

The cover of 'The Aquarist' magazine features a teal background with white wavy lines representing water. A central illustration shows a fish with a body made of fine white lines, swimming towards the right. Behind the fish are several red, branching coral-like structures. The title 'The AQUARIST' is in the top left, and descriptive text is on the fish's body. The volume and issue information is in a white banner at the bottom, and the price is in a red banner at the very bottom.

*The*  
**AQUARIST**

THE  
ORIGINAL  
MONTHLY MAGAZINE  
DEVOTED TO AQUARIUM  
FISH AND REPTILE  
KEEPING

Volume XIII Number 5  
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ONE SHILLING & THREEPENCE

# The AQUARIST AND PONDKEEPER

(Incorporating "The Reptilian Review")

Founded in 1924 as "The Amateur Aquarist"



PUBLISHED MONTHLY

VOL. XIII NO. 5

AUGUST, 1948

## EDITORIAL

SINCE this is the last editorial column that I shall be writing for some time, readers will perhaps forgive me for making a more personal approach than usual.

As some of my friends are aware, aquarium matters form but a small part of my work in connection with fishes, and much of my research in the past has concerned marine species from the depths of the ocean, the coral reefs of the tropics or the fishing grounds of our own coasts, most of which are unlikely to be seen in aquaria. It is the pursuit of such studies that now makes it necessary to relinquish active editorship of this magazine for at least eight months. During that period I shall be engaged upon a survey of the fishes of the Gulf of Aden, on behalf of the Colonial Office, my task being to obtain and examine as many specimens as possible of the numerous and varied finny inhabitants of the region, and to identify them as a necessary step towards further studies which may have considerable economic importance. In particular, I shall pay attention to big species such as sharks, tunnies, and horse mackerels, which are too large to be preserved in bottles and, therefore, not available for study in museum collections; at any rate this will be a change from guppies!

Needless to say, it is not without regret that I leave a magazine with which I have been associated since its inception, twenty-four years ago, and say *au revoir* to my many friends in the hobby, but I shall not lose contact completely and am confident that our journal will continue to receive loyal support and encouragement, and will go from strength to strength.

This confidence is fortified by the knowledge that a capable hand will be taking the helm in my absence, and it is now my pleasant duty to introduce to you the new Acting Editor, Mr. Anthony Evans.

Mr. Evans is no newcomer to *The Aquarist*, for he was a friend of our former editor, Frank Austin Watson, and assisted him in his work on the aquarium at Chessington Zoo. He has made a number of

valuable contributions to our pages from time to time, as many readers will recollect.

Young and enthusiastic, a physiologist and an able writer, Mr. Evans has risen nobly to the task of taking over, at short notice, the complexities of editorial responsibility, and I am sure that he will prove more than equal to the occasion. At the same time, he will need the encouragement and co-operation which was extended to me when I took over after the war, and I know that this will be readily forthcoming from our many readers. This is no ordinary journal; it is an integral part of the hobby, produced by aquarists for aquarists. There was no aquatic hobby worth mentioning in Britain until *The Aquarist* appeared, and the two have grown together in a spirit of mutual help and understanding. In fact the success of the journal has depended as much on its readers, who are the hobby, as on its editors, and I am anxious to record here my gratitude and thanks for the splendid support accorded me during my term of office.

If I may make a "last request" it is that similar support be extended to Mr. Evans, particularly in this difficult period when he is picking up the threads where I must drop them. An editor's food is "copy." In our speciality this is not supplied by legendary figures who strut Olympian heights, but by the ordinary aquarist gaining experience in practical fish-keeping; that is to say, by you. Anything you think will interest your fellow readers will be considered for publication—never mind the literary style, just let us have the facts. If you do that you are helping to maintain the journal as a living force.

With this I must say *cheerio*, wish you all the best of luck, and hand over the editorial pen.

*G. Fraser-Brunnell*

# 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. 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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A. FRASER-BRUNNER, F.Z.S.

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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.

## THE HIGHER EDUCATION

The value of the aquarium as an aid in education is being recognised more and more by authorities, and it enters into the regular curriculum of many schools. Mr. George Tomlinson, the Minister of Education, is himself interested, and well-versed in the subject, and in the accompanying photograph



he is seen inspecting the "catch" during a visit to the camp of the Dorset County School at Carey, Wareham, Dorset.

This photo, by L. D. Frisby, is reproduced by kind permission of the Dorset Education Committee.

## DICKENS AND EXOTICS

In Mr. A. E. Hodges's *Tropical and Aquarium Fishes*, it is stated on page 88—"The Paradise Fish may be said to be the first 'tropical' to reach Europe alive, unless we include the familiar goldfish. It was imported from Eastern China to France in 1869. Dickens, writing in 1843, in *Martin Chuzzlewit*, makes Martin say (Chapter 17) to some American ladies who asked after 'the goldfish in that Grecian fountain in such and such a nobleman's conservatory, and whether there were as many as there used to be, he gravely reported, after mature consideration, that there must be at least twice as many; and as to the exotics, Oh! well! it was of no use talking about *chow*; they must be seen to be believed."

Martin was, of course, only making it up, but would Dickens have written it 26 years before a live exotic had reached Europe?

W. R. Burwell.

# PREPARING THE POND FOR WINTER

By

M. WARD-SMITH

**I**N the great freeze-up of early '47, many pond-keepers lost the majority, if not all, of their fish. It was a serious disaster for those who sustained these losses, for at that time fish were both scarce and expensive, but more regrettable is the fact that many of these losses need not have occurred, if only a little care and attention had been given in the previous autumn. In addition to the prevention of heavy losses through the rigours of winter, such attention will often encourage earlier spawning in the following spring.

Fish, being cold-blooded, become less active as the temperature falls, and during the winter month seldom feed, relying upon their stored fat to keep them alive until the return of the warmer weather. Therefore it should not be difficult for the reader to appreciate that the more fat that a fish can store up during the late summer and early autumn, the greater will be the probability of its survival of the winter, and it will be in better condition for breeding than one which has been neglected.

It is seldom realised that the average garden pond is grossly overstocked, not from the gallons per inch of fish angle, but in the matter of being self-supporting. Under natural conditions fish can find plenty of food to enable them to withstand the winter, but in the over-stocked garden pond this is not possible, since many hungry mouths are constantly seeking it out before it has a chance to mature. It is, therefore, necessary to augment this natural supply—gnat larvae, etc.—by other foods. Now prepared fish foods may be very good in an aquarium, but in the garden pond they are not really satisfactory, since even the coarser grades are usually too fine for the larger fish and then again this method of feeding proves very costly if an adequate diet is to be provided, therefore an alternative must be found.

Probably the most suitable fat building food is porridge, and in many households the most convenient, since the scrapings of the breakfast porridge provide a daily supply. When this is cool it should be fed to the fish in lumps about the size of a walnut, at which they can nibble, at the rate of about one lump per fish per day. If this is soon cleared up the ration should be increased. As with many other things in fish-keeping, it is a matter of experience as to how much to feed. The fish have a far greater knowledge of their food requirements than the aquarist, so if the ration is more than they will clear up in half an hour, reduce it a little. This porridge diet should be supplemented frequently, at times other than the normal porridge feeding hours by a diet of small red earth worms. These small red worms are often found under damp stones or in compost heaps and are greatly relished by all pond fish, to whom they should be fed whole, since in nature fish feed on whole creatures of a size that they can swallow. After all, which do you prefer, a nice

juicy steak or mince? The answer is obvious. These worms can be collected by laying wet sacks on the ground under which they will congregate, and can be easily gathered up when an extra meal is required. The best way to feed the worms to the fish is singly, allowing one worm per fish per round, followed by a short interval to allow for mastication, before distributing a further portion. This should be continued for as long as the fish show any inclination to feed, which will probably exceed the worms available.

This diet should be concentrated upon from about the middle of September and continued until the fish go off their food, probably in late November. The object being to fill the fish to capacity all day, and every day, and thus build up the reserves required. It is possibly a little extra trouble, but well worth it.

The feeding of whole worms may possibly upset the ideas of some readers, since many writers are constantly advocating chopped worms and washed pieces, on the grounds that the earth content of the worms causes constipation and other complaints. This may be so, but I have never experienced any trouble from this source. If the internal organs of a fish are so weak as to be seriously affected by a perfectly natural diet then the fish is far better destroyed, since the weakness may be inherent and passed on to future generations, if the fish be allowed to live and breed. Weaklings only occupy space and consume food which would be of more benefit to strong healthy fish.

Apart from feeding there are a few autumn jobs to be done with the pond. These apply more particularly to the small pond, under five thousand gallons, but the large will benefit from the same treatment.

As soon as the autumn leaves have fallen remove as many as possible from the pond, a rake is an excellent implement for this purpose, and cut back all marginals and semi-submerged plants, such as water lilies, to just above the crowns. Submerged plants should be cut back to about six inches from the bottom, since these shortened stems will provide the new shoots for next season's growth.

Having dealt with the problem of decaying vegetable matter, it is now time to consider the water. During the summer and early autumn the fish have been feeding heavily and consequently producing a considerable amount of excreta, which, on breaking down, adds to the chemical contents of the water; in addition a considerable amount of water has evaporated from the pond during the summer and this loss has been made good, probably by means of the garden hose, from the tap. Now mains water has a mineral content and consequently adds to the

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# A SPOON-FED FEMALE

By

A. FRASER-BRUNNER

ONE of the most remarkable of spawning performances is that given by the Characin fish *Corynopoma riisei*. This species is often called the Paddle-fin, but I fear that is a grave reflection upon the powers of observation of the aquarist who bestowed the name; for the "paddle" concerned is not a fin, nor part of a fin, but an extension of one of the bones of the gill-cover. "Paddle-gill" might therefore be a better name, but in view of what I shall describe shortly, "Spoon-fish" would be still more appropriate. The generic name *Corynopoma* means roughly "tassel head," and the species was called *riisei* by Gill, in honour of a Danish zoologist named Riise. It inhabits northern South America from the Rio Meta in Colombia to the island of Trinidad.

It is a graceful and peaceful fish, and very beautiful in its delicate quiet way. Both sexes are silvery, with metallic reflections, all the fins being transparent and rather fragile in appearance; but the male differs in possessing a more or less distinct bluish band along the side. The male further differs from the female very considerably in form, the lower lobe of the caudal fin being prolonged into a strong sword-like blade (which has earned for it the name Swordtail Characin in America), and as though to counteract the disturbance of equilibrium which this produces, the dorsal fin is also greatly enlarged.

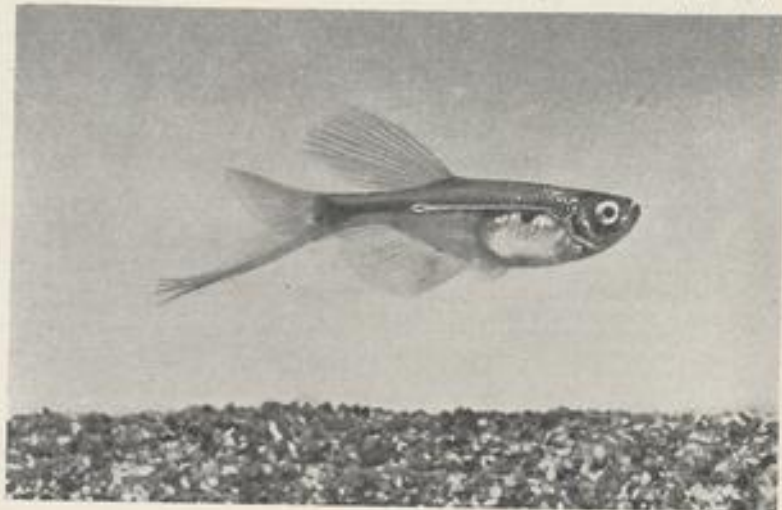
Most curious feature of the male, however, is the enormous extension of the sub-opercular bone as a

slender, stiff rod, which when lying along the side reaches nearly to the end of the anal fin. At the end of this is a spoon-shaped flap of skin which is brilliantly metallic. The sub-opercular bone is so articulated that this "paddle" or long-handled spoon can be moved sideways at right angles to the fish.

The manner in which the male makes use of his special structures is most interesting. When, after conditioning, he is placed with the female, he courts her by swimming round, as do many Characins. But so far from being interested she is actually aggressive and tries to drive him away. He continues to circle round at a safe distance, but every now and then thrusts his "spoon" rapidly in her direction, at the same time sweeping the long caudal lobe, the dorsal and the anal fins to the same side. This action appears always to be accompanied by a discharge of some of the milt, which is wafted by the fins in the direction of the spoon, so that some of it probably adheres. As the spoon flashes towards her the female bites at it, sometimes so viciously that the flap of skin is torn off completely, and the result is that she receives some of the milt in her mouth. This apparently serves as a stimulus for her egg laying, for she soon ceases to take further interest in the antics of the male, and seeks a suitably broad leaf, which she methodically caresses with her mouth, depositing the milt upon it. Then she brings her vent close to the leaf and deposits a few

(Continued on page 173)

The male *Corynopoma riisei*, showing the "spoon" on the gill-cover



(Photo: B. & F.)

# NOTES AND NEWS

## TWO EXHIBITIONS AT GUILDFORD

The West Surrey Pondkeepers' and Aquarists' Club recently staged two displays of tropical and coldwater fish in Guildford. The first took place from 28th to 31st July, at Guildford House, High Street, a centre normally used for exhibitions of art, sculpture, etc. The second was held in Stoke Park in conjunction with the Guildford District Allotments and Gardens Association's Annual Horticultural Show, and was open during the afternoon of August Bank Holiday.

### Guildford House

This exhibition, which was open daily from 10 a.m. to 8 p.m., was designed to illustrate to the public the many varied interests of the Club and consisted of about 80 aquaria of all sizes, there being ten separately illuminated community collections of fishes in 24 x 12 x 12 tanks. A sea-water aquarium, containing one or two crabs and a number of sea anemones was exhibited by Mr. L. R. Beighwell, F.Z.S.

Two vivaria containing slow worms, viviparous lizards and toads, aroused very great interest among visitors. In addition, 54 beautifully mounted photographs of reptiles, fishes, and batrachians, were on view. These were the originals of some of the many world-famous studies by Mr. W. S. Pitt, of Walton-on-Thames, who is a member of the Club.

A glass case containing heaters, thermostats, aerators, siphons, etc., used in the hobby, was on show and for those with pond interests, members had erected a realistic pool at one end of the hall. This was surrounded with rockwork, bog-plants and rushes, and by means of a pump the water was circulated and ran down over the rocks with a miniature waterfall effect.

Specially interesting exhibits were two magnificent axolotls lent by Mr. Pitt, two of the newly created "Byron" aquaria, shown by George Fletcher of Dorking, a compartmented tank containing seven very fine veiltailed fighting fish, also provided by George Fletcher, and a reinforced concrete aquarium on an oak stand, manufactured by Mr. Smith of Merrow.

There is no doubt whatever that the show aroused immense interest locally, and was the first of its kind in the district for many years. No admission was charged, and the attendance figures for the six days totalled 8,562, a truly surprising number of people.

A range of aquatic literature was on sale and quite a number of new members were enrolled for the Club.

### Stoke Park

During the week-end following the show at Guildford House, some of the equipment, and all the fish and living exhibits, together with additional items were transferred to the show marquee in Stoke Park, where members worked very hard indeed to complete arrangements in time for the official opening at 2.45 p.m. on the Bank Holiday.

A large number of show tanks, complete with staging, were loaned to the Club by the East London Aquarists' and Pondkeepers' Association, and these were tastefully arranged with sand, plants and fish, the main object again being to give the public an artistic set-up and to foster interest in home aquarium keeping. In all, 106 tanks were displayed.

An even larger pond was designed at one end of the marquee complete with a fountain, and the whole covered an area of about 20 ft. x 15 ft. Several James Brydon water lily blooms and large goldfish completed a very attractive exhibit.

A tank containing innumerable livebearers was placed in a prominent position and visitors were asked to guess the exact number, the prize being a pair of nylon stockings.

Considerable publicity was given to the show, on posters, and in the local Press, about 30 sideshows and a spacious refreshment marquee were prepared in the park, and everything was set for the usual scene of interest and activity, which, in the past, has accompanied this local horticultural event. However, the elements decreed otherwise this year, and at 1.30 p.m., a down-pour of rain started, and continued, unabated, until the evening, so that our "gate" was reduced to only 300. This was most disappointing for all concerned, especially as it came after a holiday week of unbroken sunshine and the very successful show at Guildford House.

However, these first post-war events have given the Club confidence and experience which will doubtless be reflected in next year's displays.

## EALING CIVIC WEEK

During the week in which a display by the West Middlesex Aquarists' Society was staged at the Ealing Town Hall, visitors totalled 10,000. Numerous questions were answered, and the Society has received the thanks of the Mayor and Public Relations Committee for their contribution towards the success of the "Arts and Civic" Week Exhibition, in connection with which the display was held. The Society members greatly appreciated the words of thanks as their undertaking had been a large job of work, involving daily attendance for twelve hours, with conducted parties of local children, some 50 to 100 in number each day.

At the July meeting of the Belle Vue (Manchester) Aquarium Society, a member of the Club, Mr. R. Dearden Fielding, gave a talk on breeding *Barbus nanaosus*, involving many useful tips from his own experience. The talk provoked a lively discussion.

Walsall and District Aquatic Society have been co-operating with the Wolverhampton and District Aquarists' Society in several enjoyable meetings. The two Societies had a good time together on a visit to the Belle Vue Aquarium, under the guidance of the Superintendent of Belle Vue, Mr. Gerald T. Iles.

On Friday, August 6th, a "quiz" between the Societies proved a great success, the Walsall Society winning by a very narrow margin.

Wembley Aquarists' Society reports increasing membership, the Society now having over 75 per cent. of the intended complement of 50. The Society is visiting the London Zoo Aquarium during August since their schoolroom headquarters will be closed during that month.

## FORTHCOMING EVENTS

**Harrow Aquarists' Club's** Second Annual Public Show and Exhibition will be held at Roxeth Parish Hall, South Harrow, on September 10th and 11th, 2.30 to 10 p.m., on the first day, and 10 a.m. to 9 p.m. on the second day. There are twenty classes in the show schedule, including the Inter-Club Competition for Furnished and Stocked Aquaria for the London Challenge Cup.

All entries should be in the hands of the Show Secretary, Mr. L. Lelyveld, 85, Rugby Avenue, Wembley, Middx., not later than August 30th, 1948, from whom entry forms can be obtained. The hall is close to South Harrow Station on the Piccadilly Line, and there is a car park.

**The Federation of Northern Aquarium Societies** is holding its third assembly on Sunday, the 3rd October, 1948, at the Zoological Gardens, Belle Vue, Manchester. The programme as thus far arranged includes short lectures, a tour of the aquarium and zoo, and a show of some "outstanding nature films, not normally available." Tickets, price 10/6d., are now available for affiliated Societies' members, who should secure reservations via their Secretaries, from the Secretary of the Federation, Mr. G. T. Iles, Longsight Lodge, Redgate Lane, Manchester, 12.

**East London A. and P. Association** committee are offering a trophy—the "Cousens Atkinson Trophy"—for "Fancy Goldfish," bred in the current year, to be awarded by annual competition (in October) to any member who has not gained a first prize for breeding fancy Goldfish.

### "THREE TOWNS SHOW"

The aquatic section of this show to be held in Dagenham, on August 28th and 29th, is being staged by the Benbarrat, Havering and Dagenham Societies. The show will consist mainly of "Furnished Aquaria," tropical and coldwater classes, and there will be 100 tanks with canopy lighting available. Entries have been open to all aquarists and the show should be a fine sight.

### "BRITISH JOURNAL OF HERPETOLOGY"

The first number of the official journal of The British Herpetological Society recently appeared. This Society is now approaching the first anniversary of its inception, and its plan is to promote the study of reptiles and amphibians. Journal No. 1, most fittingly, contains an extremely detailed account of the distribution of reptiles and amphibians in the British Isles, with notes on species recently introduced, written by Mr. R. H. R. Taylor. Literature from 1845 onwards has been examined and a comprehensive list of authorities cited is included. There are thirteen pages of distribution maps and the whole presents a show full of good promise. The journal is free to members of the Society, but is otherwise obtainable at the price of four shillings.

# Indian Pythons Hatched at the London Zoo

Photos by R. A. LANWORN

**T**HIS has been a good year for Indian Pythons (*Python molurus*) in the Reptile House at the London Zoo. During the spring three females laid batches of eggs and a number of healthy youngsters was reared from each. The period of incubation was 58 days, at the end of which time the embryos cracked the parchment-like shells by means of the egg-tooth, and emerged from the eggs.

The stomachs were slightly distended with yolk, which was absorbed after three days. At five days

old they were given freshly-killed half-grown mice, which they struck and constricted before eating. Feeding frequently proved a difficult business, since when one was offered a mouse, several others would strike it at the same time. Those hatched in April are now eating four or five full-grown mice each per week.

In all cases the young Pythons were aggressive at first, but very soon could be handled without biting.



An embryo Indian python uses its egg-tooth to break the egg shell, and surveys the world. When approached it popped inside again!



The danger past, young *P. molurus* disengages his coils from the egg-case and begins to explore



New and shiny but every inch a python!



Though aggressive at first, young pythons soon become tame

# Breeding the SCALED FANTAIL

By \_\_\_\_\_ A. BOARDER

*(Continued from the June issue)*

THE Scaled Fantail is a very good type of fish to keep in an outdoor pond, but it is necessary to attend carefully to several details in order to ensure success. It will be agreed generally that it is easy enough to keep these fish throughout the warmer months of the year, but the winter may bring several troubles that will tax the skill of the pondkeeper. I feel sure that the way that the fish are looked after in the summer and autumn will make a great deal of difference as to how they survive the winter. Once the temperature of the water drops below 50 degrees the fish will not be so active and will not be able to digest their food so well as when the water was warm. It is, therefore, useless to try to feed the fish once it does turn cold, and so in order to enable the fish to go through the winter in good health it is essential to feed up the fish whilst the weather is still warm. The fish can store up a certain amount of nourishment as a reserve, and so give as much food as they will take at all times before the winter arrives.

Some people feed worms to their fish during the winter but I am sure that it is best to refrain from feeding at all during the coldest months of the year. It does not require many dead uneaten worms to pollute a pond and nothing must be done which will in any way add to the almost inevitable pollution which results from decaying plant life in the pond. I think that it will be agreed that goldfish can withstand any amount of cold that they are likely to get in this country. During the very severe winter of 1946-47 my Fantails came through in the outdoor pond quite safely. It is not the cold which kills the fish but the lack of oxygen in the water which causes the trouble. Now how does the water lose its oxygen, especially in the winter? There is no doubt that a number of decaying water-lily leaves will soon turn the water foul with gases that are very harmful to fish.

If your pond is one which was made with concrete it may be possible to empty it and thoroughly clean it out at the commencement of the winter. I am positive that it is much more easy to winter fish in a pond that is sweet and clean than in one which is polluted by an excess of decaying vegetable matter. The mere fact of freezing up of the pond need not cause any harm to the fish, there are many authentic

cases of goldfish being quite all right after having been frozen solid in blocks of ice. This proves that it is not the actual cold that we have to contend with, but the lack of oxygen in the pond.

You will find that if an unbroken coat of ice remains on a pond which contains decaying vegetable matter for some time, the water will become very foul and smelly. This is the danger signal and you will soon have trouble. It is, therefore, essential in my opinion to break part of the ice each day so that the water can get in contact with the fresh air as much as possible. Also, if the water does smell you must run in some fresh tap water as soon as you can. I think that it is a very good plan to do this fairly frequently during the winter.

Any snow which lies on the frozen surface of the pond should be removed as soon as possible as foul gases soon form in the dark water underneath. Even fish that have been very well fed during the summer cannot survive in an unhealthy pond. The trouble is not always evident during the actual winter but when the water warms up in the Spring is the time when the dreaded fungus appears on fishes which have become weakened by unhealthy conditions in the winter.

It may not be out of place here to give a little advice to those who wish to show their fish. It is absolutely essential to show your fish against others to find out whether the fish you are breeding are in the main true to type. It is no use going to a show without your fish and then telling everyone there that you have better fish at home. We have all heard that one and it comes a bit stale. You might think that your fish are as good, but until you place them in their show tanks against the others you cannot form a correct opinion as to their actual value as show fish. Many fish look good in the pond or tank but it is only by comparison that you will be able to judge how good your fish really are. You can easily become biased towards your own fish and you will be helped greatly by the placing of the fish by the judge. I might think that I know a good scaled fantail when I see one but as I have watched the fish develop I may possibly have overlooked a slight fault which may be apparent immediately to a judge as soon as he sees it. Also when you are trying to breed



to a type it is absolutely essential for you to show your fish against others so that you can have expert guidance as to whether your type is correct or not. I have often heard it said at a show, "what's the use of me showing my fish against old so-and-so, he is sure to win"? Now this is the wrong attitude to adopt as it is only by showing your fish against the very best that you will be able to form an opinion as to whether you are breeding to the correct standard or not.

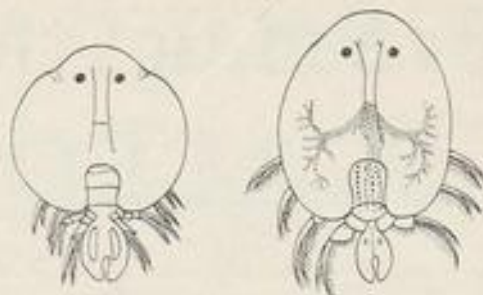
Although you can assess the value of your fish by showing, it is up to the judge to give a guidance by not always awarding a first or even a second prize if he considers that no fish in the class is of sufficient quality to merit such an award. It is not always enough for the judge to place the fish in their right order of merit but by withholding a prize or two he can easily notify the exhibitor that the fish are not up to the required standard. Many clubs are at fault here as they may, through their show secretary, indicate to the judge that they wish all prizes to be awarded. This often means that a successful exhibitor goes home with a first prize and a fish that he thinks perfect and then goes on to breed similar fish, instead of trying to breed something nearer the correct type. It may be that the points for the annual cup are at stake, but the awarding of a cup should not be sufficient justification for the awarding of a first prize to a fish that is not somewhere near the standard.

I should very much like to see a few at least in each club make up their minds to specialise in one type of goldfish and then try to breed to the recognised standard. By this means it would be possible in a short time to have well-filled classes of good type fish and not something tragic as could be seen in the common goldfish class at the last National Exhibition. Remember too that you are not showing for the sake of pot collecting, and not only to find out the value of your fish, but to indicate to other breeders what type of fish they should breed.

It is not always easy to keep your show fish in good condition if they are kept in a pond. The water may not be clear enough for you to see the fish properly, and it is possible that they may have some recent damage which would prevent them from looking their best at the show. Not long ago I caught up three fish from my pond to take with me to a club to demonstrate the type of fish I was talking about and I was surprised and distressed to find that they had been badly damaged by fish lice. These had bitten them so badly that one had a small hole right through the dorsal fin whilst another had several bad places on it.

I had to catch all my fish and clean them from the lice and I found several signs of damage. I know that the damage soon becomes repaired but had I failed to find out the trouble until the day of a show I should have been unable to show the fish. It is essential then that you should examine your fish occasionally to see that they are in good condition and that can only be done by catching them individually.

I have since placed a small bleak in my pond with the fantails, as this very quick-feeding fish will no



The fish louse *Argulus trilineatus*. Upper views of male (left) and female (right)

doubt put an end to any free swimming fish lice that may still be in the pond. I shall probably lose a few eggs, which will be eaten by the bleak, but surely the labourer is worthy of his hire.

Whilst on the subject of shows I would like to remark on the fact that some schedules do not have separate classes for all the main recognised types of goldfish, and this is a great pity. It is impossible for an exhibitor to assess the value of his fish if he can only show them in a mixed class. I have been advocating for classes for fantails for some time and then when a society provides a class for them they then mix up the other classes for fancy goldfish and I get kicked to death by would-be exhibitors whose types have not been catered for separately; as if I could help it anyway.

I receive many inquiries as to how old a fish must be before it can breed. I am unable to say at present how soon it would be possible to get young fantails to breed, but last year I bred with some of my fish that were only thirteen months old. This year, however, my fish went one better and bred at eleven months. The two fantails which won 2nd and 3rd prizes for me at the National Show in June, 1948, were then only a year old, had bred once, and on being returned to the outdoor pond after the show, obliged by spawning on the following Monday, 14th June, from which spawning I appear to have quite a few good youngsters. Therefore it is quite possible that by proper feeding and attention some fish may breed even earlier. It may be questioned as to whether it is wise to allow fish to breed so young. I can see no apparent harm to my fish caused by this early breeding and providing the fish are healthy and well looked after I see no reason to try to put a brake on their natural urge to spawn.

It has always been an interesting problem to me as to how old the native fishes of this country are before they can breed. I have just had a remarkable instance of my home bred two year old green tench breeding and have young fish from them, but I also saw some year-old tench chasing as if spawning and the female looked very fat on one side. Unfortunately I have not been able to find any eggs yet and so am unable to verify the spawning of these year-old tench.

# FISH AS FILM STARS

By \_\_\_\_\_ N. H. BENNETT

*Photographs by the Dartington Hall Film Unit.*

I HAVE noted with interest that Aquarium Society's sometimes have film shows on aquatic subjects. Most of the films have been made by Gaumont British, many of which are quite good. This article deals with the experiences of an amateur in making a film connected with aquaria, under the guidance of professional film makers. I hope it will encourage some aquarium clubs to work, perhaps in collaboration with Cine Societies, to produce aquatic films. Unlike professional films, the only cost will be film stock, and there should be some return by other clubs and schools borrowing copies of the film.

A film-making course was held recently by Dartington Hall Film Unit, for teachers, and others interested in film-making for record purposes. It was an entirely practical course. The nineteen members who attended were divided into four

groups, each group making a different type of film. Readers can imagine my delight as an aquarist when the Director, T. R. Stobard, B.Sc., a biologist, suggested the biology group making a film on setting up an aquarium.

I have thought for sometime that a film on this subject is badly needed in all types of schools. In my own district for instance, I am always meeting teachers wanting information on how to set up an aquarium, or who have set one up without much success. Incidentally aquarists and aquarist societies could give tremendous help to schools in their districts, by maintaining aquaria in schools and permanently interesting large numbers of youngsters in our hobby.

At Dartington we had fourteen days in which to make our film. You probably think, as we in our inexperience thought, the time more than sufficient. We were, however, beset by numerous difficulties that wasted a great deal of time. We had everything in the way of lighting, light meters, and cameras, the very things that would trouble the amateur. Our greatest difficulty was in obtaining water weeds and creatures in a part of Devon, conspicuous by its absence of ponds. The material for nets had to be "scrounged," and the nets made up. Also, we had but one aquarium, that developed leaks at wrong moments. The film demanded it be handled a great deal by children. In a film studio nothing can be too robust or too reliable. Pressed steel will not do, angle iron is essential. Pitch, run down the inside junctions of the glass would help to prevent glass caving in when handled empty. If there is any cement that can make the aquarium more reliable when moved, it should be used. I make this point because there will be inquiries for aquaria from studios from time to time. For instance, two films, now in production, are "The Stickleback" and "From Tadpole to Frog."

The first three days were spent in script writing. It is usual to begin by getting together ideas for the general treatment of the subject. It took us several attempts to arrive at a "general treatment" that satisfied the five of us. Continuity is a constant problem in any film, but particular attention has to be paid to it in a silent film, for one has not the sound commentary to explain it. Titles must be used here and there, but it is not desirable to have too many. We, perhaps, used too few, but we had in mind, the teacher or lecturer commenting on points of interest during the showing of the film.



In the studio the director places his young "actors"

Those of you who have not tried to make a film will think ours fairly simple, namely to film someone setting up an aquarium from soil and gravel, etc., to plants and fish. However, it is necessary to make quite clear to the audience that what you are putting in is soil. This could be done by placing a label on a jar. It is more interesting to show as we did, some soil being collected in a ploughed field. This confronts one with the problem of flashing from field to aquarium, and then perhaps to a pond. You may think this is done in a film, but if it is, a great deal of thought goes into the sequence. You would soon see the effect if this was done badly.

From the general treatment a detailed plan of the film is made and from this a shooting script. A shooting script gives exact details of each shot wanted. Some producers even draw a picture of the beginning of each shot, indicating with arrows what movement will take place. This helps to visualise the problems, and saves time and film when shooting is being done.

A bare week was spent shooting 600 ft. of film, half an hour of screen time. Professional film makers reckon they are doing well if one-fifth of what they shoot is included in the final film. We were obliged to keep just over two-thirds, and I must admit some shots do need retaking.

Editing took nearly a week. I advise the use of negative stock. Editing is done on a copy. Great care is taken of the negative, and it is cut to match the edited copy. Further copies can then be obtained cheaply from the undamaged negative. I mention this because most amateurs use direct reversal film. The film that has been through the camera is processed in a special way, and the same film used for projection. This cuts costs a good deal where only one copy is required, but increases cost where several copies are required. We made the mistake of using direct reversal stock, not realising copies would be wanted. We edited on the single copy, putting on scratches in some places, and this had to be used to make further copies.

We were, however, pleased with the final film, though we felt we could have made a better one given a little more time, and perhaps another 100 ft. of film.

I was extremely lucky to find myself with 100 ft. of film to shoot off on the various creatures we had managed to collect in the aquarium. I spent an entire afternoon and evening on this. I managed to get some passable shots of minnows, sticklebacks, a miller's thumb, a newt eating a worm, and one or two other things. I found it a tremendous advantage to know the habits of the creatures I was filming. I also learnt a few things. For instance, it is possible to get a snail to stick on the glass on a certain spot, if you hold him there a few seconds.

In a future article I hope to deal with some of the technical problems involved in aquarium cinematography, many of which apply also to still photography.

For the information of those societies that have not had film shows, I might add that they are not difficult to arrange, and they can be free.



On location—filming a pond hunt

The Central Office of Information, which has replaced the Ministry of Information, is Government-sponsored, and has mobile vans that give free shows. They have one or two films of aquatic interest in their own library. They might possibly be persuaded to show private or library films as well. The address of the Central Office of Information is: Imperial Institute, South Kensington, S.W.7.

Most education authorities have 16 mm. projectors, and will arrange shows. As they are Gaumont British Library members, they will also order the films you require.

#### MICRO CULTURE DE LUXE

Little more than a year ago "Micro," the minute nematoid worm *Anguilula*, was first made known to British aquarists through an article by Mrs. Morten-Grindal of Sweden, published in this journal, and the Editor received from Mrs. Grindal a small tube containing a culture of the worms. They proved to be a perfect food for young fishes in that difficult stage when they are too large to eat infusoria and too small to take *Daphnia* and other large foods. The Editor carefully cultivated the worms and sent samples to clubs in various parts of the kingdom, where they were further cultivated and soon became widely used. To-day most dealers can supply them and they are as much a part of the aquarists' equipment as whiteworms or *Tubificæ*.

This remarkable development now reaches its climax with the production of a special device by Norgard Bros. which makes the use of the food a simple and clean process. This apparatus is called the "Microcult," and is advertised on another page. It is beautifully made, of neat appearance, and is accompanied by a leaflet giving full instructions.

A metal stand contains six plastic beakers in each of which a desertspoonful of the culture can be placed. These are covered by ingenious lids having sockets in which match-sticks are inserted so that when the lid is in position the ends of the match-sticks are in contact with the culture. At a temperature of about 80 degrees F., the worms multiply rapidly and move up the match-sticks, so that all one needs to do in order to feed the fishes is to remove the lid by the handle provided and twist the match-sticks in the aquarium.

The pots contain enough of the culture to allow feeding about four times a day for four days, after which they should be cleaned out and refilled.

In its simplicity, efficiency and attractive appearance, this is such a well-designed gadget that most aquarists will consider it worth 15/6d. to be able to possess it. By taking the messiness out of Micro culture it will give a greater incentive to use the food, and the increased stocks of healthy fishes raised will repay the cost many times over.

# The Dwarf Gourami

By

JACK HE

THE Dwarf Gourami (*Colisa lalia*) stands very high in the estimation of aquarists, and it is not without good reason that this handsome fish is such a great favourite among tropical fans.

Not only is it of a lively, inquisitive disposition and an excellent subject for the mixed tank, but it has highly interesting habits which make it of considerable appeal to aquarists of a scientific turn of mind.

It is one of the very few fishes which build a nest, if nest the bubble and weed contraption of the Dwarf Gourami could be called. It also has an auxiliary breathing apparatus which enables it to collect oxygen from the surface of the water, and in consequence is not likely to become much affected by overcrowding.

The development of this auxiliary breathing apparatus is an interesting example of adaptation to environment, and without its aid the Gourami might not have survived. The fish inhabits Northern India, where it is found in shallow waters which at times become very hot and foul, perhaps often too warm to contain enough oxygen to support the respiration of fishes. But with its air-breathing system, the Dwarf Gourami is able to survive in these seemingly impossible conditions.

For the beginner in tropicals it is difficult to find a better fish to start with than the Dwarf Gourami. It is easy to keep in quite a small aquarium, and is very pretty and hardy. Ordinary sized specimens are about 1½ ins. long, but specimens up to 3 ins. are occasionally seen. These latter big ones are, however, pretty expensive and mostly for exhibition purposes.

The sexes are differently coloured. The male has the basic hue blue, and is marked with red. The sides are marked with about a dozen vertical bars of bright crimson and blue. The dorsal and anal fins are narrow, serrated at the edges, and running from a point just behind the head almost to the tail. All the major fins are pale coloured, and ornamented with red spots. The eyes are somewhat large and black, rimmed with gold, and with the top of the outer rim tinted with red.

The female is more of an olive green shade, with the characteristic bars of a pale orange hue. It is said that on spawning the female assumes colours almost as brilliant as the male, but I have not personally noticed that this is the case.

It is true, however, that Dwarf Gouramies only show their colours to the best advantage when they are kept in water maintained at a pretty high temperature—round about 78 degrees Fahr. being ideal.

Dwarf Gouramies, as may be expected from their natural habitat, are lovers of warmth, sunshine and shallow water. These lovely fishes show their colours at the best under the influence of good light. Light also plays an important part in promoting the growth of *Algae*, which forms their chief natural green food. Gouramies are all largely vegetarian in diet, and a feed of cooked spinach or cabbage, very finely minced, is always much appreciated.

Regarding food, Dwarf Gouramies are somewhat small-mouthed species, and so only proprietary foods of a small or medium grade should be used. They are fond of fine oatmeal, and this forms a cheap and palatable food. Live food, such as mosquito larvae and blood worms can also be given, but I doubt if they are really essential.

In disposition, the Dwarf Gourami is naturally rather shy, and newly acquired specimens have a habit of hiding away behind rockwork and water plants, but they are not unintelligent and soon get to know feeding times, and in time may even come to the top of the water to take tit-bits from their owner's fingers.

In a mixed collection, Dwarf Gouramies are usually peace-loving creatures, but occasionally a spiteful member is met with.

Dwarf Gouramies are not difficult to breed, and this is an extremely interesting operation. For breeding, prepare a tank about a fortnight before mating by covering the bottom with half an inch of loam pressed down firmly and covered with about 1½ ins. well-washed sand.

Plant half a dozen *Vallisneria*, or, better still, *Myriophyllum* cuttings in bunches set close together, to provide hiding places for the female. Arrange a temperature of between 75 and 85 degrees Fahr.

On being introduced to this tank, the male will almost at once commence chasing the female, and in the course of a day or so will start building the nest. This is a fascinating process to watch. He gathers pieces of plants and takes them in his mouth to the selected spot at the surface. He then takes in a mouthful of air and blows a multitude of small bubbles from the gills under the pieces of plants.

Duckweed is the favourite "nesting material." The nest takes at least a day to complete, and measures about 3 ins. in diameter, the structure being raised in the centre just above the surface of the water.

The female sometimes takes some interest in the nest, but is usually driven away by the male, who evidently considers that her interest is not to any good purpose.

But soon his mental outlook changes, and he deliberately seeks out the female among the weeds, and shows off to her, with much stroking of fins and love-play. Finally, she is coaxed under the nest, where they embrace and the eggs are laid in small batches at a time.

The male produces bubbles under the eggs, and they float upwards to the nest. Several minutes elapse as a rule between embraces and subsequent laying of batches of eggs, and the process goes on for some hours. At the end of the mating always remove the female.

The male now works very hard indeed in the maintaining of his nest, and constantly renews the air-bubble support beneath it. The eggs hatch out in a period varying from about 30-48 hours. The

fry soon leave the nest in spite of the efforts of the male to return them thereto, and can be seen clinging like bits of black cotton to the sides of the tank and to aquatics. The male fish should now be removed.

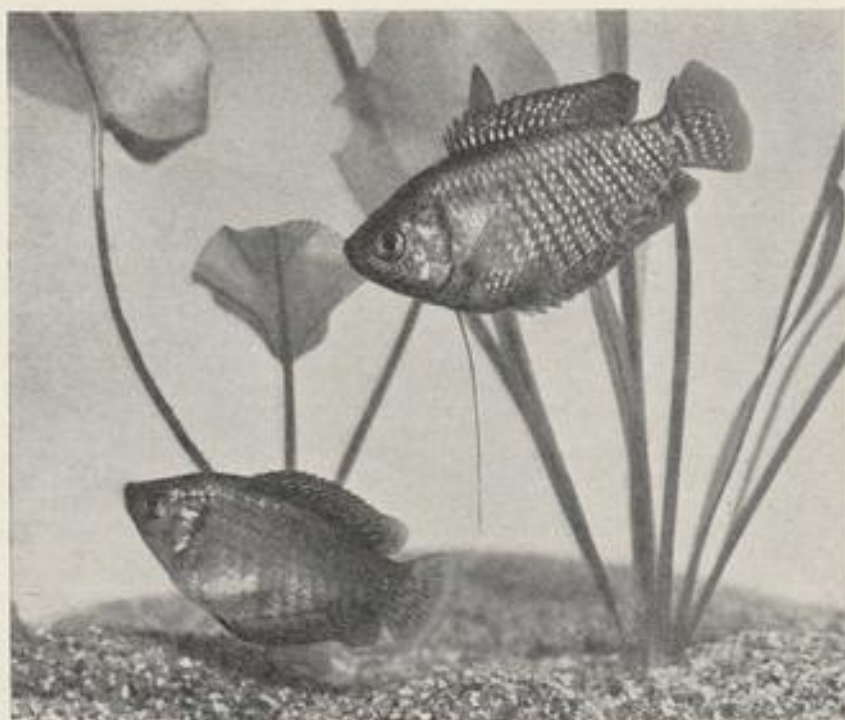
Feed the fry with cultures of Infusoria until about a fortnight old, when they will usually take freshly-hatched Brine Shrimps. They grow slowly and irregularly, however, and when two months old the largest do not measure more than  $\frac{1}{4}$  inch. They are at this stage exact replicas of their parents, but of a silvery grey hue. Live food in the early stages helps growth along considerably.

Beginners are advised to keep the fish in a community tank until they show desire to spawn. Another tip is to have the water well below the top of the tank, as draughts are highly detrimental to the eggs and fry.

When the fish are about ten weeks old you can begin to pick out the males from the females. The males begin to show dark smudges on their bodies, these gradually giving place to the characteristic colours. At three months old, the fish are fully grown, and ready to mate.

Dwarf Gourami  
(*Colisa lalia*)

The upper fish is  
the male.



(Photo: B. & F.)

# UMBRELLA GRASS

By \_\_\_\_\_ H. A. DAY

(Photos by the author)

IF you want something of a grassy or reedlike appearance at the edge of your lily or fish pool or stream, turn your attention to the great desirability of the *Cyperus* (Umbrella Grass) which is far more ornamental and graceful than most other grass-like subjects, and you will begin to want to plant the *Cyperus*. Unfortunately, however, you cannot, with any degree of assurance, plant *Cyperus* out of doors in this country—except the notoriously warm parts of it—and you may think this fact prohibits you from employing those plants as outdoor water-side subjects. This is not the case, because you may plant the *Cyperus* in a pot or a bowl, thus enabling you to put it in position out of doors in warm weather and to take it under shelter—not necessarily a hot-



*Cyperus alternifolius gracilis* successfully hiding its pot



*Cyperus vegetus* which remains in this condition all through the winter.

house for the colder portion of the year. Although there are reputed hardy species and varieties there can be no guarantee that even these will stand up to severe weather conditions.

These hardier plants include *Cyperus para matensis*, *Cyperus longus* (Sweet Galingale), *Cyperus erythrorrhizus*, and *Cyperus rotundus* (Nut Grass). *Cyperus vegetus* is hardy, but it is wise to take no chances with this plant—it comes to us from Chile and it may resent the English climate. All these hardy plants could be put out in warm sheltered positions, and some means of protection devised for them in very severe weather, when there is the possibility of their becoming established as permanent occupants of the garden.

Nevertheless, the flower-pot solves the difficulty. In pots, the plants can be placed anywhere—by the side of the water, in the water, or the pot can be buried and hidden in the soil. The plants may be placed in a different position each year, if desired, for

change or improvement, which is an advantage, and this advantage may be accompanied by another—the use of the more tender and beautiful kinds, such as *Cyperus haspan viviparus*, *Cyperus alternifolius* (the "Umbrella Plant," which is so useful for growing in a bowl of water and keeping in an ordinary living-room as a decorative plant), the "Papyrus," *Cyperus papyrus antiquorum* (from which the ancients make paper), and *Cyperus adenophorus*. All that is needed to shelter these plants during the winter is a glasshouse, unheated, except by sunshine, or even in a living-room! All the species of *Cyperus* make useful table plants when planted in bowls of water. All of them have grass or reedlike stems topped with umbrella-shaped heads of bracts and glumes of a red or brown colour.

The soil for these plants should be good—loam, for example; but it need not be special—good garden soil will do. Water is the chief requirement, and the plants grow well in a few inches depth of water, or planted in a wet soil. In drier conditions, the soil must be kept moist, and should never become dried out.



*Cyperus haspan viviparus*  
growing in an ornamental bowl  
of water

## THE AQUARIST AT OLYMPIA

THOUSANDS of people visiting the *Evening News* Flower Show at Olympia, on August 5th to 7th, found the stand of *The Aquarist* one of the major attractions, and a constant stream of people filed past the exhibits from the moment of opening until the doors closed. Situated on a busy corner, brilliantly lit and attractively decorated, the stand



A corner of our stand at Olympia. Plants decorating the pond-side can be seen in the foreground

displayed four major aspects of the hobby—the cold water aquarium, the tropical aquarium, the vivarium and the pond. It further displayed the close bond that exists between the journal and its readers and advertisers, for the plants for the pond were supplied by Messrs. Perry of Enfield, the aquarium tanks by Messrs. George Fletcher of Harrow, and the aquaria were furnished by members of the Twenty Club. Much interest was shown in a young crocodile and two baby caiman alligators, kindly loaned by our advisor on reptiles, Mr. J. W. Lester, of the London Zoo. Mr. Frier's two splendid Veiltail Goldfish were greatly admired, while the high quality tropicals shown by Mr. R. G. Mealand, and others, were an eye-opener to most of the visitors. We had regretfully to decline offers of help from other sources owing to the limited space, but to all these friends we extend our heartfelt thanks for their practical expression of affection for the old journal. A special word of gratitude must be extended to our good friend, C. W. G. Creed, who gave up three days of his vacation in order to deal with the bombardment of inquiries.

Altogether this was fine propaganda not only for the journal, but for the hobby as a whole, as we expected it would be. The *Evening News* organisers were sufficiently impressed by our display to place a special poster outside advertising the "fancy fishes as bright as the flowers," and for this gesture as well as their friendly co-operation throughout the show we thank them also.

## A USEFUL WIRING BOARD

By  
D. W. JONES

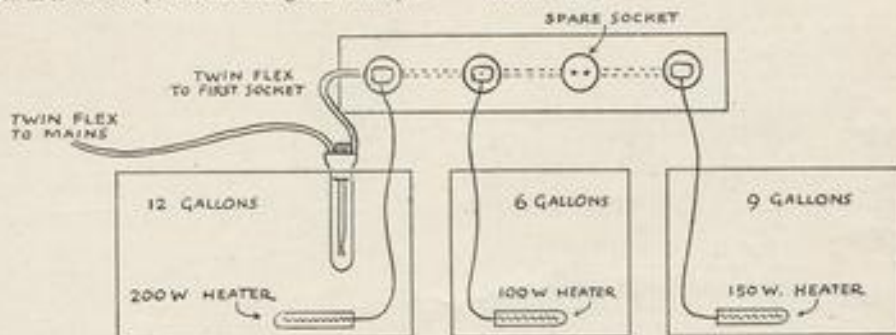
MANY aquarists use one thermostat to control the temperature in two or more tanks—most thermostats will take up to 500 watts, that is five heaters of 100 watts or their equivalent—but the resultant joining of the various leads is sometimes a problem and, if insulating tape is used to bind the joints, a great deal of work is caused when one or more heaters has to be disconnected.

The following "Wiring Board" may be of interest to readers:—

The thermostat is inserted into one tank and the lead which is normally joined to the heater led to a board on which are mounted three or four ordinary two point electric sockets which are joined one to the other by short lengths of ordinary twin flex, the two points of one socket being carried to the two points of the next and so on to the end of the board. The heater from each tank is then plugged in to a socket, the result being that when the

mains lead from the thermostat is connected to the electric supply in the normal way all the sockets become "live" or not according to whether the thermostat is switched on or off, which is of course governed by the temperature of the main tank.

This system will be found of great use when tanks of varying sizes are used or when different depths of water are needed, the factor to be considered being the heater inserted in proportion to the water in the tank. Thus, for example, if the main tank (the one containing the thermostat) has a 200 watt heater, a tank with six gallons to be heated will need a 100 watt heater and the other tanks in proportion. Should one tank be out of use for some reason the heater plug is pulled from the socket and that is all. In some cases two heaters can be inserted and as long as the proportion of heat to water is remembered the temperature will be controlled as set on the thermostat.



### A SPOON-FED FEMALE—(Continued from page 162)

eggs, after which she proceeds to other leaves to repeat the procedure, occasionally taking another snap at the male on the way, to collect more milt. In this way she eventually deposits from sixty to a hundred eggs, which she next proceeds to rearrange to her satisfaction, taking them from one place and sticking them on another with her mouth (in which there possibly remains some milt to increase the chances of fertilisation).

From this point the female guards her eggs, and the young when they hatch (in 24 hours or so), very assiduously against all dangers, including the male, whom she continues to regard with hostility, though he takes no special interest in his offspring. Until the fry are several days old and active, the female takes no food, though the male will be hungry after his exertions.

Though the fry will not commence feeding until about three days after hatching, it is advisable to start a drip-feed well before this in order to have a plentiful supply awaiting them.

*Corynopsis rissei* is usually obtainable in small numbers from dealers in tropical fishes, and is well worth keeping, if only to observe the strange performance described. This is of considerable interest to students of behaviour and adaptation, for the hostility of the female which would ordinarily militate against reproduction is here turned to good account by quite extraordinary modifications of the male.

The breeding tank should be at least 24×12×12 ins., well-established and, of course, containing some broad-leaved plants such as *Cryptocoryne* or small Amazon Swordplants. A temperature of 80 degrees F. is suitable, if the fishes have been conditioned in an average temperature of 75 degrees. The sexes must be conditioned separately, with live food such as small *Daphnia* and whiteworms, though when not in breeding condition they swim together peaceably enough, and are excellent community fishes.



# THE DIVING BEETLE

By IRIS MURRAY

(Photos by L. E. DAY)

**D**YTISCUS *marginalis* is one of our largest and most powerful aquatic insects (Fig. 1). It belongs to the family Dytiscidae, and is only one species of about a hundred and twenty which go to make up the whole family. They vary in length between one-tenth of an inch to an inch and a quarter, and the Great Diving Beetle is the largest.

It is oval in shape, and has hard elytra or wing cases, of a rich chestnut shade, while all round the margins of the thorax and elytra is a yellow band—hence the name *marginalis*. The head is small in comparison with the rest of the body and the eyes are large and compound. They have the power to see above and below at the same time. The antennae are long, segmented and slender, and dwarf the palpi.

The beetle has three pairs of legs, which, in this particular family are especially adapted for swimming. The fore-legs and the middle legs are placed fairly closely together, and the hind legs are placed further away from the others, to allow them plenty of room for swimming. It is with these hind legs that the insect swims. They are long, while the tibia and five-jointed tarsus are flat, and have an edging of stiff hairs along one side. Each leg ends in a powerful claw, although this is not so pronounced as in some other members of the family.

These legs propel the beetle through the water by striking it with the broad side at the beginning of the stroke, while during the return part of the stroke the thinner blade side of the leg is presented to the water—very much like an expert rower feathers his oars. The beetle is enabled to perform this movement owing to the fact that where the legs join the body there is a kind of axis on which they can rotate (Fig. 2).

It is interesting to note that both hind legs move together, therefore the Dytiscus swims with the same kind of movement as a frog. The middle and fore legs are fringed and shorter, and the middle pair appear to steer the insect's course when swimming.

It is easy to distinguish the male and female Dytiscus. The female has longitudinal sulcations down the wing-cases (Fig. 3 inset), while the male has smooth elytra, although there are a few exceptions to this rule. The infallible difference between the sexes is the modified foreleg of the male.

The three first segments of the tarsi in the male are enlarged and flattened to form a disc. This sucker is used during mating, when the male may be seen clinging to the female for many hours.



1. *Dytiscus marginalis* Female

The under surface of the disc is roughened by the formation of tiny stalked growths. There are also two larger bodies, which are also stalked and are of unequal size, although their formation is on the same principal as the smaller ones. They are like open umbrellas, with numerous minute ribs enclosed in a web, the stalks are hollow, and through them flows a gelatinous substance, which strengthens the male's clinging power.

The middle legs are also slightly modified in the same manner, but these are mostly used to grasp the prey during feeding. During mating the fore legs grasp the female round the pro-thorax and the middle legs grasp her round the smooth margin of the wing cases.

These insects have insatiable appetites, and as such, must be feared denizens of the ponds, and any stagnant waters. They will attack, and devour any small fish, larvae, water insects, and even their own kind. The females are particularly pugnacious, and their appetites are only surpassed by those of the larvae.

Although this particular beetle is definitely aquatic it must have fresh air to breathe, and if trapped for any length of time, and unable to rise to the surface, will easily drown. It is lighter in weight than water, and when a fresh supply of air is needed, it floats carelessly to the surface. Once there, the rear portion is pushed through the surface film into the air, and the elytra are slightly lifted. The air is trapped by two spiracles, and travels into the mass of hairs beneath the wing cases. It is retained here to be used later when the beetle has once more descended.

When sufficient air has been obtained the insect sinks once more into the water, in search of food (Fig. 3).

It is often possible to see the respiratory operation in progress, on a still summer day in almost any pond,

# The Pond Builder

By——Major R. LANE

READERS of this journal should know all about the construction of small ponds—the neat little diagrams—reminding one of Adam the Gardener of the *Sunday Express*, who forever works in a little paradise of precision and neatness.

If you do not take it too seriously, you can still build one of these ponds, but let me again describe how it is done.

There is always that rather neglected part of the garden which is crying out for a pool. Aquarists, of course, always call a pond a "pool," and I don't blame them—a lovely word nearly as satisfying as "mere."

We select a flat piece of ground, and just beyond, there must be a gentle slope, so that we can have a useful overflow. If the whole of our ground is level, however, we can either sink a deep well, or just trust to luck about emptying the pool, which, by the way, will empty itself quite easily unless we follow the instructions carefully.

Now mark out the area and remove the top spit of earth—which is simple—just a few barrow loads. The turf will make a nice bank under the hedge. Start digging in earnest to about one and a half feet in depth. Goodness knows how many barrow loads this will be, and as the work progresses they will each have to be raised somehow to the surface level. You may know where to put this earth, but when excavated it will be found to have increased its bulk considerably. We'll skip this problem. It will now be found that we have reached a hard impermeable layer of clayey consistency (samples may be taken up from the drawing room carpet later and studied at leisure). This layer usually becomes the bottom of the future pond, or should I say, pool.

As I have stated before, the removal of earth has been accomplished by dropping the barrow into the not so shallow depression—filling it endlessly, honking it up and wheeling it away, the track of the wheelbarrow making a little canal, which it is quite worthwhile to cement up later, should you desire to keep an eel or two.

So far so good. Blisters should be carefully cleansed with soap and water, then methylated spirit and then pierced sideways. Give them forty-eight hours to settle down.

We have now got to rock-bottom—as far as we are concerned anyway, with sloping sides, so that the ice will not burst open the edges.

We note that the top few inches of soil are much more loose and crumbly than the lower strata—so we smack it with the spade. This will make it look



better, but really makes no difference, and anyhow it was time we got a new handle for the spade.

It is now time to mix the concrete. Mix the appropriate proportions on a wooden platform on the ground, not at the bottom of the pond, for I don't mind betting you that there will have been a good shower of rain, and the whole show will be nearly full of water by now. On no account be discouraged. From my calculations these things must happen. On this occasion the pond will be found to be fairly watertight and while the water is subsiding, the first lot of blisters should be practically healed. At any rate sufficiently to enable one to scoop out the residual moisture, and to get the concrete mixed. This should be laid evenly round to a depth of about six inches and allowed to harden.

It is not easy to judge when this process is complete, but if the acuter backache pains have subsided and there is no more paralysis, the concrete is probably ready for its final dressing.

Of course it will have to be baled out, and this activity will incidentally help to soften up the shoes again after the concrete mixing. The pond is baled out and it only remains to mix a soft creamy mixture of cement and sand and to brush it over the concrete. We should now get either a heavy downpour of rain or some very hot sun. Both will spoil the work, so it is best to choose a fine day and cover with some borrowed sacks, which should be damped.

After emptying and refilling the pond several times, over a period of some weeks, the sand can go in for the plants, and fish can be cautiously introduced, or bunged in according to taste. Avoid Carp as they certainly stir up the mud. I would advise Rudd if obtainable. The water will remain crystal clear and the fish will soon become tame and visible all the time.

You will now be all set for a visit from the nearest heron.

# 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., Longsight Lodge, Redgate Lane, Manchester, 12.

## Balham and District Aquarist Club

Secretary: A. P. 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, Longsight 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, Pum-Erw Road, Birchgrove, Cardiff.

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

## Chelmsford District Aquarists' Society

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

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

## 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, Beigstock 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, Ridgeway 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, "Kilgerran," 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.

## Hallifax and District Aquarists' Society

Secretary: Frank M. Slater, 63, Green Park Road, Skircroft 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. Cloyn, 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. Sweetenham, 5, Devonshire Road, Hornchurch, Essex.

## Hornsey Aquatic Society

Secretary: T. W. Tiffany, 38, Talbot Road, Tottenham, N.15.

Meetings: First and third Wednesday of each month, 7.30 p.m., at "The Priory," Hornsey.

## 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. Samurley, 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 Orleu, Bridgwater, Somerset.

**National Aquarists' Society**

Secretary: Kathleen Cooke, F.R.H.S., 28, Poulett Gardens, Twickenham, Middx.

Meetings: Caxton Hall, Westminster.

**Newcastle-on-Tyne and District Aquarists' Society**

Secretary: C. L. Crighton, 14, Middle Street, Walker, Newcastle.

Meetings: Y.M.C.A., Blackett 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, Croftdown Road, Highgate Road, N.W.5.

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

**North Staffordshire and District Aquarist Society**

Secretary: G. R. Davies, "Castri," 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 65465).

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., Ladbrooke 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.

**Scottish Aquarium Society**

Secretary: Strachan Kerr, 42, Aytoun Road, Glasgow, S.1.

Meetings: Christian Institute, 70, Bothwell Street, Glasgow, C.2 (as per syllabus).

**Sheffield and District Aquarists' Society**

Secretary: E. 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, Beresford Street, Woolwich S.E.18

**Southampton and District Aquatic Society**

Secretary: C. C. Parrot, 63, Upper Brownhill Road, Nursling, 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, Ferrymead 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.

**Tropicol 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, Walsley 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: E. F. Stames, 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. Yarsley, 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, Coronation Court, 31, Willesden Lane, N.W.6 (Phone: MALda Vale 8742).

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

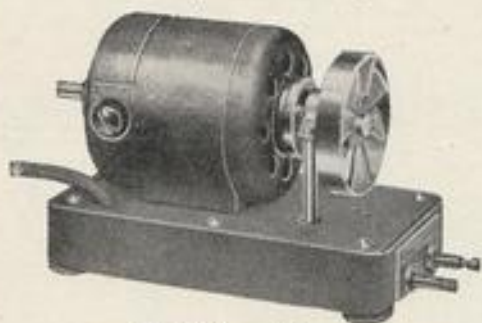
**Wolverhampton and District Aquarists' Society**

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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