort. She has a pair of spinnerets near the apex of the abdomen, and begins by spinning the globular part of the "retort." It is fastened to any object which may be floating on the water-surface, and the "neck" is spun last. The eggs are placed high in the body of the cocoon above an air-space, therefore it is supposed that the cocoon is "anchored" to prevent it from

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tipping over. The female fills the cocoon with air from her own supply, and then seals it. The outer covering is waterproof, and although it is soft when first made, it soon hardens. The stem of the retort, projects above the water-line to admit fresh air, for the female places as many as sixty or a hundred eggs inside the cocoon. They hatch in approximately five or six weeks according to the temperature of the water, and the larvae emerge from the base of the cocoon, and swim into the water (see figures on the previous page).

The larvae are soft-bodied, and a dull-grey colour. The body tapers towards the tail, and slightly towards the black, shiny, head. A curious feature about the head is that the larva is able to move it around in any direction, even to the extent of bending it backwards on to its body. It has three pairs of short legs, and breathes by means of the fringed appendages at the tail-end. These it pushes through the surface film, and absorbs the fresh air direct, as each filament is connected with part of the tracheal system. The jaws are long and curved, and the tiny creature has an insatiable appetite, feeding mostly on molluscs and other water creatures. Therefore it differs from the adult, in that it is carnivorous. If it has sufficient nourishment it undergoes three or four moults, and is ready to pupate within a few weeks. At the end of July and the beginning of August it leaves the water, and tunnels its way into the damp mud. It makes an oval cell, from a glutinous secretion, and remains inactive, until it is ready to emerge.

Each organ of the perfect insect can be seen enclosed in a separate sheath, and the whole is slung by eight hooks—two on the tail, and three on each side of the head. This is to prevent contact with the soil, and they are discarded with the rest of the skin when the imago emerges.

Although these beetles are easy to keep in an aquarium, they are difficult to rear during the pupation stage. Great care must be taken to keep sufficient soil above the water-line, to enable the larva to pupate, otherwise it will die.

### Beginners' Tips

FOR netting fish in an aquarium use a net that will allow free and easy movement in the water, one with a fairly coarse mesh. The square or rectangular-framed variety is the best. Try not to disturb the fishes too much when placing it in the tank, and then with slow and steady movements manoeuvre the net until you are able to trap the fish you want between it and the glass of the aquarium. If the fish dives down on to the sand do not try and scoop it up into the net; it is easy to cause damage in that way. Bring the net square to the glass and when the fish has swum well in, slide it up the glass to the water surface, turn the lower edge of the frame so as to close the bag, and supporting the fish within it with one hand, draw the net from the water. Do not allow a fish to flap about in a net when transferring it from tank to can but always gently restrain its movements with a supporting hand. In thickly planted tanks a planting stick or similar object is usefully employed in the hand not holding the net to urge the fish out of the plants to the front of the tank where the net is waiting.

KEEP an eye on tropical fishes that may have undergone chilling on a long journey home. At the first signs of abnormal behaviour—swimming on the side or shimmying, raise the temperature of the water to about 80° F. and keep it there for several days before slowly bringing it down again, after the symptoms have disappeared. The longer this treatment is delayed the less likely is it to be successful. Livebearers appear to be particularly prone to chilling, and fish with shimmyies should be treated in this way.

J.F.

In the Water-Garden:

## A Dainty Flowering Marginal



Photo: L. E. Dennis  
Water forget-me-not growing at the pond-side

THIS plant, be it noted, is quite different from the "garden" forget-me-nots. It has much larger and prettier flowers, of a wonderful shade of blue, which do not smother the plant as in the garden varieties. The plant also trails along the ground—or on the water—instead of growing upright and compact.

If you can give it a place where it can freely ramble, even over the surface of the water, without interfering with or spoiling the beauty of any other plants, it will prove an attractive asset. But this forget-me-not must have water. You can plant it in water; as it trails over the surface it sends roots downwards. Planted on land in a wet soil it acts similarly, but if the soil becomes dry the plant is apt to die.

The water forget-me-not (*Myosotis palustris*) can be found chiefly by the riverside, and it also grows in the drainage ditches running through meadow land near the river; but while this may be an easy way of acquiring a plant, you will do much better if you can get *M. seepiflorus*. You will find this a better plant, which will give flowers over quite a long period. There are other varieties such as "Nixenaug," a deep-coloured blue with a large white eye; "The Czar," a strong grower with very large flowers; and "Fairy Maid," with striking blue flowers.

Once the plants get a good hold upon the soil, they grow rapidly and soon attain a large size, sending their white rootlets down into the water or the muddy bank.

H. A. Day

READER'S RECORD:

## Fish from the Far East

AS I am a navigator employed on B.O.A.C. aircraft on Far Eastern routes I can call in at most points in that area where tropical fishes are to be found, and I wish to relate some recent experiences.

On a recent trip to Hong-Kong I mentioned to a member of the staff at Bangkok that I would like to try to transport a few Siamese fighters to my home in England. On the return journey I was met at the aircraft by my friend, who had the fighters all right, three of them—each one in a ridiculously small one-pound jam-jar! No insulation, no heating, no aeration, nothing except a small volume of water.

Anyway, I put the jars under my table on the aircraft in a small shopping-basket, and with a daily half-volume change of fresh water and an occasional pinch of well ground biscuit (the only form of food I could provide), I am pleased to say that the fishes all survived the journey home. They are now well established in my tanks, and in one, the male is furiously bubble-nesting, to the consternation of the female in the adjoining section.



An interesting visit was one I paid to a fish-breeding establishment in Hong-Kong; it was an eye-opener to see sword-tails and mollies breeding in open-air ponds. Angel fishes were also breeding in tanks which were without plants, gravel, stones or any other adornments, just the bare glass sides and bottom. Most satisfactory results are obtained, and I saw clusters of eggs adhering to the sides; in one tank over 500 youngsters resembling a cloud of *Daphnia* were seen.

The goldfish breeding ponds were also thick with fishes. My photograph shows the form of the ponds, and the small tub to be seen at the side is used for rearing the young fry.

I shall be going prepared on my next trip, for I have purchased a rubber hand bulb and inflator with a diffuser stone fixed in the tubing. With a clip on the tube it is surprising how long this aerator will give a steady flow of bubbles once the inflator is well pumped up by the hand bulb.

E. H. Woods

## The AQUARIST Crossword

Compiled by J. LAUGHLAND



### CLUES ACROSS

- |   |  |
|---|--|
| 1 Microcystis (12)  | 23 Most fishes are travellers and these are sidelanes (7, 5) |
| 9 Glass substitute unsuitable for tanks, half amicable when upset (4) | 28 This water lily sounds queer (4)                          |
| 10 This fin is on the back (6)  | 29 Face is laid back (4)                                     |
| 12 Perhaps most brilliant fishes (5)                                  | 30 Usually L.A. Colonel (1, 1)                               |
| 14 Tooth of calico goldfish (3)                                       | 31 Does this is the zebra (3)                                |
| 15 Norma sounds a foxy national (4)                                   | 32 Pique (6)   |
| 16 Fish disease (abbrev.) (3)   | 34 Fish eggs (3)   |
| 17 All in the lotus water lily (3)                                    | 36 A dorsal fin starts a stir (3)                            |
| 18 The French of <i>Labeaux</i> (2)                                   | 38 Half neon (2)   |
| 20 The goby loses its activity (2)                                    | 40 External parasitic microbes (7)                           |
| 21 Is are (3)   | 41 Can be aquarium (4)                                       |

### CLUES DOWN

- |  |  |
|--|--|
| 1 Potential flies in armour of own making (6, 6) | 15 Knowing patter or angler's equipment (3-4)      |
| 2 Could be rod or caught with one (5)            | 19 Half (4)  |
| 3 Last stage of insect life cycle (3)            | 20 The dab returns to evil (3)                     |
| 4 None in the Nile (3)                           | 22 Senior service (1, 1)                           |
| 5 Company commander (1, 1)                       | 24 Tail of scalars (3)                             |
| 6 Zebra species (5)                              | 25 Tub not upsets expensive flat-fish (6)          |
| 7 None as bright when upset (4)                  | 26 Deposit eggs (3)                                |
| 8 Silence on river (5)                           | 27 A puddle (4)                                    |
| 11 Thus the sole starts (2)                      | 32 Alternative mark of orf (2)                     |
| 13 Entree settlement with a caudal fin (10)      | 35 Emergency square meal for fry (3)               |
|  | 37 Usual alternative to alternating current (1, 1) |
|  | 39 In the sink? (2)                                |

### SOLUTION ON PAGE 47

### White Spot Experiments

CHAIRMAN of the *Swiss and District Aquarists' Society*, Mr. Jewett, gave members an account of his experiments in the treatment of white spot disease at one of the society's meetings. First he had tried acriflavine—five grains to a 24 in. by 12 in. by 12 in. tank of rosy barbs—and found that the fishes were cured after three days, but the females had become sterile and *Elodea* plants were killed by the treatment. He had repeated the experiment under similar conditions with quinase sulphate (seven and a half grains) and had obtained a cure after six days without plants being affected.

RECENTLY which has a symbol of the water plants—W. J. Jewett pleased to hear

AN aquatic as has a name decided. Mr. Jewett is secretary, and will write to his

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## New Societies

RECENTLY formed is **The Aquarist Society of East Anglia**, which has adopted as society emblem the flag of East Anglia with symbols of the main interests—cyclic and coldwater fishes, reptiles and water plants—of the society superimposed on it. Secretary is Mr. W. F. Rowberry, Berryford, 19, Highfield Road, Ipswich, who will be pleased to hear from aquarists living in the area.

AN aquatic society formed in the **North Birmingham** area already has a membership of twenty. The title of the society has yet to be decided. Mr. A. G. Ramsey, 546, Kingstanding Road, Birmingham 22a, is secretary, and he hopes that all aquarists wishing to join the society will write to him; junior members are especially welcome.

FIRST meeting of the **North of Scotland Aquarists' Society** was held in the library of Strathdee's Rooms, Aberdeen, in April. Meetings are now held on alternate Tuesday evenings at 7.30 p.m., and all who are interested should communicate with the secretary, Mrs. R. Fretland, 105, Oscar Road, Aberdeen.

THE **Eastern Counties Section of the Guppy Breeders' Society** has been formed to care for aquarists living in East and North London, Essex, Suffolk, Cambs. and Norfolk who desire to specialise in guppy-breeding. Meetings are held at the White Horse Hotel, Ilford, and the secretary is Mr. J. P. Keene, 11, Southwood Drive, Barkin, Essex.

ALTON, Hampshire, aquarists are invited to write to Mr. J. C. Jarvis, Andrews, Winchester Road, Four Marks, Alton, who wishes to start an aquarium society in the district.

## Forthcoming Events

FIRST exhibition of the **Coventry Pool and Aquarium Society** is to be staged on Saturday, 24th June at the Morris Pavilion, Courthouse Green, Coventry.

TWO-DAY show of the combined **Southampton and Winchester City Aquarists' Societies** is to be held at the Avenue Hall, Southampton, on 23rd and 24th June. A special welcome is offered to aquarists from other areas who may be in Southampton on these dates by the societies' secretaries.

SECOND Annual Club Show of the **Kingston and District Aquarist Society** will be held on 6th, 7th and 8th July at the Y.M.C.A. Gymnasium Hall, Ebbon Street, Kingston-on-Thames, Surrey. Inter-fish and individual tropical and coldwater furnished aquaria and fourteen individual fish classes are included, with cups and shields as prizes.

OPEN competition of the **Aquarist Section of the Kodak Recreation Society** will be held at the Kodak Social Centre, (close to Harrow and Woodstone Station), on 7th, 8th and 9th July. Twenty-six competitive classes including four for stocked and furnished aquaria are arranged, with cash prizes or trophies and prize cards to be awarded. The society promises a high standard of show presentation.

SCHEDULES for the **Watford Aquarists' Society's** Annual Open Show may be obtained from the show secretary, Mr. H. E. Moore, Craig-Y-Don, Little Bushey Lane, Bushey Heath, Herts. The Show, to be held at St. Mary's Hall, Watford on 4th and 5th August, will have thirty-one classes, including four stocked and furnished classes (two for individuals and two for clubs), two classes for juveniles and a class for miniature pools and gardens. It is hoped that the show will be up to the society's usual standard but on a larger scale.



Kodak Social Centre, where next month's show is to be staged



AT a recent verisomy at the Calne Public Library, Mrs. H. Azmuth of the **Calne and District Aquarist Society**, handed over to the Library an aquarium which will add considerably to the attractiveness of the children's room. Councillor J. M. Ogden, Deputy Chairman of the Public Library Committee, spoke of the need to make civic buildings in general, and libraries in particular, an attractive as possible to that children would be encouraged to use them. The aquarium, he said, supplemented the stack of books which the library held on natural history, and would awaken in children a healthy interest in the world of nature. The gift was very warmly welcomed by Councillor Ogden. Some fourteen varieties of fish, and about six varieties of plants are at present in the aquarium which is 36 in. by 15 in. and is mounted on a substantial oak pedestal, but the stock will be varied from time to time in order to show the breeding habits of the various species.

A MALGAMATION is announced of the **Grimsby and Cleethorpes Aquarists' Societies**, in future to be known by that title. The Cleethorpes Corporation has offered the society a building for use as an Aquarium on the Promenade, and this is to be opened on 16th Saturday. Fifty tanks are to be showing; charges for admission are adults, 6d., children 3d., and facilities are to be made for organised parties of school children to be admitted. Joint secretaries of the society are Messrs. A. T. Baskcomb and G. W. Chapman, Kilgerran, 59a, Burgate, Grimsby.

A NEW venture in aquarium society management is that of the **Sheffield Schools Aquarists' Society**. This was originally started by teachers of the Firhill Council School, meeting monthly and making aquaria for the use of children at the school. Now ten schools of the city have joined in the scheme and more are showing interest. A tank of coldwater fishes has been presented to the children's ward of the City General Hospital, and the society plans an exhibition and interschool show on 23rd and 24th June in one of the schools. The president of the society, Mr. J. R. Thrale, 41, Abbeley Road, Handsworth, Sheffield 9, considers that the idea is one that schools in other cities may be interested to follow, since it gives greatly added interest and facilities in the study of biology.

## Crossword Solution

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A	D	O	X	O	N	I					
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AQUARIST

June, 1950

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THE AQUARIST

June 1952

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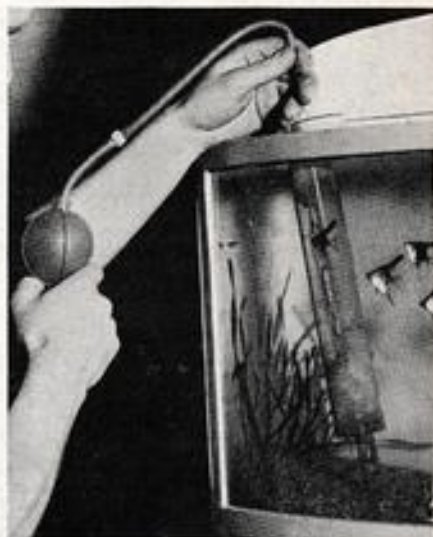
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**Method of Use as a Filter**

After having cleaned your aquarium of all filth from the sand wash and dry your Filt-a-vac thoroughly, then rebind with new cotton wool. Attach to aerator then stand nozzle end on piece of stone and allow it to work for approx. 12 hours (do not submerge the top but allow over 1" to protrude above water level).

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AQUARIST

June, 1950

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5-6 "	"	..	"	£1 10 0	"	£2 0 0	"	"	£5 0 0
6-8 "	"	..	"	£2 10 0	"	£3 0 0	"	"	£9 0 0
3-4 inch	SHUBUNKINS	..	BREEDING PAIRS	£1 0 0 and	£1 10 0	pair	—	4 pairs for	£3 10 0
5-6 "	"	..	"	£2 0 0	"	£3 0 0	"	"	£7 10 0
6-8 inch	EXHIBITION COMET TAIL	..	BREEDING PAIRS	..	..	pair	£4, £5, £6, £8		
7-9 inch	GOLDEN ORFE	..	..	..	..	..	..	pair	£4 and £5
3-4 "	GOLDEN RUDD	..	..	..	..	15/-	pair	—	4 pairs for £2 10 0
3-4 "	SILVER RUDD	..	..	..	..	5/-	"	—	6 " " £1 0 0
4-5 "	"	..	..	..	..	6/6	"	—	6 " " £1 7 6

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LAND TORTOISES	..	10/-, 12/6, 15/-	each	..	6 for	50/-	
WATER TORTOISES	..	6/6, 8/6, 10/6, 12/6	"	..	6 "	40/-	
GRASS SNAKES	..	..	..	5/-	"	6 "	25/-
GREEN LIZARDS	..	..	..	5/-	"	6 "	25/-
WALL LIZARDS	..	..	..	3/6	"	6 "	18/-
SEPS	..	..	..	3/6	"	6 "	18/-

### VIVARIUMS

12×9×9	each	18/-
14×10×10	"	21/-
18×13×13	"	30/-

316, LEE HIGH ROAD, LEWIS

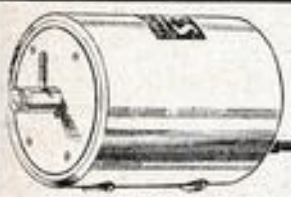
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THERMOSTATS	
"ES ES" THERMOSTAT SUBMERSIBLE	.. each 18/-
"ANGEL"	" " 18 6
"LITTLE WIZARD"	" " 25/-
"ANGEL A1" OUTSIDE CONTROL	.. 26 6
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	£	s. d.	£	s. d.	£	s. d.
18×10×10	1	14 6	14	3	1	0 6
18×10×12	1	16 0	15	9	1	0 6
24×12×12	2	5 0	18	9	1	3 6
24×12×15	2	9 6	1	0 3	1	3 6
30×12×12	3	0 0	1	3 0	1	6 3
36×12×12	3	6 9	1	4 9	1	7 6
36×12×15 $\frac{1}{2}$ -Plate Front	4	4 0	1	6 3	1	7 6

These Aquaria are glazed  $\frac{1}{4}$ " rough cast glass, bottom and back and 32 oz. front and sides, and are all beautifully spray finished in the very finest quality cream enamel. Any other size, colour or finish quoted by return. Slate bottoms fitted if desired. Please add 10/- to cover cost of carriage at buyers risk. Balance will be refunded on return of special packing materials which ensures safe delivery.

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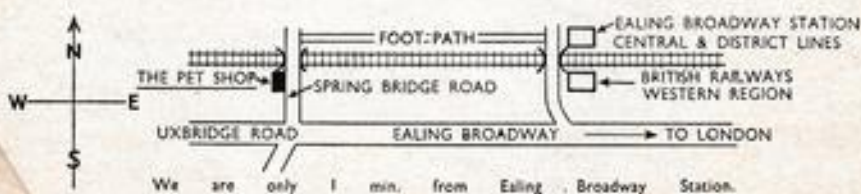
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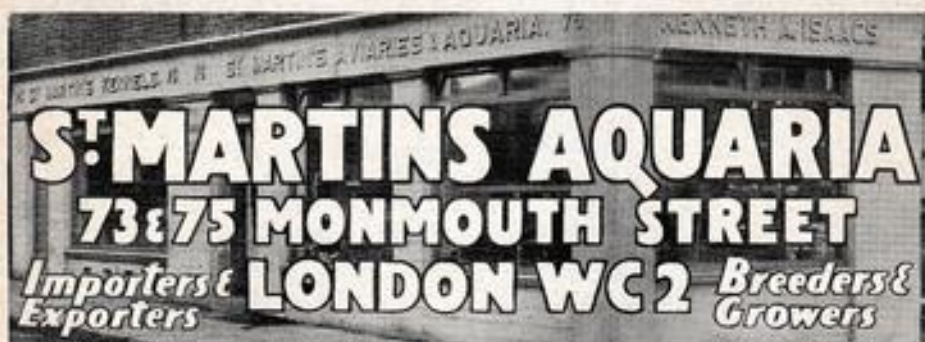
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