

The AQUARIST AND PONDKEEPER

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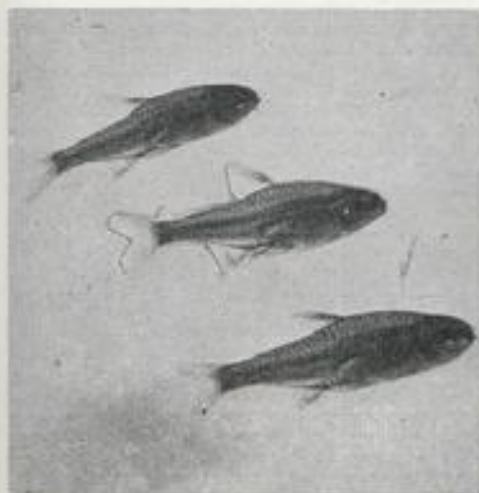
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A fish to which no mere black and white photograph can do justice is the neon tetra. This "living jewel" is the subject of this month's Refresher Course article on page 154.

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1955

Editorial

DURING the last war there developed a plethora of orders and legal restrictions concerning all manner of everyday things, so that a normally law-abiding citizen might quite easily transgress in all innocence and so become a law-breaker. The danger of excessive legislation bringing the law into contempt has been stressed many times, and this was one consideration that expedited the cancellation or lapsing of orders in the immediate post-war years. Occasionally, however, even in peace-time some obscure Act is brought to light which shows us to have been unwitting minor criminals for years.

Thus, many pondkeepers in Kent were surprised to learn from a magistrates' court case a few weeks back that, unless holders of fishing licences from the Kent River Board, they were technically guilty of an offence every time they caught fishes from their ponds. This is because of the existence of the River Boards Act (1948), which controls all waters, whether connected with rivers or not, within the area of a River Board exacting licence duties. Permission to fish in a particular water is not enough: in addition the licence fee of the River Board must be paid. The area controlled by a River Board is defined geographically and includes in law any enclosed pieces of land (and hence small gardens and large estates as well) within which there are waters containing fishes. This applies to the whole of England and Wales, so that a good many of us must share the guilty feelings aroused in our Kentish aquarist brothers.

However, before any pondkeeper begins to worry every time he sees a policeman looking interestedly at his garden pond, and before anyone gives up buying *The Aquarist* in order to pay licence fees, we hasten to add that as yet no cases have arisen under the Act, concerning private pond-owners. We know of at least one aquarist who sometimes "plays" his pond fishes on rod and line with (unhooked) earthworms, to his own and apparently the fishes' delight. If this pursuit is at all common then perhaps this new knowledge of its illegality may serve to bring a little fresh zest to its performance by unlicensed aquarist-anglers.

In the Water Garden in NOVEMBER *by Astilbes*

MOST matured garden ponds will require very little attention during this month. If the safeguards explained in last month's issue of *The Aquarist* are observed then all should go well. Many aquarists keeping their fishes in tanks have at this time of the year the urge to construct a garden pond, and a few hints on how to go about this task may be helpful.

A garden pool can be a great asset to any garden but unless care is taken in the beginning of the project some heartburns may be experienced later on. Strangely enough few people who propose to make a pond spend any time in trying to get the best information on the subject before they start. They usually make the pond first and then when something goes wrong seek the necessary instruction they should have had earlier. It is quite possible to make a pond during the winter months, and some aquarists find that this is the only time they are able to do the work. Certainly the necessary digging is far less arduous than if it had been undertaken during the heat of the summer.

Whatever you do, make sure that your mind is quite made up as to where the pond will be best. It cannot be shifted once made! It is better to locate it on high ground rather than on low if you have a choice. This will obviate the possibility of fouled water draining into the pond and will make any subsequent emptyings far more easy. It is fairly obvious that the pond should not be made near overhanging trees. Also it may be well to consider the filling and servicing of the pond, and so the proximity of a water supply must not be overlooked. It may be that your sub-soil is fairly porous, in which case it may be possible to incorporate a drainage sump when making the base. If a deep hole is made under what will be the deepest part of the pond, a drainage outlet can be made and fitted with a stopper from an old hot water bottle or similar gadget. Care must be taken with this method to renew the stopper's rubber washer each year or the water may drain away when you are away from home.

When the position of the pond has been decided on see that you get your levels right. Unless these are accurate you may find that when the pond is filled with water the edges are very uneven, spoiling the look of the pond. A few short sticks driven into the ground can be levelled up by placing a long straight plank from one to the other and using a spirit level.

The depth to be dug out is most important; many ponds are made too shallow to be safe. Remember you have to allow enough room for about three inches of concrete. The removed soil can present a problem but it is quite possible to heap it near the pond so that a rockery can be made later on. This can enhance the appearance of the pond and get rid of the surplus soil at the same time. Make sure before any concreting is commenced that there will be at least two feet six inches of depth to the finished pond; anything less will only give trouble later on. The soil should be well rammed down before concrete placing starts. This part of the task should not be done in frosty weather, but at some time during our usual winters there will be periods when the weather is fairly mild.

If the pond sides are sloping there will be no need to use any shuttering. Any formal shaped pond with almost straight sides will have to be shuttered, but these types of pond are always liable to crack when the water freezes, whereas those with sloping sides are safer. Ordinary fresh cement can be used, but make sure it is fresh. Any which contains lumps will not do. The ballast should be well washed and contain no dirt. It is better to have gravel of varying grades. Do not have all large stones, but there is no need to use too fine a mixture. The concrete should

be worked into the position in two stages, as the first mixture needs to be coarse whilst the second coat, about an inch in thickness, should be made with sharp sand and cement in the proportions of three of sand to one of cement. The mixture for the first application need not contain as much cement by half.

The secret of making a lasting job lies in using the mixture as quickly as possible after it has been mixed and to endeavour to get all done without allowing the edges to start to set. In any case the top coating should be applied in one go, if possible, so that there is no fear of a joint giving way at a later date. This will happen if the second application of finish is added to a part which has been left for a few hours. Two inches of the first coarse mixture followed by an inch of the top floating will make a good job. Faults can occur later on if the base has not been well rammed. Remember that the weight of water in a pond can soon strain anything underneath which is not quite solid. Any lumps of soft sand in your mixture can also cause a leak to occur. The treatment with special water-proofing agents should not be necessary, as a mixture of three parts sharp sand to one part fresh cement will hold water even if only half an inch thick.

The provision of pockets for plants is not necessary as all planting is better done in pots. These can be removed at any time desired whereas any plants placed in pockets may have to stay in the pond for years. Frost should not be allowed to reach fresh concrete and some sacks will give protection during setting, if necessary. The concrete will take longer to set during the colder times of the year, which is an advantage. Once it has set the sides can be well scrubbed to remove any free lime. The pond can then be filled, but it is well to fill about half way for a time. Two or three washings out may be necessary to make it safe and this can be done at intervals. There is no need to hurry over the task as fishes and plants should not be placed into the pond before about the middle of April. If, however, the pond remains filled with water for a few weeks it will be far safer when actually taken into use.

As for the size of the pond this will depend on the depth of one's pocket or the amount of space available in the garden. I would never make a pond less than about eight feet by six feet with a depth of about three feet. The larger the pond the harder and more costly to make but the easier to run for ever after. The smaller the pond the more trouble with fish, plants and water ever after. For a path around the pond, use separate flag stones in preference to a solid concrete path joined to the actual pond concrete.

Coelacanth's Egg-cases

FROM the discovery of clusters of eggs at all stages of development within the female coelacanth caught in the Comores last March, Dr. J. L. B. Smith suggests in a letter to *Nature* that this fish will be found to lay egg-cases similar to those produced by dogfishes and other elasmobranchs ("mermaids' purses"). He also comments on the failure of its captors to keep the coelacanth alive in a boat improvised as an aquarium; death may not be due to decompression involved in bringing the fish up from great depths and the higher water temperature it then encounters, explanations previously put forward. Large fishes caught alive after a struggle on the hook seldom live long in aquaria, even though they may show no signs of injury, says Dr. Smith.

Methods of Aquarium Filtration

by JACK HEMS

MANY years ago I used to think that mechanical filtration of aquarium water was an unnecessary refinement—in short, a sort of lazy aquarist's short cut to crystal-clear conditions and sediment-free compost. For somehow or other in those far-off days before World War II, I always seemed to find time to use the dip-tube every 48 hours, or so, and give the bottoms of the aquariums a good siphoning at least once every fortnight.

But now, with a fairly extensive flower- and vegetable-garden to look after, and more to occupy my mind in the domestic sphere, I have been forced to revise my ideas about mechanical filtration, and admit that the use of an air-pump at frequent intervals saves hours of precious time, which may often be employed in other useful directions.

Although quite satisfactory filtration may be obtained by using the combined air-lift and perforated filter-box which is attached to the inside of the aquarium by means of rubber suction discs, this type of filter has certain drawbacks which soon become apparent to the busy and discerning aquarist. One is that it clogs up very quickly, and needs to be emptied of its contents and re-packed with cotton-wool or fine nylon fabric before it can be pressed



Filtering and pumping equipment in a large public aquarium
—the famous Shedd Aquarium in Chicago, U.S.A.

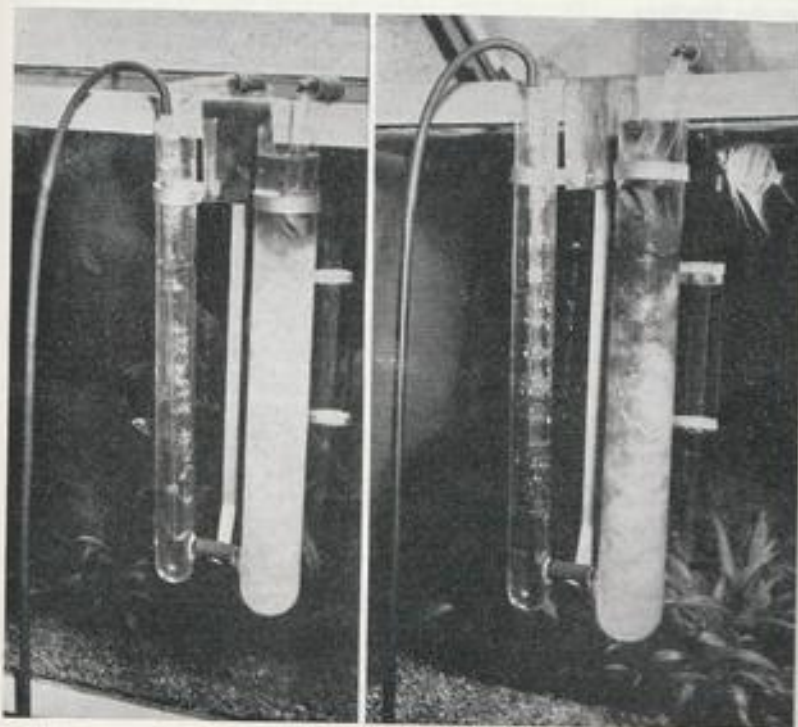
into service again; the other is that the intake-tube being, as it were, one-piece with the filter-box, the area cleaned tends to be limited to a few square inches around the mouth of the tube (air-lift), and is not spread over the whole area of the aquarium.

Perhaps one of the best methods of combined filtration and aeration to use is that which siphons dirty water from close to the floor of one end of the aquarium into a fairly deep plastic container (attached to the outside of the aquarium), and, after it has percolated through the filtering medium, emerges through an aperture in the bottom and is passed by the force of gravity along a horizontally-inclined tube to the opposite end of the tank, where an air-lift raises it above the surface and empties it back into the aquarium in a constantly spurting stream of purified and well-aerated water.

Such a filter may be fitted up in a very short time by any ingenious aquarist who has some odds and ends of glass and rubber tubing lying around, and a rudimentary knowledge of how an air-lift and siphon works; but the finished article may be bought all ready to attach to the side of the aquarium from those dealers who stock all the latest and best in aquarium appliances.

It is not necessary to keep such a contrivance working day in and day out. Experience has shown that it will clear a 15-gallon tank and freshen up the compost and plant-life overnight; that is while you are enjoying (or should be) a proper night's sleep. A short while after such a filter is

(Continued overpage)



This external filter (the "Glen Monarch") is packed with glass wool. The picture on the right was taken 10 hours after the first, and the dark area at the top of the tube indicates the amount of sediment trapped by the glass wool

set working, it is a good idea to rake over the compost with a stick to release particles of decaying matter which may be trapped between the gritty stones or buried below the surface by the swimming actions of the fish.

Although I have referred above to the filtering medium being composed of cotton-wool, pieces of nylon and the like, it is up to the aquarist himself to find the medium most suited to his own special requirements. For instance, some aquarists favour a layer of wood charcoal, topped by finely graded grit or sand, while others place their faith in neatly laid layers of pebbles, grit, sand, carbon, and animal or synthetic wool or close-woven fabric. A filter box containing a layer of peat is a useful thing to have, for the peat keeps the water slightly acid and gives it that attractive, slightly amberish appearance.

Personally speaking, I am not in favour of using glass-wool to pack a filter. For one thing, tiny splinters of glass soon work their way into one's hands, and I feel certain that hair-fine splinters of glass are not the best of things to have drifting about among one's fishes.

Another thing that the newcomer to aquarium-keeping must remember is not to use the above-mentioned method of filtration in a tank containing fry, or they will be sucked up by the siphon, and, after a hectic journey through the tubing, will be spewed out to die (if not already dead) from shock and multiple injuries, on the filter-bed. Then again, a scrupulously clean aquarium is not the ideal nursery for the majority of newly hatched fry, which grow more quickly when they can hunt the tiny living organisms which breed and exist among the rich brown sediment.

Newcomers to the hobby may wonder whether a small air-pump adds much to the electricity bill. The answer is definitely "no," for the amount of electricity consumed by the average pump is infinitesimal. In fact, such a pump may be kept running day in and day out for about a month or so before it consumes so much as one unit of electricity; and I feel sure that a few coppers added to the electricity account is well worth the increased pleasure to be gained from looking into cleaner tanks populated by brighter-looking fishes swimming among sediment-free plants.

TROPICAL FISH-KEEPERS' REFRESHER COURSE:

by Pisces

The Neon Tetra

(*Hyphessobrycon innesi* MYERS)



ORDER:—Ostariophysii, from Greek *ostarion*—a little bone, and Greek *physis*—a bladder.

FAMILY:—Characidae, from Greek *charax*—a sea fish.

SPECIES:—*Hyphessobrycon*, from *hyphe*—a little, and Greek *brycon*—tear in pieces, plus *innesi*, after the American author-aquarist, Wm. T. Innes, and Myers, the celebrated American ichthyologist who first described the fish.

I BELIEVE that no other tropical fish has ever made so great an impact upon the hobby as did the neon tetra when it was first introduced, a few years before the last war. No colour print, photograph, or painting can possibly convey the glowing colours of a healthy specimen. They have to be seen to be believed. Their beauty far transcends that of any other species I have ever seen. When placed in a community tank all eyes are drawn to them and them alone—the other occupants, as far as I and many others are concerned, simply do not exist. To attempt a verbal description is difficult, but in the absence of a coloured reproduction, is necessary.

Firstly, all colours glow with an iridescence of such intensity that they seem to be lighted from within the body walls of the fish. The back is a bluish-green, with an electric blue lateral stripe separating the upper from the lower half of the sides. The lower forward half of the sides is yellowish, and the rear portion intense red. All fins are almost completely transparent. A fully-grown specimen seldom exceeds a length of one-and-a-quarter inches, with a beautifully streamlined body which reaches its maximum depth at the beginning of the dorsal and pelvic fins.

It seems remarkable that such a perfect jewel should not have been discovered prior to 1936. The reason, however, lies in its habitat, which is in the heart of dense Brazilian and Peruvian forests, where daylight has difficulty in penetrating. Had not a Frenchman, M. Rabaut, ventured into these forests in search of orchids, they might have remained

undisturbed to this day. When natives showed some of the fishes to him, he realised at once that he had found an orchid among fish, and collected them to take back home. The results are well known—everyone went mad about the little creatures, and arrangements were made for thousands upon thousands of them to be imported into America.

Naturally enough, every aquarist wanted to breed them, but here the fishes had a say in the matter, and refused to co-operate in spite of everything done to coax them. Greater knowledge of their native home would, perhaps, have helped considerably. The water of the rivers in which they had been found in such numbers was soft and slightly acid. In addition, the rivers were dark, very little light penetrating the overhanging foliage.

To reproduce these conditions in home aquaria is troublesome, but not by any means impossible. Above all, the greatest precautions should be observed to prevent the development of bacteria in the breeding tank. Dim light and acidity are both anti-bacteria measures. Natural rather than chemically arranged acidity is desirable. This is most easily obtained with the use of baled peat in old rainwater or distilled water.

An old oak water butt is admirable to collect and store rain or distilled water. If at the bottom of the butt an eight inch layer of baled peat is placed and occasionally stirred—say, every two or three days, the water should acidify nicely. A tight lid is desirable to prevent the ingress of light and impurities from the air. This butt is a stock supply. Now let us consider preparing an aquarium for the breeding fishes.

The bigger the better is my motto for all aquaria, but a 24 ins. by 12 ins. by 12 ins. can be used in the absence of anything else. All-glass are preferable, presenting less cracks and breeding places for bacteria. Well scrub the glass—a detergent is useful to assist in this, but if used the aquarium must be very thoroughly rinsed to ensure that every vestige of the detergent is removed.

Gravel or well-boiled sand can be used as compost. To



A Fish out of Water

This 10-inch specimen of *Plecostomus plecostomus* pictured in the hand of Mr. W. C. Webley, was removed from its tank at the Nottingham A.S. Show this year and behaved perfectly for the photographer. Owned originally by Mr. H. P. Lynn, the Society's president, the catfish has been presented to the London Zoo Aquarium since the show. It was reared in captivity and is about three years old. Large quantities of blanket weed formed its diet and owing to the size of its suction disc some difficulty was met in taking it from the tank. The skin of this species in large specimens is hard and rough, described by Mr. Webley as "being similar to a crustacean to the touch".

Photo: "Guardian Journal"



remove any lime there may be in the sand or gravel a little hydrochloric acid should be added. When it stops fizzing add more. If no further fizzing is noticed the sand is lime-free. Further thorough washing to get rid of the acid is necessary. When using the acid, care must be taken not to spill any on clothes, furniture, or fingers.

The aquarium can be filled to a depth of six inches with soft water—a domestic water softener is excellent for this part of the operation, and the balance procured from the stock peat-water. To minimise the introduction of solid matter it can be poured through a filter of bolting cloth or passed through a glass funnel containing filter paper (obtainable from any chemist). The final acidity should be pH 6.5. For testing this a buffer solution set is better than pH papers.

Disinfecting the Plants

Plants must all be disinfected before introduction to the aquarium. For this prepare a solution of alum—a tablespoon to a gallon of water—and soak the plants in it for five minutes—then rinse thoroughly in cold, boiled water. Most favoured plants are *Fontinalis* and *Myriophyllum*. Plant thickly, to reduce the amount of light entering the aquarium. The temperature of the water should be very near 73° F. for breeding purposes—not high, by any means, for "tropical" fishes.

If you have already secured your potential breeders they must be conditioned to the water of the breeding tank gradually. Too sudden a change—from pH 8 to 6.5 will kill them; too sudden a change from hard water to soft will do them no good. In fact, I have seen it stated that neons raised in hard water will not breed even if placed in soft. I do not know whether or not this is an accurate statement—certainly if the change is too much for them and they die as a result of it, of course they will not breed.

Discretion being the better part of valour, spread the change over a matter of two or three weeks. If your fishes are from six to nine months of age, they should soon be mature enough to breed. Sexing is comparatively easy when both sexes are ripe, for the females are noticeably plumper than the males, and may show deeper colour on

their ventral surfaces. Their readiness to spawn will be shown by the increased interest of the males in their opposite numbers. Feed liberally with small live foods such as smaller *Daphnia*, micro worms, new-hatched gnat larvae, etc. Then net them out and place them carefully in the breeding aquarium.

In the normal way they will spawn in a matter of days—sometimes hours. The eggs are adhesive, and will remain on the plants. Spawning complete, remove the parents and either completely cover the aquarium so that it is in total darkness or reduce the light considerably. The eggs will hatch in from 36 to 48 hours. The fry are among the smallest known to aquarists, and may easily be completely overlooked, particularly as they love to get down among the *Fontinalis* and hide themselves for several days at a time.

Food should not be introduced until four days after hatching, and then only a little at a time. The smallest of infusorians can be eaten, but the fry themselves and their mouths and stomachs are tiny, unable to contain much food at one feed. Uneaten food will soon perish and start undesirable harvests of bacteria or general pollution.

At a fortnight old, the first faint colour will develop in the fry—a pale pink, heralding the intense red of the lower rear of the body. This will be followed by the blue-green and the electric blue line. It will be a couple of months, or more before they are large enough to be called fishes, but their brilliant colouring will render them easily seen some time before—if not as fish, as brilliant illuminations.

Neons should never be included in any show in a mixed characin class. In such cases, their less brightly coloured relatives do not stand an earthly. With a dozen or so entries in a special neon class the judge can really compare one specimen with another, and come to some decision regarding their respective merits. The tendency to fade colours under show conditions is nothing like so developed in neons as in many other characins.

They still look best, of course, in a brilliantly lit aquarium against a background of immaculate plants, but fish always kept in such conditions cannot be expected to breed.

Naked and Unashamed *In defence of the angle-iron aquarium*

by J. FRANCIS

LAST month the Editor of *The Aquarist* had some pretty strong words to say about the unadorned aquarium within the home. Although agreeing with him in principle, I think it is going too far to suggest that the rectangular angle-iron tank never readily forms part of a room decor unless it is concealed in some way. That's why I've called these notes "naked and unashamed."

A very good place for the aquarium is within the loose lattice screens used so often in contemporary room design, making an open division to separate part of a room from the main part. In a drawing I have tried to show one way in which the aquarium can play its part here. The shelf-providing screen is of quite light construction, extending right up to the ceiling, but the boxed-in base to the aquarium conceals a support of much stronger design. No attempt to conceal the aquarium frame is made, neither is this necessary here. Unless the mistake of painting it in some



(Above) An aquarium forms a solid basis for an open rectangular screen used as a support for cacti, climbing plants and light ornaments. Woodwork and tank frame are all painted the same light colour



(Left) Two aquaria placed one above the other on an angle-iron frame used also to provide shelves and potted plant supports. The stand is placed at right-angles to a wall to make a small alcove behind it in one corner of a room



(Right) For a dark corner—an aquarium on a wall shelf can be lighted by external contemporary lighting fittings mounted on either side of it

is mounted on a shelf of the same dimensions, on the wall in a dark corner of a room or hall-way. Yet this can be most attractive, forming an illuminated picture with the cover lights over the tank, or as an alternative, lighted by two of the modern swivel lighting fixtures with bright shades, fitted on the wall one on either side of the aquarium.

dark or clamorous colour is made one is not aware of the tank's skeleton at all in these surroundings.

In case you think that such a screen is of use only in large rooms I have shown another framework used successfully in a small suburban living-room. Here a special angle-iron frame was made to carry two 24 ins. aquaria with shelf space in between, and it was placed at right angles to a wall. Behind it is concealed an office desk which is continually used by the man of the house. Whilst at work at his desk he and untidy papers are apart from the rest of the room, yet not isolated in the way he would be if working in a separate small room.

Completely naked and unashamed is the aquarium that

As hinted above, tank and support colours are all-important if "fitting-in" is to be achieved. If painted the same shade as the nearest wall the effect is usually quite good. It will be noted from the drawings that potted plants and cacti play their parts as well. They will be found to blend most happily with the aquarium, and if you have not yet investigated the large number of potted ivy-type climbers available for indoor use then do so now, and let your friends know which you will be pleased to receive from them at Christmas this year.

Spirostomum — an Aquarium Visitant

by EDWARD LINDEMANN

Photographs by the author

OF all the long, broad, round, flat, bulky, every-shaped tribe of primitive animals called Protozoa, *Spirostomum* is among the less known, less heard of. School and college biology books usually specialise in *Amoeba* and *Paramecium*, leaving most of the fascinating protozoan world to be taken out of more obscure works (and out of ponds) by the nature lover himself. Here we'll try to remedy that a little and present a bit of protoplasm that can be called spiral-mouth. That name is translated directly from its Greek one, for it has no common name in English. Yet it's such an interesting creature that it surely deserves one.

At least six species of *Spirostomum* are known, and they seem to be distributed pretty generally, appearing in certain ponds during warm weather. Here we'll inspect *Spirostomum ambiguum*, since it's "a protozoan you can get your hands on," as one biologist put it. That almost isn't a joke, for this species is sometimes a good three millimetres long, quite large for a one-celled animal. It's easily visible in a jar of water, looking like a bit of white thread. *S. ambiguum* can be studied to a certain extent even with a magnifier of only ten or twelve power, though of course a microscope is best.

Spirostomum ambiguum has a long body covered entirely with cilia, or small hair-like "oars"; a long mouth extending along the body and spiralling at its end; and a single vacuole, or surplus-water expeller, at the rear end. Its nucleus is rather special. One is tempted to call the nucleus of a one-celled animal a brain-womb-stomach, so important a part does it play in various vital processes. When its nucleus is removed by microsurgery, a protozoan can no longer digest, grow or reproduce, and soon dies. On the



Spirostomum ambiguum, slightly flattened by glass pressure. In centre and at top, three show vacuoles clearly. Dark granules are food balls. Living animals photographed at 1/100 second

November, 1955

The simple animal described in this article is one which occasionally appears in aquaria, particularly those polluted by excess food. The appearance of the tiny white "threads" on the glass and in the water is a sure indication that all is not well in a tank, but *Spirostomum* itself does no harm and as shown here is an organism of special interest.



The vacuole canal of *Spirostomum*, running from the vacuole (at bottom), just beginning to fill, almost to the front end of the animal. Living cell

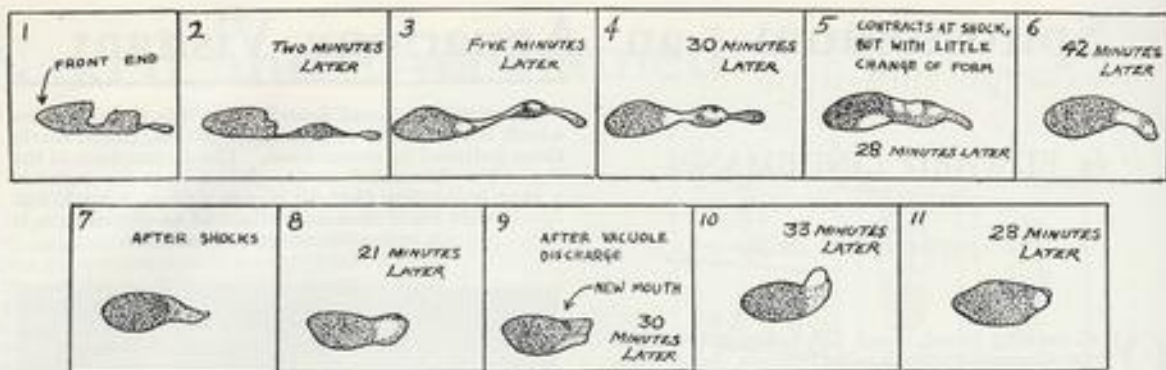
whole, the larger the cell, the more nuclear material seems to be needed to control its chemical and physical processes; some animals, such as flatworms and rotifers, have just continuous masses of protoplasm without cell walls, but have nuclei scattered throughout these masses.

In *Spirostomum* the nucleus takes the form of a string of beads—up to as many as fifty little oval lumps of nuclear material attached one to another, usually running almost



These living *Spirostomum* are contracted. The long nucleus is seen clearly in the one at left, looking like a string of beads. The centre animal has a slight hump and ridge on its right side; this is the spiral mouth

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the entire length of the animal. This is sometimes a little difficult to see in living specimens, though with careful adjustment of the microscope mirror it stands out clearly. Each "bead" is joined to the next one by a short neck called a commissure.

The body is smooth and blunt-ended, somewhat suggesting a straight frankfurter in shape, and transparent yellow-tan in colour. The cell membrane, corresponding to our skin, is not ideally flexible—it can be seen crinkling like stiff wrapping paper when the organism makes a sharp turn. Round globules containing fat or ingested bacteria are seen here and there throughout the body.

Spirostomum swims very smoothly, usually spiralling its long body to the left. The least impediment, or even a slight jar, sends it into reverse, and then forward in a new direction. A slightly stronger jar, as from tapping the microscope slide, will cause it to contract sharply into an oval shape—the word "wincing" comes to mind as one observes this. The contractions are made possible by muscle-like fibres just below the outer membrane; these run the length of the body. During contraction the protoplasm twists along the animal's length, so that the vacuole canal normally seen straight along its "top" side may become a spiral around its body—an effect that should not be confused with the normally spiralled mouth.

Irritating chemicals cause the same reaction, and in their presence the animal may contract so often that it almost seems to vibrate. *Spirostomum* is very sensitive to foreign chemicals in its water; it will be killed, for instance, by methylene blue, a dye which stains other Protozoa without stopping their life processes. A poisonous chemical will generally cause the body to burst, and the protoplasm, food, fat globules and long nucleus will emerge. Yet such is the persistence of life on this low scale of organisation that though a mere fragment of the outer membrane remains, its cilia will keep churning away for some time as if nothing had happened. One can see a similar persistence of ciliary motion in fragments of other low-level animals—in the jellyfish, for example, and in the gills of mussels.

The cilia, as so often in Protozoa, serve two functions—propulsion and feeding—for a specialised group of cilia fused into broad paddles, the membranelles, border the long mouth and sweep food particles into it. The cilia are hardly visible by 100 times magnification, and their motion is usually more indicated than seen, by the swirling of debris and bacteria that they cause along the animal's side. The cilia might be roughly compared, for relative size, to the coat of fur on a cat, but their relative number is considerably fewer than a cat's hairs. The electron microscope shows that a single cilium is about five microns long—that's five one-thousandths of a millimetre—and less than one micron thick. Yet each cilium itself is made up of bundles of threads called fibrils, that are much thinner.

Diagrams 1 to 11 show regeneration of *Spirostomum ambiguum*. Times between separate observations are given. The animal restores its body's width before regaining its original length

A protozoan's vacuole was originally believed to be an outlet purely for the waste chemicals of its metabolism. This view is no longer widely held. Protozoan's bodies become over-filled with water—it comes in with food particles and it enters by osmosis through the outer surface because there is ordinarily a higher concentration of salts and other chemicals within a freshwater protozoan's body than in the water surrounding it. Though *Spirostomum* does eject some urea from its vacuole, the principal substance which leaves its body in this way is surplus water.

The vacuole occupies the entire tail end; its appearance is like that of an elongated bubble—that is, when full. As one watches, the bubble gradually becomes larger and tighter, then suddenly disappears, leaving a three-sided collapsed bag of protoplasm. This tail portion around the vacuole appears to have a cohesion that the rest of the animal's "skin" doesn't possess, for in some experimental work I've several times observed a *Spirostomum* tail-part detach and swim away as a unit while the rest of the animal disintegrated completely from a chemical—in one case ordinary sugar, in another case beef liver blood—added to its water.

One end of the vacuole is joined to a canal that runs straight through the body almost to the front end. After the vacuole's collapse water trickles to the rear through the canal, the bag gradually fills up, looks more and more like a bubble again, and there is another eerily silent collapse. The water is released through a weak spot at the rear of the vacuole, and this spot serves also as an anus. The time between the water excretions apparently varies according to size and activity of the animal, and the chemical state of the water; one zoologist, Ann Bishop, found that excretions generally occurred every seven to ten minutes.

Bacteria and Protozoa form the food of *Spirostomum*. On rare occasions a large protozoan is taken in, but mostly they are the smallest types. The food is swept into the groove leading to the mouth and, once inside, is formed into balls. These may be green, pink or other colours, depending on the type of food eaten; brown seems to be a very usual colour. The sphere passes up toward the animal's head region on one side of the body and down toward the tail on the other side, being gradually digested. The undigested portions slow up toward the tail end and are ejected through the anal spot one at a time. Experiments with powdered carmine and India ink show an interesting variation in this process. These substances are swept into the mouth and form balls of the material, but since they have no food value, they make no circuit of the

body. The balls move directly from the mouth back to the anus and are expelled. Hard-boiled egg yolk, and also raw milk have been fed to spirostoma and were observed to pass directly to the rear like the carmine, apparently being indigestible to the animal. This short-circuiting thus serves a very useful experimental purpose in testing *Spirostomum's* need for or independence of various chemicals.

To reproduce, the animal becomes pinched near the middle and gradually pulls itself into two shorter pieces, each of which is thereafter an individual. This process of fission is, on the whole, the reproductive method of all Protozoa, though details vary. More than eight hours before the final break, *Spirostomum* begins to form a second mouth behind the original one, the membranelles or food catching cilia appearing first. Like the untrained fingers of a baby, these lack smooth co-ordination in the beginning. The nucleus loses its beadlike form and contracts toward the front of the animal for a time. Then it moves to the middle as an oval lump and finally begins to stretch out again to full length. Toward the end of this process the body's constriction begins, a second vacuole forms and soon there are two spirostoma where one was before. The twisting and thinning and final snap of the connecting strand are dramatic to watch. The ends may show a point of protoplasm after the break, but this rounds out in a few minutes.

Like most Protozoa and many worms and other low-level forms of life, *Spirostomum* regenerates remarkably, and this power is, in essence, at the root of reproduction. B. Sokoloff has shown that if some nucleus is included, pieces as small as one-sixty-ninth of the total length will grow again into a normal animal! I found it particularly interesting to observe the regeneration shown in the accompanying set of drawings. (No internal structures except the vacuole are shown.) The *Spirostomum* had been partially destroyed by letting it dry out somewhat at the edge of a water drop; a form resulted which consisted of three pieces of protoplasm connected by thin strands. In the course of about four hours this restored itself to an animal that was normal except that it had not yet grown to full length. Separate vacuoles developed in the first and second lumps of protoplasm, but not in the third; probably

no nucleus had been left in the third piece. It seems likely that a separation of the nucleus into two pieces was responsible for the two separate vacuoles. These merged later on.

From time to time spirostoma strengthen their life processes and particularly their reproductive ability by conjugating. They stop eating and two will attach firmly to each other on the mouth sides. They remain this way for two or three days while complicated changes take place in the nucleus and the smaller micronuclei. Then they separate and begin dividing rapidly again. Thus we can see the beginnings of sex even on this elementary life level.

Occasionally the animals can be seen congregated in clumps of two or many more, often with one group of ends together and their other ends floating freely, giving the total effect of a flower with half-open petals. Presently they separate slowly; but in some cases, without any apparent outside stimulus they all contract simultaneously—it makes one think of a small explosion—and swim off. There is reason to think that this temporary massing together is part of the process leading up to conjugation.

Spirostomum of course needs a water environment that suits its chemical pattern. The natural habitat is slime on pond bottoms, rich in hydrogen sulphide from decaying vegetation, and the water above it. Only certain ponds, particularly those with slow inlet and outlet, have these conditions. In this ooze the spirostoma cluster densely, giving off ammonia into the water, as zoologist Heinz Specht showed, and using very little oxygen. If kept reasonably warm they will usually live a long time in jars, where they tend to distribute themselves evenly through the water. A little fresh cow manure, timothy hay and wheat in water have been recommended for highly productive *Spirostomum* cultures. I've had fair to good success with using simply pond ooze in water and giving occasional small feedings of commercial wheat germ; it appears to be best to allow the wheat germ to decompose on top of the water rather than sink to the bottom.

Spirostomum is most certainly worth collecting and cultivating, for it's not only one of the most interesting of the Protozoa, but its large size, contractibility and full transparency make it easy to handle, whether for serious investigation or casual relaxation with the microscope.



World's Largest All-glass Tank for American Aquarium

The American Pittsburgh Plate Glass Company has recently designed and built this nine feet long and 540 gallons capacity glass tank for the Detroit Municipal Aquarium. It is "the largest, free-standing, all-glass tank" ever built; unique in material, design and construction. The sides and the bottom of the tank are connected by brass rods, and the tank is any time as strong as any other tank of similar size and shape. Its occupant in the photograph is for purposes of size comparison only!

British Aquarists



2ND. *Aquaria and fishes in the Belle Vue (Manchester) A.S. entry were arranged around this giant crown upon its plush cushion. This design gained second award*

PHOTOGRAPHS on these pages show the three winning entries in the artistic display class (Class 3) at last month's British Aquarists' Festival held at Belle Vue, Manchester, together with other meritorious entries. The standard of presentation in this class was high from all competing societies, and it is a pity that space does not allow all the ingenious ideas to be pictured here. Bury Aquarists' Society's lagoon scene was awarded the Hammond Trophy, and with this went *The Aquarist's* cash prize of £25: second award went to Belle Vue (Manchester) Aquarists' Society (£15) and Wombwell and District Aquarists' Society's entry won the third award of

£10 cash. Results in other classes were as follows:—

Classes 1a and 1b—Silver Challenge Trophy for best furnished aquarium, presented by Messrs. Cassons, Sons & Co. Ltd. 1—Leeds and District A.S. (83 pts.). 2—City of Salford A.S. (81 pts.). 3—Belle Vue (Manchester) A.S. (79 pts.).

Class 2—Challenge Trophy for best six pairs of fishes, presented by St. Martin's Aquaria. 1—Burnley A.S. (479 pts.). 2—Leeds and District A.S. (475 pts.). 3—Swinton and District A.S. (473 pts.).

Class 4—Challenge Trophy for the best complete display presented by the Federation of Northern Aquarium Societies. 1—Belle Vue (Manchester) A.S. (636 pts.). 2—Bury A.S. (622 pts.). 3—Leeds and District A.S. (618 pts.).

Class 5—Challenge Cup for best pair of livebearers, presented by Mr. A. Fraser-Brunner. 1—Mr. F. Dayton (Burnley). 2—Mr. L. Jowett (Swinton). 3—Mr. J. Hodgetts (Burnley) and Mr. C. Graham (Leeds).

Class 6—Challenge Cup for best pair of coldwater fishes, presented by Belle Vue (Manchester) Ltd. 1—Mr. H. Smith (Accrington). 2—Mr. J. Williamson (Salford).

Class 7—Challenge Trophy for best pair of cichlids, presented by the



1ST. *Bury A.S. formed a lagoon scene with windows beneath the water. This design won the Hammond Trophy and*



160

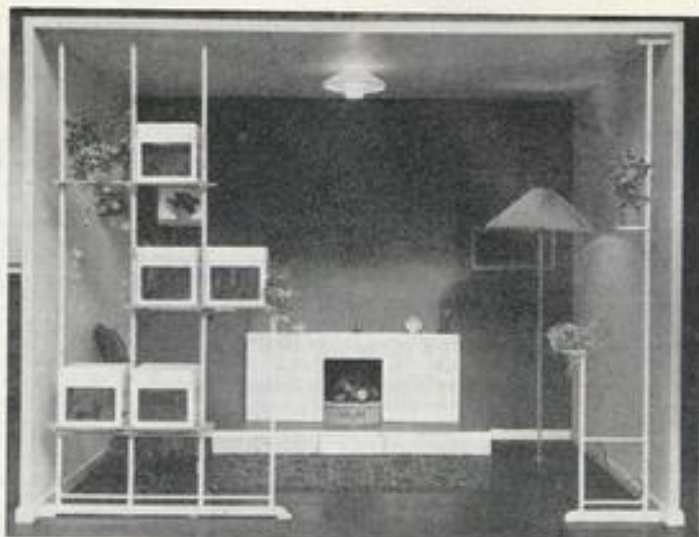


The highly original "T.V." entry made by Swinton and District A.S. (left) greatly impressed Mr. Philip Dee, T.V. aquarist, who visited the B.A.F. and who is seen in front of "The Aquarist's" stand (nearest camera) in the picture above. Mr. Dee donated a special consolation prize of £5 to the Swinton Society

ies' Festival 1955



salagoon scene with the aquaria acting as set. This winning entry brought the award of "The Aquarist's" cash prize of £25



3RD. This glimpse into a living room furnished in contemporary style with aquaria forming a screen and also built into the wall was the work of Wombwell and District A.S.

National Aquarists' Society. 1—Mr. G. Iles (Belle Vue). 2—Mr. D. M. Crowther (Dewsbury). 3—Mrs. A. Ledger (Stretford) and Mr. J. Williamson (Salford).

Class 8.—Challenge Trophy for best pair of labyrinth fishes, presented by the F.N.A.S. 1 and 2—Mr. W. New (Macclesfield). 3—Mr. H. Oldroyd (Dewsbury).

Class 9.—Challenge Trophy for best pair of fighting fish, presented by Mr. A. J. Bland. 1—Mr. F. L. Hoyle (Swinton). 2—Mr. A. Bray (Leeds). 3—Mr. D. Baldry (Accrington).

Class 10.—Challenge Cup for best pair of *Barbus* species, presented by The Aquarist. 1—Mr. T. Meneally (Burnley). 2—Mr. R. W. Bosman (Leeds). 3—Mr. A. T. Johnson (Swinton).

Class 11.—Challenge Trophy for best pair of characins, presented by East Lancs. A.S. 1—Mr. B. Cheshire (Belle Vue). 2—Mr. J. Hodgett (Burnley). 3—Mr. F. Taylor (Burnley).

Class 12.—Challenge Trophy for a.o.v. tropical fish pair, presented by the F.N.A.S. 1—Mr. J. Boldis (Leeds). 2—Mr. C. Hammond (Doncaster). 3—Mr. N. J. Boardman (Belle Vue).

The Aquarist's award cards were presented in all the above classes. Additional awards were for the best guppy

(Guppy Breeders' Society Trophy awarded to Mr. A. Wardle) and the best angel fish (Whitwell and Smykala Trophy awarded to Mr. A. Ledger). The Daily Dispatch Challenge Trophy for the best fish of the show, presented by Kemsley Newspapers Ltd., was awarded to Mr. F. L. Hoyle.

Judges of the artistic display class (3) were Miss Sally Jay (Play Producer, Manchester Theatres); Mr. and Mrs. G. K. Lean (Store Window Display Organiser and well-known northern artist). Other entries were judged by Messrs. A. Boarder (London); H. Loder (Burnley); W. L. Mandeville (Birmingham) and C. D. Roe (Shirley).

A lean-to fish-house (right) provided a novel staging for the presentation of entries from Doncaster Naturalist Society members. It had a realistic air of being a house in everyday use

A "mermaid" was one of the B.A.F.'s added attractions, and she is seen below in her rocky cave keeping abreast of aquarium news by reading "The Aquarist"



Microscopy for the Aquarist—14 by C. E. C. COLE

MOST microscopists have a great deal to say upon the subject of illumination, and, indeed, it is a most important matter—one which can hardly be over-rated. Yet so far I have merely touched upon the fringes of it—a procedure which will undoubtedly be frowned upon by many experts.

I make no apology, however, for although I agree that if things are done correctly from the very beginning, their proper performance becomes a habit, the object of this series of articles is primarily to stimulate and afterwards foster and maintain interest in microscopy from the aquarists' point of view. To serve up a mixture of theory and practice is, in my opinion, a better way of doing this than by writing nothing but theory month after month.

I have told you sufficient to get you started—you have been introduced to and have probably acquired sufficient apparatus to enable you to examine a large selection of the macroscopic neighbours of our tropical and coldwater fishes. You can do this much without any further explanation from me, and learn a great deal about their structure and ways of living. But there are limitations to the amount that can be discovered if you stop here. If progress is to be made, another small dose of theory must be administered, and its practical application explained.

First let me recapitulate for a moment. Refer to article 8 (*The Aquarist*, May 1955). In this I advised you to "see that the concave side of the sub-stage mirror is uppermost, and tilt this towards the light—a window, an electric torch, or the electric light of your room. Move it backwards and forwards until a shaft of light is seen to illumine the water."

You may have already discovered that even though the light illuminates the water, it fails to enter the front lens of the objective, causing the field surrounding the specimen being examined to remain very dull. Should this be the case, move the mirror first one way and then the other, until the field becomes bright. You should, of course, do this while looking through the eyepiece.

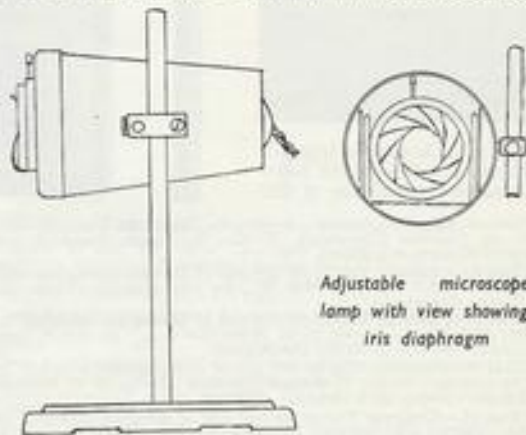
While focusing in the normal manner, watch the image of the object. Does it grow plainer and then fainter as you pass through the focus, without any apparent movement in any direction? It should do. If it does not, the light is not being directed correctly up the body tube. It is coming from an angle. If now the mirror is rotated slowly with the object slightly out of focus, the unfocused image will appear to move in a small circle. Re-focus and adjust mirror so that defocusing will result merely in the image becoming fainter.

Daylight Illumination

Quite a lot of our study may be undertaken during daylight hours, using daylight as an illuminant. For low-power work, this is usually satisfactory, if there are plenty of large, white, bright, clouds about. Too often, however, particularly in the autumn and winter, the light is extremely poor. Moreover, bars of window frames, and curtains interfere with its free use, and we are severely restricted as to where we can place the microscope—it just has to be on a table by the window—frequently the coldest portion of the room. Discomfort cools our enthusiasm and distracts our attention. Finally, the ideal calls for concentration of all light on the specimen, and a complete absence of it elsewhere, and in daylight this ideal can never be attained.

Actually, what we want is a portable, controllable white cloud from the northern sky. This is impossible to procure—we must be content with one of the many lamps manufactured by reputable firms—at reasonable prices—especially for the use of microscopists.

The most practical for our present purposes are those which consist of a pillar arising from a heavy metal base. The pillar holds a lamphouse which can be moved up and down, and tilted at almost any angle. On the front of the lamphouse is fixed an iris diaphragm and a filter holder. The iris diaphragm controls the amount of light emitted from the lamp, or, more accurately, the size of the light source. The filter holder is there if we desire to use ground glass or coloured filters—to change the nature and effect of the light rays. Generally, the lamp is a pearl or



Adjustable microscope lamp with view showing iris diaphragm

opal one, giving a more diffused light than a clear glass bulb would do.

How to use such a lamp in order to obtain the maximum benefit from its purchase will be more fully discussed next month. One benefit not stressed by manufacturers is that it can be used in the same room as your television set without disturbing those watching the programme by the emission of too much illumination. In these days of restricted coal that may be of real value, saving a fire in another room.

Daphnia

A friend purchased some *Daphnia* from a shop and when he used them nearly all his fishes died. He said that the water fleas appeared to have a brown coating over them. Can you explain this?

Regarding your friend's experience with *Daphnia* it is probable that those he purchased were attacked by a parasitic fungus, in which case the *Daphnia* were either very old or from a very foul source. I do not know whether the fungus was wholly responsible for the death of your friend's fishes, but may have contributed to it. It is always wisest to rinse *Daphnia* in clean water before feeding them to fishes. This is easily done if they are poured into a fine mesh net and swirled round and round in a bowl of clean water. This procedure will lessen the risk of trouble, and is well worth while.

THE Madras Government has decided to revive the old aquarium for inland fisheries under the Second Five-Year Plan. A site on the foreshore opposite the Senate House has been approved for the location of the aquarium.

AQUARIST'S Notebook



by
RAYMOND YATES

BREEDING hints and tips from established breeders are always in demand from hobbyists. A few years ago the Federation of Northern Aquarium Societies made a concerted effort to obtain reliable data for the use of member clubs by sending out a questionnaire to some of the prizewinners at the first British Aquarists' Festival, which had been held previously at Belle Vue Zoological Gardens, Manchester. The results were issued in printed form on card folders, free to members of clubs affiliated to the F.N.A.S. and at a charge of sixpence to others. This was a brilliant idea, the more so because really exhaustive data were given, not the sketchy variety which one so often finds which leaves one little the wiser. The fishes dealt with were quite a cross section of the hobby and included *Aphyosemion bivittatum*, *A. australe*, angels, *Badis*, *Apistogramma ramirezi*, *Hyphessobrycon serpaie*, *Callichthys*, glow lights, *lineatus* and sunfish to mention a few. The data given covered a wide field and included information on best breeding age, size at this age, types of food used, favourite food, size of breeding tank, type of lighting and intensity, type of heating and temperature, aeration, tank set-up for fish in question, pH of water, hardness, source of water supply, spawning action, estimated number of eggs, incubation period, time following hatching to fry becoming free-swimming, first food requirements, results of rearings and number of rearings, proportion of males to females, any other data and sexing methods. From the above it will be seen that a clear picture can be obtained of what really experienced aquarists have encountered in breeding a certain variety. The F.N.A.S. idea could well be followed up by other associations or individual clubs with other fish, in other parts of Britain.

What is your pet extravagance in the hobby? I suppose most aquarists would answer that it was fishes, or plants, or more tanks. One could get everybody talking on this topic at a club night. Probably it depends a great deal on the age of the aquarist, and how long he has been in the hobby. For my part my main extravagance in the hobby is travel. I like travelling, and with the time to do it within limitations, I get around visiting new places, poking my nose into dealers' shops in all sorts of odd places and looking in at shows, clubs and public aquaria wherever I can find them. Another extravagance is aquarium magazines—I get most of those published in English, so that the postman seems to bring something almost every day. Books too, are a weakness, and I find I have something over 40 books on the hobby in its various phases, quite apart from dozens of booklets and pamphlets. Other weaknesses are using a lot of light on tanks (electric), aeration to excess and, last but not least, giving far too much time to the hobby. This last is probably general. I know quite a few aquarists who seem to spend almost all their free time with their fishes—perhaps one day we shall talk of "fish widows" in the same way as "golf widows" are referred to to-day.

Complaints have reached me recently from aquarists who have received lists from certain dealers listing a number of rare and unusual fishes at very reasonable prices indeed. They have been asked, when ordering by post, to state alternative choices if the fishes desired are out of stock. In every case the fishes desired have been out of stock and the much more common alternatives have been sent instead. The fancier suspects, quite naturally, that the rare varieties never were in stock and were a mere bait to get his custom. However that may be, hobbyists and small dealers buying fishes from lists may consider it wiser to state no alternatives; I know one dealer who sent off an

order in this way marked "Definitely no alternatives." He did not get the fishes which had been advertised and his money was not returned until four months later following protracted correspondence. This does not mean that there are not many reputable dealers with bargains to offer, there are; but there are also a few who are not so particular in their methods. The aquarist is well advised to make enquiries from other aquarists and club members about distant dealers—in this way he will get many recommendations and also learn who to avoid.

Dealers themselves have many troubles in this line, because they would naturally like to import many fishes direct. The difficulty is that the most reliable export firms abroad are not interested in small orders and those that are may prove to be very doubtful organisations indeed. A few dealers in Britain manage to import fishes from abroad privately but the great majority buy their imported fishes through two or three main importers who buy in large quantities. The word goes round, the telephones ring, and the dealers rush round with their vans to pick up what they want when a consignment comes in. It is a good thing for the hobby that this method obtains because otherwise few of the rarer types of fishes could ever be offered.

One of the foremost marine aquarists in the country is Mr. L. R. Brightwell of Sussex, perhaps the most well-known name to older readers of *The Aquarist*, for he had been contributing articles far longer than any other writer. Apart from his numerous books and magazine articles he is also quite famous for his really delightful sketches, which range from aquatic and marine life to amusing incidents at the zoo. Many of his posters have appeared at large public aquaria and they always command attention. He tells me that great efforts are now being made to purchase (£3,000) a site at Newhaven, the few experts who have seen it regarding it as ideal, for a much needed Marine Biological Station near London. Mr. Brightwell has been advised to get together, provisionally, a council of six scientists to control the laboratory. Fresh sea water is assured, on tap, and trawlers land right on the doorstep as one might say. It is only a question of raising the money and that should not be impossible. Mr. Brightwell will be pleased to hear from anyone interested in this project or in a position to support the movement. His address is 1, Edith Avenue, Peacchaven, Sussex.

About thirty years ago I began to study the Spanish language and I have never lost my interest in this most beautiful of all European tongues. It was, therefore, with added interest that I recently came across an aquarium magazine in this language. This was *Aquario*, issued bi-monthly in Havana, Cuba, and circulating all over Latin America. This is now in its third year of issue so it is quite well established. It contains roughly 25 pages of reading matter and a further ten pages of advertisements, with a coloured cover. An idea of the material contained therein can be gauged from the following list of contents from a back issue—Editorial, Rosy Barbs, Local fish of Cuba *Limnophila (Ambulia)*, Cuban official comments on the magazine, Catching local fish, Fish diseases, Marine fish (*Pomacentrus*), How to hatch Brine Shrimp, *Gammarus* through the lens, Green water, Congratulations to a

American firm of dealers, letters, reviews, questions and answers and so on. As might be expected, this market has been invaded by the American aquatic dealers and most of the equipment offered for sale originates in U.S.A. One is reminded that aquarists are the same everywhere by the questions asked, such as "Why do my fishes blow bubbles?" "Is new water bad for the fish,?" "Does 24 hours light affect the fish,?" "Is algae an oxygenator,?" "What is the best food for my fish,?" Language is no barrier to the hobby.

One of the troubles with most fish shows is the fact that they are rather dull to the lay visitor once the furnished tanks have been seen. The Portsmouth club introduced a new note at one of their shows with a tank which contained a bottle of a well-known beverage and the label "The best Bass in the show." Another tank full of dirty water held a lady's shoe. The label read "Sole and (H)eel—female . . . Don't let your tank get like this." Good work, Portsmouth. Other clubs could well follow this lead.

Some time ago I came across a grand aquarium book which was published way back in 1934 and is now some 21 years old. This was *Life and Love in the Aquarium* by C. H. Peters, published by the Empire Tropical Fish Import Co. of New York. It is very interesting reading through the pages of the past, and it is with something of a shock that one realises that some of the fish looked upon to-day as relatively rare and unusual were far from unknown then. This book is a real gem and deals very thoroughly with hundreds of different varieties of fish, many of which are quite unknown to-day to the average aquarist. It is true that one has to get used to many well-known fish being given unfamiliar names, but there are so many illustrations (85 full plates—25 coloured) that it is almost impossible to go far wrong. There is no doubt that this edition puts to shame many much more recent books on the hobby and if you get a chance to obtain a copy do not miss the opportunity. Printed in the usual excellent American method, it is just short of 400 pages. This copy was a second-hand one and came from a Peterborough bookseller, but it could still command a second-hand price of 25s, which is recommendation enough!

When one goes into a dealer's shop one hopes that some brand new importation will be on view or at least some species never previously seen. When this is the case the urge to buy one or even a couple is very great. Unless the fish in question are good specimens, in the best of health, it should be resisted. It is stupid to buy weak fish merely because you have never had the chance before. Remember, a fish which looks good at the dealer's will probably look good in your tank but a fish which looks sickly in the shop will look worse when you have transported it home. The fact that this variety is on view shows that some are about; you may get a much better "buy" if you curb your impatience for a week or two.

The keyhole cichlid (*Apistogramma maronii*) is quite a rarity although fairly hardy and easy to breed. It is very beautiful when young with its inverted V on the forehead and through the eyes, and its glowing colour. This fish is not a nuisance in a community tank and gets on very well with most tropicals. Naturally, it prefers live food and is always ready for a meal. Like young angels they do not always take kindly to new quarters, and some get a yellow fungoid covering from which they sicken and die within two days. Once used to a new tank they are very hardy. Even so they are rarely seen, which is very queer as most aquarists know a good fish when they see one. Perhaps it is because they are cichlids, which are not quite so fashionable nowadays as they were.

People who do not keep cichlids miss a lot of real pleasure.

Young Jack Dempsey are most attractive fish and quite safe in a community tank of fish of similar size. This fish has been wrong labelled as dangerous, whereas it is no more vicious than any other large cichlid. Young Dempsey cichlids are brilliantly coloured but nothing like the pattern of later life. If you get the chance try them out up to two inches in length.

Barbus filamentosa is now very popular and it is a fine barb. It grows rather quickly, is very active and eats anything. It prefers constant aeration however, and keeps near the top when aeration is off. I have not found them dangerous even with tiny fish such as *Rasbora maculata*. The price is still rather stiff. Very small specimens have the most colour, and only large four inch fish have the dorsal filaments. Well worth adding to your tanks.

Although macaroni is fairly well known its more diminutive relation vermicelli is rarely heard of nowadays. Thirty years ago this was one of the regular foods given for fish although its food value cannot be very high except in carbohydrates. It should be broken up very finely and allowed to soak for five minutes before being put in the aquarium. It is quite popular with most fish except those with strictly carnivorous tastes. I doubt if there is any cheaper food and your stock lasts indefinitely.

The competition angle within a club is usually restricted to table shows and the like. Recently, I came across a completely new idea which may appeal to some of the more go-ahead clubs. The idea comes from Canada and is being tried out at present by the Canadian Aquaria Society of Toronto. A challenge trophy has been presented to the club which consists of a chrome-plated ten gallon aquarium, canopy and stand. The donor (a local dealer) wished it to be used to encourage membership and to give members an added incentive to take a really active part in club matters. A contest is being run for the seven months period ending in December, 1955, which is open to all members of the club. The winner will be the one who has obtained the most points on the basis of the following points scheme:—

- | | | |
|---|----|-----------|
| 1. Attendance at monthly meetings | .. | 10 points |
| 2. Table show entries (per entry) | .. | 5 points |
| 3. Annual show entries (per entry) | .. | 10 points |
| 4. Articles written for club magazine— | | |
| if over one page | .. | 10 points |
| one page or less | .. | 5 points |
| 5. Cartoons drawn for club magazine | .. | 5 points |
| 6. Each new member obtained for the club | .. | 25 points |
| 7. Attendance as a worker at the annual show, | | |
| for each day or night | .. | 10 points |

Members of the committee are automatically excluded. Various modifications or additions could be made for clubs in England. I think it is well worth a trial.

A very fine set of 12 stamps depicting animals has been issued by Yugoslavia. These are extra-fine engravings and a joy to see. The whole set in used condition costs 5s. 6d. but only the three highest values are of interest to aquarists. These depict an eel, a salmon and a lizard. It is of interest to mention that although one might expect the names of the animals to be in Slavonic characters they are actually given their scientific names in Roman letters. Many countries issue stamps with a view to their sale to collectors—Yugoslavia will certainly succeed with these.

The plants which collect algae are mainly those with broad leaves such as *Sagittaria*, *Vallisneria*, *Cryptocoryne*, Amazon swords and the like. Hold the leaf flat on a piece of newspaper and run a damp nail brush along the leaf. Most of the algae can be removed this way without damaging the plant.

COLDWATER FISH-KEEPING QUERIES answered by A. BOARDER

I have a pond 12 feet long, 1 to 3 feet wide and 1 to 3 feet deep which is fed by water from the river. Although tench and carp survive for a long time goldfish have died off within a few weeks. There is a laurel bush and some ivy growing near the pond. Why do the goldfish die?

The ivy and the laurel may be the cause of the death of the goldfish, as poison can come from the leaves if they fall into the water. However, the other fish in the pond would also be likely to be affected although both tench and common carp can stand a water which is less pure than can goldfish. It may be that the goldfish were not very healthy when introduced to the pond. If the goldfish were quite healthy then there must be something wrong with the water and a check up should be made.

Can I breed goldfish and golden orfe in an indoor aquarium?

It is possible to breed goldfish in an indoor tank but I do not hold out much hope of success with golden orfe. To breed goldfish in an indoor tank it would be necessary either to remove the parent fish from the tank once the eggs are laid or else to remove some of the water plant with eggs adhering, to another vessel for hatching and rearing. It is almost certain that most of the eggs or fry would be eaten by the spawning fishes if left together. Golden orfe are not likely to breed in an indoor tank unless they are of a good size and the tank is large and well aerated. Orfe like a largish pond in which to breed and then will only do so as a rule if the water is very pure and well oxygenated.

What is your opinion of silver sand for the top of the compost in a set-up tank? I consider that it would be easier to siphon up the waste matter from this than from large gravel.

Fine sand is not usually put into tanks as it is said that the water plants cannot run their roots into it as easily as into coarser sand. I have an open mind about this question as I remember seeing some tropical tanks in which very fine sand was used and the plants were in excellent condition. I agree that it would be far easier to siphon up waste matter from fine sand; I think that a medium sand, not too coarse and not too fine, is the best for all purposes.

I have a batch of fry hatched in May. I have not used any heating. As winter approaches should I use any heat, if so what should I use in a tank 48 ins. by 15 ins. by 15 ins.? The depth of water is six inches at present; should I leave it shallow?

If you wish to keep the fry growing through the winter it is essential to use some form of heating. A 100 watt heater used during the night time should make a great deal of difference to the growth of the fish. A lot will depend on the position of the tank and the temperature of the room. You may not need a thermostat but by experimenting you can arrive at the correct time to leave the heater on each night. At a temperature of just over 50° F. the fry can eat and grow, but at 60° F. they will naturally grow much faster. I do not see that there is any immediate hurry to force the fry. As long as you can get them through the winter safely they will soon grow when the warmer times come. You should certainly increase the depth of the water now, and the tank can be filled.

Some time ago I transferred some platys and swordtails to my outdoor pond where they have thrived and grown much better than those in my tanks. My problem now is, will these fish survive the winter? The pond is 8 ft. long and 4 ft. wide, with a depth of 2 feet. Should I try to net the fish before the bad weather?

I quite understand the fact that your platys and swordtails have thrived in an outdoor pond this summer. I do not think that they will survive the winter, however, unless we get a very mild one. I found a pair of platys in my pond some years ago when I was breeding tropicals, and this was

Many queries from readers of "The Aquarist" are answered by post each month, all aspects of fish-keeping being covered. Not all queries and answers can be published, and a stamped self-addressed envelope should be sent so that a direct reply can be given.

at the end of October when the water had become fairly cold. I caught them and found them to be in perfect condition. Many of the tropicals could be kept in outdoor ponds for most of the summer months but should be taken inside near the last week in October. Once the temperature of the water drops below 50° F. most tropicals become dormant and sink to the bottom of the tank. Some will not stand this drop, even if gradual. Nearly all will turn on their sides at the bottom when the temperature drops to 45° F. and unless rescued will succumb.

I am considering using a galvanised tank to house some of my fish. Will this be safe or should I line it with slate?

When using some tap waters galvanised tanks can be dangerous to some fishes. You can paint the insides with a cement and fine sand wash, and when dry wash out. I have been using tanks treated in this manner for many years.

We have a large pond of approximately three acres in extent and about 50 feet deep which is used by our Angling Society. Practically all the fish which have been caught this season have been badly infested with fish lice. The fish are mainly tench, carp and roach. Each fish caught appears to have about 40 lice on it and some fish have been bleeding. What can be done about this?

This is a difficult problem as there is such a large volume of water concerned. Also argulids (fish lice), are so tough that most chemicals which would kill them would also kill the fish. In the first place it might be useful to try to find why the fish are in so bad a condition. I think that the pond water must be very foul and that the fish are overcrowded. It is probable that, like most anglers, your members return the fish they catch to the pond after having handled and kept them in a "keep net" for some time. When fish are handled with dry hands much of the protective mucous covering is sure to be removed from



Photo: J. French
Last month provided excellent weather for pond cleaning. Here a large pond on Barnes Common, near London, is seen being cleared of mud.

the fish. This leaves it a ready prey to the fish louse as it can more easily get a hold. When fish are kept in a keep net any lice can easily pass from one fish to another. Now, as to trying to get rid of the trouble. Once the fish became more healthy they may rid themselves of the lice and so my advice is to catch as many fish as possible and do not return one. Let all and sundry fish the waters so that the numbers are reduced considerably. The remaining fish will become much stronger and in time I think that you will find conditions improve. It seems to me that there are too many fish in the water for the amount of food there, and so by greatly lessening their numbers you will assist the return to good health of the fishes remaining and the lice may disappear. The lice lay their eggs on plants and stones and leave the fish for this purpose; also the young lice must swim to find a host. Minnows are supposed to eat the free swimming lice but if you have any pike or perch in the pond it is possible that the minnows would not survive long if introduced.

When I visited the National Aquarists' Show I saw some furnished tanks which had built-up rockery at the back and sides. How can this be made?

The rockery may be constructed in the following manner: Lay a sheet of glass on a firm base and have the glass the size to fit in the back of the tank. Lay a sheet of paper on the glass and spread a layer of concrete, made from one part cement to three parts sharp sand. Whilst still damp press small pieces of rockery stone into the concrete and form the pattern you require. Do the same with two other pieces of glass which fit into the ends, allowing for the

thickness of the back piece. After a couple of days the concrete parts can be removed from the glass and the paper peeled off. They should then be well soaked and washed to remove any free lime and they are then ready for use. Do not use too thick a layer of concrete or use too large pieces of stone or you will reduce the volume of water and swimming space inside the tank.

I have bought a good sized tank and have set it up according to the book but after a day or so the water goes cloudy. Where am I going wrong?

When a tank is first set up the water sometimes goes cloudy but may clear by itself. On the other hand a tank can cloud up as soon as set up if the sand has not been washed enough. All fine dusty particles must be washed out before use. The water should be run into the tank on a thin board so that the base is not disturbed. The plants should be clean. Where you may have gone wrong is that you may have fed too soon. Some people imagine that a goldfish will die over-night unless it is continually fed. This is quite wrong, as an ordinary healthy goldfish could go for several weeks without any artificial food at all and still remain healthy. When your tank is getting established and the fishes can be seen browsing about over the leaves of the water plants is the time to give a very little food. If this is taken eagerly a little more can be given. Always try to give a quantity which can be cleared up in a minute or so. It is better to do this and then give a little more after an interval of an hour or so than to try to give the whole day's feed at once. The fine uneaten food will cloud up a tank quicker than anything.

OUR EXPERTS' ANSWERS TO TROPICAL AQUARIUM QUERIES

I have been told that peat keeps the water on the acid side, and so is good for most of our tropical aquarium fishes. Please can you tell me how much peat would be needed to treat my 36 ins. by 15 ins. by 15 ins. tank?

If you intend to use peat as a subsoil in your aquarium, a layer about half an inch thick spread all over the bottom should give excellent results. Soak the peat thoroughly before spreading it over the bottom of the tank, and on top of the peat place not less than a two-inch thickness of coarse aquarium compost. If your aquarium is in a flourishing state, it seems a great pity to disturb it; so in that case fill several clean glass jars with ordinary tap water, and add about two tablespoonfuls of moistened peat to each one of them. Leave the peat to soak in the jars for about a week, after which strain the amber-tinted water through fine muslin or a piece of nylon stocking into the aquarium.

I have been informed that extra heat alone will cure white spot disease. Is this true?

We have always found that raising the temperature of the water by several degrees, and keeping it high for a week or two will eradicate white spot disease from a tank. But we hasten to add that heat alone will not cure white spot disease if it has been allowed to get a good grip on all the fishes in a tank. When treating fishes for white spot, it is a good plan to keep siphoning some of the water from the bottom of the tank every other day until all traces of the disease have vanished from the fins and bodies of the fish.

Would it be possible to breed a pair of *Barbus schuberti* in a tank measuring 16 ins. by 8 ins. by 8 ins.?

Your aquarium is on the small side, but the fish should spawn in it if given clear water, a good light, and a fairly thick growth of fine-foliaged plant life. After spawning is over, transfer the parent fish to another aquarium. The

eggs will hatch out within two days, and the fry become free-swimming two or three days later. If the spawning is a large one, some of the fry will have to be moved to another tank to make sure that all of them get the chance to develop properly and reach maturity.

Can you tell me how to breed fine red platys? The fish I breed never seem to grow very quickly, and the colour is not as vivid as I should like to see in the fish.

Give your parent fish plenty of swimming space in clear water not deeper than about eight inches. The light should be bright enough to encourage a good growth of algae, which the fish like to eat. In fact, green food is almost a necessity in their diet; if algae and fine-foliaged plant life is lacking in the aquarium, give the fish Bemax or some other proprietary cereal food at least three times every week. The fish should have several meals every day. The most nourishing food for them is chopped earthworm, scraped, washed raw liver, *Tubifex* worms and other small live food. If you have a tank of fry, keep them on the feed even when the days are short or dark by burning a thin light just above the surface of the water. The temperature of the water should not be too high. Between 70° and 73° F. is about right.

I have owned a tropical aquarium for the past three months, and everything has gone along very well. But the level of the water has fallen several inches through evaporation. What I should like to know is what sort of water should I introduce into the aquarium to bring the water up to its original level; that is to say, should I use fresh tap water warmed over a stove, or clean rain water collected outdoors?

Clean rain water collected in a glass or china vessel placed outdoors is quite suitable, but not rain water which has run off a freshly painted bitumen-on-felt roof, or corrugated iron roof, or through a dirty gutter. Ordinary tap water is as good as anything if it is left to stand outdoors for a day or two, then heated to the same temperature as the water in the aquarium.

our readers



write

Readers are invited to express their views and opinions on subjects of interest to aquarists. The Editor reserves the right to shorten letters when considered necessary and is not responsible for the opinions expressed by correspondents.

Address letters to The Editor, *The Aquarist*,
The Butts, Half Acre, Brentford, Middlesex

Earthing Aquaria

WITH your permission, I would like to correct the suggestion made in recent correspondence and, unfortunately, endorsed by your expert, that the body of water in a tank can be earthed by allowing an earthed lead wire to dip into it. This procedure will achieve very little, since in the event of an underwater fault only the water in the immediate vicinity of the lead wire will be reduced to zero voltage, the water near the fault remaining at mains voltage. In certain circumstances, e.g. earth-free situations (see below), such inefficient earthing might easily increase the danger.

A better method is to wrap the lead wire closely around all immersed components and cables. Even then, the resistance of the water will normally prevent the blowing of a fuse when a fault occurs, whereas a low fault resistance to earth is essential in a true earthed system, in order that protective devices such as fuses can fulfil their proper function. The statements I have made above are easily verifiable by experiment. It follows that an aquarium is much more difficult to earth than, say, an electric iron.

In my view, the recent correspondent who was concerned with the safety of his young child should concentrate on the following:—

1. Install the tank in an earth-free situation, i.e. avoiding stone, tile, concrete or damp floors, water and gas pipes and making sure that radio and other earth connections are well insulated. Socket outlets should all be of the shuttered kind. Any earth connections to the tank should be insulated and of the statutory size.
2. Use an all-over glass cover and enclose the whole tank including canopy with a wooden cabinet which will effectively prevent access to all metal. The point of the glass is to prevent condensation which may produce a dangerous situation when forming inside a metal light canopy. It is better, in fact, to use a wooden light canopy or build it into the tank cabinet.

One correspondent recommends soldering a lead wire to the tank frame: should the frame be of angle iron I fear that he will find this extremely difficult.

C. W. THOMAS, Faversham, Kent.

YOUR contributor Mr. Raymond Yates requests in his September article some points concerning electricity and aquaria so I am listing the following.

All aquaria should be situated in an earth-free position, i.e. at least six feet away from stone floors, gas pipes and lead-covered electric cables (unless fitted by a really competent electrician) and should NOT be connected to earth

November, 1955

except through a lamp or other warning device. Under these conditions a broken heater glass will not affect the fishes nor will one get a shock from fresh water if the hand is placed in it (salt water is, of course, a good conductor of electricity).

In these circumstances, even if the metal frame of an aquarium becomes alive (full voltage) as a result of flex to lights or heater chafing against it and losing its insulation, no shock will be felt nor the fishes harmed. With A.C. current (practically all supplies are now A.C.) a slight current in unearthed metal can be felt by some sensitive people, but this is harmless and I doubt if it would be felt in the water. I cannot think of any circumstance where the fishes could be harmed by electricity.

The main thing to remember to avoid shocks is to keep away from anything connected to earth when handling electrical apparatus. Under no circumstances connect the frame of the aquarium to earth without getting expert advice; it can be deadly and a number of electricity authorities will not allow it.

J. STANHOPE, Glasgow, S.1.

Dangerous Chemicals

WITH reference to the recent article concerning phenoxetol and its use in the treatment of fungus, etc. I should appreciate it if you would draw the attention of aquarists to the fact that this chemical is extremely dangerous if taken internally by any person. My two-years-old son managed to obtain some phenoxetol from my fish cupboard and as a result from swallowing some he very nearly died; only prompt action by a hospital physician saved his life. Please—if you have this chemical in your house keep it under lock and key.

"PHARMACEUTICAL," Co. Durham.

This warning does, of course, apply to several of the remedies used in fish-keeping—quinine, mercuriochrome, for example, but we are hoping this letter will serve as a reminder to any who have come to be careless with their chemicals.—EDITOR.

Pond-making

I AM not quite clear why your correspondent whose letter is published in the October issue of *The Aquarist* uses potassium permanganate in his new pond. From the procedure he describes one would imagine that the permanganate is used to remove free lime from the new concrete, but it is, of course, quite useless for this purpose. Permanganate is a very weak disinfecting agent and may kill any living organisms present in the new pond, but it cannot neutralise harmful free lime and, in fact, since it too is poisonous to fishes it introduces another risk.

J. SAVERS, Esher, Surrey.

Aquarium Science

AN indication of the conditions under which some tropical fishes breed is given by a paper in a recent issue of Britain's scientific weekly, *Nature*. In a communication from the East African Fisheries Research Organisation, Dr. P. H. Greenwood reveals the hitherto unknown reproductive habits of the catfish *Clarias mossambicus*.

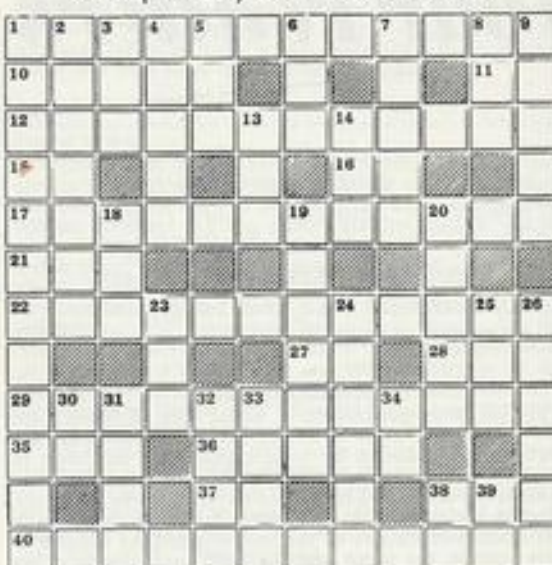
Spawning of this species was found to take place in a shallow swamp close by a stream feeding Lake Victoria. Mature fish from the lake ascended the stream when it was in full flow during the rainy season, and reached the swampy area from the stream's flooding waters. Few eggs were found in the stream itself, but many scattered in groups of five to ten in number were seen among plant debris in pools by the stream. The eggs hatched in 23 to 25 hours after fertilisation in water with a daily temperature fluctuating from 72° to 82° F., and the early fry were free-swimming; they grew rapidly for the first two days after hatching. Eggs raised artificially took much longer than this to hatch and it was decided that the oxygen content of the water was the factor influencing the hatching rate, since fry kept in dishes with a strong agitating current of water developed more quickly than those kept in slowly flowing water.

Observation of the spawning area revealed its temporary nature, for six days after the first discovery of fry the main spawning ground was cut off from the stream by recession of the flood waters. Some fry were eventually isolated in tiny six inches deep pools about a foot across. It was noted that the mid-day temperature of one of the pools at the surface was 93° F. with a mud temperature of 77° F. Some of the fry died when these pools dried up, but collection of many growing young *Clarias* from the main stream showed that a number had escaped into it before their nursery ground was isolated and they were thus able to make their way to the lake, the home of the adult fish.

SOME of the several essential dietary constituents collectively known as the "vitamin B complex" have in recent years been named as important substances for normal health in fishes. Now another one of them, pantothenic acid, has been suggested to have a role in the development of eggs within fishes. The suggestion comes as the result of investigations of tunny fish and cod at the Norwegian Fisheries Research Institute, reported in *Nature* (24th September, 1955). It has been found in these fishes that when the immature egg-producing organs (ovaries) are analysed, very high contents of pantothenic acid are present. In mature, active ovaries where eggs are being formed for spawning, the pantothenic acid content is lower, indicating that the material has been employed in some way during the eggs' development. From the aquarist's point of view the inference is that the conditioning of female fishes for breeding may be helped by feeding them adequate amounts of this vitamin. Although it is practically certain that on a good, mixed diet including live foods sufficient of the material will be provided, on a more artificial diet some supplementation could be beneficial. No better source for the vitamin and other required materials could be found than the young cod ovary (hard roe), a food which is easily obtainable from the fishmonger.

The AQUARIST Crossword

Compiled by J. LAUGHLAND



CLUES ACROSS

- Or, more accurately sometimes, exotic fish (8,4)
- Head x confused the series of six numbers (5)
- This is that is (1,1)
- Creep is a load for the aquarium plant (6,6)
- Little King Emperor of *Trichopaster levi* (1,1)
- It is the first word here, but could mean the last word (1)
- To transform, as tadpole does to frog (12)
- Eggs (3)
- Fish which incubates its eggs in its mouth (12)
- In French (2)
- I turn back, it sounds as if you follow and got the bird (3)
- Measure these by 1 Down, aquarists (12)
- See 28 Across (3)
- Wind turns after cod for signalling systems (5)
- More than one of these exclamations would raise a laugh (2)
- Colisa laeta* head for a pass through the mountain range (3)
- Siphon and out-size book may be a fish-house (12)

CLUES DOWN

- These instruments are of especial value to cold water fans in summer; and to tropical enthusiasts in winter (12)
- Vile ore for sculptural relief (7)
- Proprietary drink that has been used as "square meal" for fry (3)
- Padua (5)
- Orfe (3)
- Confused carp without a tail takes a circular route (3)
- Trust (5)
- Small drink from 40 Across (3)
- To lift or throw upward is almost heaven (5)
- A dory starts some bether (3)
- Tear (3)
- Toad-fish (3)
- Reared in confusion (peruse it again) (2-4)
- A number of genera having many important points in common (5)
- This answer comes back put for the water (3)
- Comes into (6)
- Uncle ends me (3)
- Leak begins after rust (6)
- Little girl in 25 Down (2)
- Mother softly makes mumble (4)
- Sound returns from the Chondropterygian fishes (4)
- Bay coloured with spots of grey or white (4)
- You and me (2)
- Cod's leader (1,1)
- Only exceptional merit earns this order (1,1)

PICK YOUR ANSWER

- "As sound as a . . ." The missing word is: (a) Carp. (b) Gudgeon. (c) Roach. (d) Tench.
- Which is the smallest of the following species? (a) *Palmatochromis annectens*. (b) *Palmatochromis arnoldi*. (c) *Palmatochromis guentheri*. (d) *Palmatochromis subocellatus*.
- Barilius neglectus* is native to: (a) Borneo. (b) Ceylon. (c) Japan. (d) Madagascar.
- The popular name of *Polycentrus ichomburghii* is: (a) Bobtail. (b)

- Comb Tail. (c) Scissors-tail. (d) Whip-tail.
- The generic name of the parasite that causes velvet disease is: (a) *Cornia*. (b) *Cyclochaeta*. (c) *Lernaea*. (d) *Oodinium*.
- The genus *Hottonia* (water violet) is represented by: (a) 2 species. (b) 4 species. (c) 6 species. (d) 8 species.

G.F.H.

(Solutions on page 170)

HIGH standard of entries made judging difficult in this year's pond competition held by the Bristol Aquarists' Society. Winning pond, which lost only seven points, was owned by Mr. S. H. Bennett, who was presented with an ornamental bird bath in stone. Second prize card went to Mr. H. Moore, and third to Mr. F. Amos. Total entries numbered 44.

SIXTY entries were made at the show held by Cambridge and District Fish-keepers Club and awards were presented to winners last month. They were:
 Class 1—Coldwater fishes: 1—Mr. Mynott; 2—Mr. Thurston; 3—Mr. Diver.
 Class 2—Livebearers: 1—Mr. Diver; 2—Mr. Diver; 3—Mr. Savidge.
 Class 3: 1—Mr. Wilson; 2—Mr. Pinner; 3—Mr. Thurston.
 Class 5a: 1—Mr. Thurston; 2 and 3—Mr. Savidge.
 Class 5b: 1—Mr. Thurston; 2—Mr. Wilson; 3—Dr. Sadler.
 Class 6: Pairs of fishes. 1—Mr. Fuller; 2—Dr. Sadler; 3—Mr. Thurston. Judge was Mr. Allan Taylor.

SECOND annual show of the Dublin Society of Aquarists was held in September, and an increased number of entries is reported. Best fish in the show was a fighter owned by Mr. W. Campbell (Gallagher's A.S., Belfast). Mrs. E. Spurling Jewell received the Evening Mail challenge cup for the best furnished aquarium. Other awards, judging to F.B.A.S. standards by the Irish Federation of Aquarist Societies' Judges, Messrs. H. Creagmille, A. Armstrong, S. H. Pace and D. Quinn, were—
 Egg-layer class: 1—Mr. W. Campbell; 2—Dr. C. Hannigan; 3—Mr. W. J. Foley.
 Livebearer class: 1—Dr. J. J. Craig; 2—Mrs. E. Spurling Jewell; 3—Dr. C. Hannigan.
 Coldwater class: 1—Mr. A. Spurling Jewell; 2 and 3—Mr. J. Hyslop.
 Water plants: 1 and 2—Mrs. E. Spurling Jewell; 3—Mrs. D. Quinn.
 Furnished aquaria class: 1—Mrs. E. Spurling Jewell; 2—Mrs. S. Redmond; 3—Mr. A. Spurling Jewell.

ANNUAL general meeting of the Halifax and District Aquarists' Society will be held at Spring Hall, Huddersfield Road, Halifax, 7.30 p.m. on 1st December. This month's meeting billed a lecture on breeding and feeding egg-layers by Mr. R. Mackerrall, a member.

MR. S. G. LAKE (secretary of Slough and District A.S.) gave a lecture on cacti to members and friends of the Hampstead Aquatic Society on Tuesday, 13th September. Tips given by Mr. Lake to those enthusiasts in this hobby, were of a nature to surprise those present. For example, he advised that best results are got by planting in the garden in June (not before) and taking cacti inside the house in early October to be placed in the coldest room in the house for the winter without watering. He gave the following specimens as being among cacti producing the most beautiful flowers: *Rebutia*, *Mimicula*, *Cochlosia*, *Ottomi*, *Margaritana Parodia*, *Levinianus*, and for the most exotic flower *Epiphyllum*. A number of fine specimens were on show and also a quantity was sold to enhance the society's funds. Mr. F. Stone moved a vote of thanks, saying he had learned more valuable information from this lecture than from some of the books he had read on this subject. The society extends a welcome to anyone interested and for future programmes advises them to contact the secretary, Mr. K. I. A. Pye, 35, Steels Road, Hampstead, N.W.3 (phone: Primrose 5888) who will notify them of date of next lecture.

INCREASED membership is one of the signs of progress reported by the Hounslow and District Aquarist Society. At a recent breeders' table show awards were made to Mr. Billington (first—red platys); Mr. R. Boul

News from AQUARISTS' SOCIETIES

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

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

(second and third—pearl danios and red platys); best fish of the year was judged to be a black mollie owned by Mr. Billington.

AT a "quiz" organised between Merseyside Aquarists' Society and St. Helena A.S. the Merseyside team of four members won by two points. Visitors are welcomed at the society's meetings on the first and third Thursdays of each month, 7.30 p.m. at Grenville Cafe, Tithebarn Street, Liverpool. Secretary is Mr. V. C. Walker, 46, Cambridge Avenue, Great Crosby, Liverpool 23.

AT a table show between South London Aquarists and Wimbledon and District A.S.,



Mrs. W. L. Mandeville is presented with the Cobby Cup for the best fish in the Walsall and District A.S. Show by Mr. "Big Bill" Pickering, club member who is known nationally for the record cross-Channel swim he made in August this year. See report on this page.

each society exhibiting 12 fishes, the South London members won the contest by four points. The show proved highly successful and a return contest is planned.

NUNEATON Aquarists' Society members have presented an aquarium to Nuneaton Children's Home.

FOLLOWING their success in the inter-society furnished tropical aquarium class at this year's Midland Show Stourbridge and District Aquarists' Society are holders of the Midland A.S. Shield. At a characin show within the society 26 entries were staged and the winning fish was a Belgian flag tetra.

Peterborough Show

ENTRIES at this year's annual show staged by the Peterborough and District Aquarist Society numbered 230. Judges were Messrs. J. H. Glyn (Hertford A.S.) and C. W. G. Creed (F.B.A.S.). Main results were—

- Class A1: *Characins*—1, Mr. B. Churchill; 2, Mr. J. E. Pinner; 3, Mr. R. Lickerish.
 - Class A2: *Cichlids*—1, Mr. R. Dicks; 2, Mr. R. Dicks; 3, Mrs. D. Bell.
 - Class A3: *Livebearers*—1, Mr. D. Coulter; 2, Mr. Georgeson; 3, Mr. B. Churchill.
 - Class A4: *Labyrinth*—1, 2 and 3, Mr. Georgeson.
 - Class A5: *Gutfishes*—1, Mr. J. Bell; 2, Mr. R. Lickerish; 3, Mr. R. Whitehead.
 - Class A6: *Carps and Minnows*—1, Mr. R. Skirton; 2, Mr. C. A. Taylor; 3, Mr. R. Skirton.
 - Class A7: *Tropical*—1, Mr. K. Abbott; 2 and 3, Mr. J. Bell.
 - Class B1: *Goldfish*—1, Mr. H. Richards; 2, Mr. W. Mathews; 3, Mr. H. Wason.
 - Class B2: *Shubunkins*—1 and 2, Mr. H. Richards.
 - Class B3: *Veiltails and Fantails*—1, Mr. H. Richards; 2, Mr. W. Hallstone.
 - Class B4: *Coldwater*—1, 2 and 3, Mr. H. Richards.
 - Class C: *Tropical Breeds*—1, Mr. R. Dicks; 2, Mr. D. Brett; 3, Mr. D. Coulter.
 - Class D: *Coldwater Breeds*—1, Mr. W. Hallstone; 2, Miss P. Stockdale; 3, Mr. W. Hallstone.
 - Class F: *Furnished Tropical Aquaria*—1, Mr. S. Benn; 2, Mrs. M. Budding; 3, Mr. G. Stockdale.
 - Class G: *Furnished Coldwater Aquaria*—1, Mr. R. Scott; 2, Mr. W. Hallstone; 3, Mr. R. Scott.
 - Class H: *Vivaria*—1, Mr. B. Budding; 2 and 3, Mr. R. Hughes.
- Best Fish in Show.—Mr. J. Bell (*Oreochromis affinis*).

Walsall Fish Show

A VERY hearty welcome was given to Mr. "Big Bill" Pickering when he rose to present the awards to the winners at the Walsall and District Aquatic Society's annual coldwater fish show in September. Mr. Pickering is one of the most popular members of the Society and his feat of swimming the Channel from England to France in record time took second place in the members' esteem to the fact that he gained the first award in the furnished aquarium class at the society's tropical show. Before presenting the awards Mr. Pickering said that he felt far more comfortable in speaking to his friends than he had felt at any of the events at which he had had to speak since his successful swim. He told of several of his experiences during the swim. Once he swam over a lifebelt, which made him think of who had been in it and wonder what had happened to him. At another time, during the darkness he touched a rope, which according to his crew, made him jump about five feet out of the water. The most uncomfortable part of the swim was during the night, since the crew had to play a searchlight on him all of the time in case he got lost. This light was shining in



Federation of Northern Aquarium Societies information stand at the British Aquarists' Festival in Belle Vue, Manchester, last month

Lectures and Films

FOR societies within one day's travel from Cambridge the services of a lecturer showing his own films are available. The lecturer is Mr. Mason Smith (42a, Russett Road, Cambridge) and the films—not available without his attendance, are "The Fighting Fish of Starn" (colour, 14 mins.), "Tropical Aquarium Fish" (colour, 14 mins.), "Blue Gouramies" (black and white, 8 mins.). For details, society secretaries should write to Mr. Mason Smith at the above address.

Secretary Changes

CHANGES of secretaries and addresses have been reported from the following societies: **Canterbury and District Aquarist Society** (Mrs. R. E. M. Bean, 33, Victoria Road, Canterbury, Kent); **Glasgow Eastern Aquarium Society** (Mr. J. Bryce, 476, Crown Street, Glasgow, C.5); **Lambeth Aquarist Society** (Mr. G. S. Tudman, 8, Elmwood Road, London, S.E.24); **Medway Aquarists' Society** (Mrs. I. Weaver, St. Hillary, Church Hill, Cuxton, Rochester, Kent); **National Aquarists' Society** (Mr. P. Scone, 53, Nassington Road, London, N.W.3); **South London Aquarists** (Mr. F. C. Orson, 17, Berrard Gardens, Wimbledon, S.W.19); **Stourbridge and District Aquarists' Society** (Mr. H. Proctor, 93, Market Street, Kingwinford, Brierley Hill, Staffs.); **Tyneside Aquatic and Biological Society** (Mr. J. R. Innes, 48, Elton Street East, Wallsend, Northumberland).

Aquarist's Calendar

19th November—Free public lecture "Fishes, Amphibians and Reptiles" by Dr. P. N. Ghadiali, 3.30 p.m. at Horniman Museum, London Road, Forest Hill, London, S.E.23. Dr. Ghadiali will also show his two films "Fishes, Amphibians and Reptiles" and "Breeding the Brown Anaca."

2nd December—British Herpetological Society (London Group) annual general meeting, 7 p.m., at the Linnean Society's Rooms, Burlington House, Piccadilly, London, W.1.

his eyes and causing great discomfort. He tried on many occasions to dodge the light but only succeeded once. When the light picked him up again he had lost his way and was swimming back to England! He felt sure that his trainer was trying to bluff him when he was told, half way over, that he had a good chance of breaking the record. During the last half hour, after dawn, he was more interested in trying to identify the fish which were swimming beneath him than in seeing how near he was to the French coast, and it came as a great surprise to him when he looked up and saw Calais beach only a short distance ahead.

Mr. Pickering presented the awards to the various class winners as below:—

Cadby Cup for best fish on show.—Mrs. W. L. Mandeville.

Competition gaining most points in show.—Mrs. W. L. Mandeville.

Class A (goldfish 3 ins. and under).—1, Mr. J. H. Buttle; 2, Mrs. M. F. Smith; 3, Mr. E. G. Perrett.

Class B (Goldfish over 3 ins.).—1, Mr. W. Harvey; 2, Mr. H. B. Chell; 3, Mrs. W. L. Mandeville.

Class C (Shubunkins).—1, Mr. W. Harvey;

2, Mr. M. E. Perrett; 3, Mr. W. Harvey.
Class E (Vedduh).—1, Mrs. W. L. Mandeville;

Class F (Cultivated coldwater fish).—1 and 2, Mrs. W. L. Mandeville.

Class G (Goldwater fish).—1 and 2, Mr. S. Millin-Clark.

Class J (Goldfish—junior members).—1 and 2, Mr. M. E. Perrett.

Class K (Coldwater fish—junior members).—1, 2 and 3, Mr. M. E. Perrett.

New Societies

Vivarium Society. Secretary: Mr. A. Richardson, 1, Hatton Street, Macclesfield, Cheshire. The society meets monthly and invites enquiries from amphibians and reptile keepers living in north-west England who are interested in membership.

AQUARISTS living in the **Mansfield Woodhouse** vicinity of Nottinghamshire are invited to contact Mr. P. Cooper, 14, Grove Street, Mansfield Woodhouse, Notts., who wishes to start a society there.

Aquatic Traders' Insurance Scheme

FROM the beginning of this month all members of the **Pet Trade Association** (originally founded as the **Aquatic Traders' Association**) are automatically covered by a new insurance scheme for liabilities resulting from accidents and deaths suffered by members of the public, damages occurring through work done or arising from the sale of equipment, foods, etc., to the extent of £10,000 in any one year. To meet the cost of the scheme the annual subscription to traders is being raised from two guineas to three guineas. Concrete examples of the way in which a trader may be faced with damages from legal action are quoted—as the result of death arising from the sale of a bird subsequently showing psittacosis (parrot disease); customer injury through a bite from an animal in the shop or an electric shock from the dealer's aquaria; fire resulting from an installation made by a dealer in a customer's house; customer losses arising from purchase of faulty equipment. All these risks are covered by the group insurance, cover being detailed as follows:

(a) Liability to members of the public for injury or damage to property arising from defects in the premises, including third party fire and explosion risks, including work away.

(b) Liability for death or injury suffered by members of the public arising by way of infection from any animal, bird or fish sold.

(c) Liability for injury to or damage to the property of members of the public caused by livestock in the shop.

(d) Liability for bodily injury to or damage to the property of third parties arising out of the despatch within the United Kingdom by road or rail of domestic pets.

(e) Liability in respect of work done by the trader or his employee away from his premises, including installation risks (but excluding professional negligence in so far as treatment is concerned).

(f) Liability arising out of the sale of foods, preparations, etc.

(g) Liability arising out of the sale of equipment, etc.

Members engaged in manufacture are not covered by this policy but for them and importers of livestock special arrangements can be made, since 10 per cent. reduction on all forms of insurance is being offered to members of the Association on policies effected through the brokers handling the scheme, including fire, burglary, theft and vehicle insurance.

This scheme should be welcomed by the trade and public alike, for although no one likes or looks for trouble it has an unobtrusive way of turning up where least expected, and then the knowledge that at least it can be met without financial worries can be a solace to the trader and his customer.

Crossword Solution

T	R	O	P	I	C	A	L	F	I	S	H
H	E	X	A	D	R	A	T	E			
E	L	O	D	E	A	C	R	I	S	P	A
R	I	U	D	A	C	R	I	T		V	
M	E	T	A	M	O	R	P	H	O	S	E
O	V	A									
M	O	U	T	H	B	R	E	E	D	E	R
E											
T	E	M	P	E	R	A	T	U	R	E	S
E	M	U	C	O	D	E	S				
R	I	M	H	A	R	C	O	L			
S	I	P	H	O	N	O	S	T	O	M	E

PICK YOUR ANSWERS (Solutions)
1 (c). 2 (d). 3 (c). 4 (a). 5 (d). 6 (a).