

The AQUARIST AND PONDKEEPER

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In the article on page 50, discussing the reactions of fishes to photography, "Clarissa," the London Zoo Aquarium's giant carp, is one of the subjects mentioned.

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Editorial

A WRITER in an American aquarium journal recently gave an account of an experiment he tried of sealing some tropical fishes in a large glass jar with water plants to see how long they would live. The idea of establishing a closed underwater community that would be completely self-supporting for all time is one that has often attracted naturalists who have taken the concept of aquarium "balance" rather too literally. There exists a similar nebulous balance for land animals and plants, yet what has been attempted so often with fishes in a few gallons of water would be thought absurd to attempt with, say, mice in several cubic feet of air.

One obliging trait of fishes which undoubtedly encourages amateur experimenters along these lines to persist in their hopeless pursuit is the ability of the animals to live a long time without adequate food. Times of survival vary with species but many will hang on to life for many months on the most frugal diet. We have all heard of goldfish kept alive for years in bowls with dried "ant's eggs" as food. The goldfish in particular has been responsible for, as Gilbert White put it in 1781, "a notion that they need no aliment." This shrewd observer wrote: "True it is that they will subsist for a long time without any apparent food but what they can collect from pure water frequently changed; yet they must draw some support from animalcula, and other nourishment supplied by the water; because, though they seem to eat nothing, yet the consequences of eating often drop from them. That they are best pleased with such jejune diet may be easily confuted, since if you toss them crumbs they will seize them with great readiness, not to say greediness."

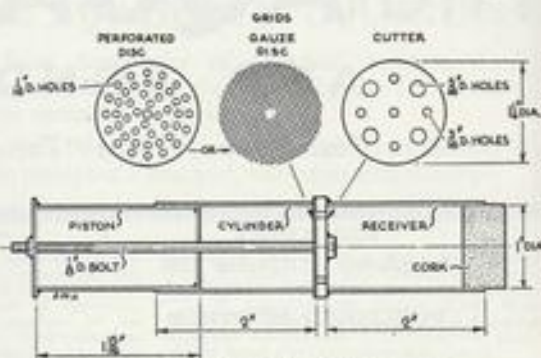
It is of course, a delightful thought that one might create and be the lazy observer of a little watery world that is quite independent of outside resources. In fact every well-established aquarium demonstrates, in the amount of labour lavished selflessly upon it by its owner to keep it in good condition, that the idea can never be realised.

A Home-Made Worm Cutter by W. H. MACEY

Of all live foods the garden worm is one of the best, being easily obtainable, and available throughout the whole year. Unlike many other live foods, worm flesh has never been known to introduce any kind of pest or disease with it into the aquarium, but, unfortunately, it has two, and apparently only two, serious disadvantages: 1, the horrid task involved in cutting them into small portions, and 2, when they are given whole to the fish, the soil inside the earth worm tends to cloud the water.

Both these difficulties are removed by using the worm cutter to be described. It instantly and invisibly cuts into small portions (the largest being no larger than grains of rice) any number of worms from half a dozen up to one hundred an inch in length, or the equivalent in bulk of larger worms, including brandlings, river worms, or the large, tough-skinned lawn worms. As the worms are all cut into small portions, all the fine soil, or vegetable matter, or mud, is easily removed, so that nothing but the flesh of the worm is given to the fish. It is also exceptionally easy to grade the portions if necessary, into microscopic, medium, and large, making it suitable as food for the smallest tropical fish up to large pond fish, and for rearing young fish fry.

It is advisable to use all brass if possible for making the appliance, but copper or some other non-corrosive metal may do for the tubes and washers. The bolt should be brass, or some hard metal, but steel is useless as it loses its threads through rust, very quickly. The piston, a length of tube sliding easily in the tube forming the cylinder, is a fraction of an inch shorter than the cylinder, to prevent it bearing against the gauze "grid" when screwed up to its limit. This means that part of the worms, mainly tough skin, remains in the cylinder, and can be given to larger fish, or thrown away. The washers closing the ends of the piston can be any suitable thickness not interfering with this restriction of travel in the cylinder. Strong brass wire gauze is obtained from an old car heating lamp or other safety lamp, for the grid which is positioned at the end of the cylinder. If wire gauze is not available, a metal disc perforated with $\frac{1}{16}$ inch holes, as shown, can be used. The drilled cutter, which should be $\frac{1}{8}$ inch plate or thicker, has the head of a bolt soldered to it. The bolt is long enough to pass through the grid, cylinder and piston, and its nut is soldered to the top washer closing the piston. Another length of tube to form the receiver has one end soldered to the same surface of the cutter as the bolt head (see sectional diagram). Both



Sectional view through length of worm cutter

the washer on the piston and cutter attached to the receiver can be soldered centrally without the use of a lathe, with a little care. The inner washer on the piston, similar in size to the outer washer, is soldered on and then its edges are filed off smooth with the piston tubing. A cork is used to close the open end of the receiver.

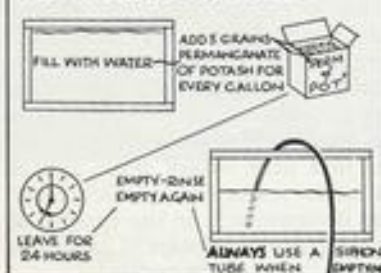
Place the worms in the cylinder, after stirring them up in a jar of water to remove any sharp grit clinging to their bodies. Insert the piston and screw it up on the receiver, holding the cylinder in one hand with the fingers steadying the piston. Once the piston has pressure on the worms, the cylinder seldom turns. The worms are forced through the grid, cut by the cutter, and enter the receiver. When the piston has been screwed up to its limit, the cork stopper is removed from the receiver and the portions of worm flesh washed from it into a very fine net under the cold water tap. This will remove all soil, etc., and a part of the microscopic portions.

To grade the portions, transfer them from the net into a jar of clean water, stir up and allow it to settle for several minutes. The microscopic portions will still be suspended in the water and can be poured off. Next refill the jar, stir up again, and within a second pour off the medium size portions; the large portions will remain in the bottom of the jar. If the appliance is dismantled after use and the parts washed and dried, it should last for years.

THE PRACTICAL AQUARIST

WHETHER YOU USE A TANK MADE BY YOURSELF AS SHOWN IN OUR PREVIOUS FEATURES—OR A LARGER TYPE—THE METHOD OF SETTING UP IS THE SAME—

FIRST MAKE SURE THE TANK IS CLEAN



BUY YOUR AQUARIUM GRAVEL FROM A REPUTABLE DEALER—BUY PLENTY—AND WASH IT THOROUGHLY BEFORE USE—



Aquarium Setting-Up





Plecostomus plecostomus—a “Sucker Catfish”

by JACK HEMS

THIS fish belongs to the family Loricariidae, members of which are found in lakes, streams and rivers over a wide area of tropical America. It is a useful, harmless and entertaining species, and may be kept in a spacious community tank, or housed by itself or with a companion of the same or another species in an aquarium measuring not less than 24 ins. by 12 ins. by 12 ins.

This may sound a hefty-sized tank to give over to one or two fish, but the fact is that though young *P. plecostomus* usually measure about four inches when they arrive in this country from abroad, they soon grow to a fairly large size, say, six or seven inches—and even larger in some aquariums—and need plenty of room to move about in comfort. In the wild state, in south-east Brazil and La Plata, the species attains a length of about 20 inches, and, at this size, must be tricky customers to take off a line or out of a net, for the horny plates which cover the back and sides are studded



Photos:

A. C. Torre

Dorsal and ventral views of *Plecostomus plecostomus* are given in this picture as the fish rest “stuck” to the glass of their aquarium

with a goodly number of short, sharp spines. The underparts are devoid of horny plates or spines.

The general body colour of this fish is greyish-brown lightening to pale biscuit or dirty white on the belly, which may be with or without dark markings. The flattened head—the body tapers away from the head to the tail—is adorned with small, closely-set brown spots; the side is spotted with similar markings interspersed with several broad vertical bars or bands, the widest ring the body just behind the large, wing-like pectoral fins.

Like the body, the fins are well-sprinkled with dark markings. The dorsal fin is large, and when raised to its fullest extent, it stands high like a sail and gives the fish a distinctive, if not noble appearance. The magnificent dorsal is matched by a well-formed caudal fin. There is an insignificant adipose fin. The mouth of the fish is situated on the underside of the overhanging snout, and has fleshy, expanded lips which look like a frilled or ruffled disc. These protruding lips form a modified sucker which enables the fish to adhere to any surface, rough or smooth, vegetable or mineral. In its natural surroundings, the fish is able to anchor itself to plants or boulders and feed at leisure, even though the current may be flowing swiftly against it.

Algae Remover

In the aquarium, *P. plecostomus* spends a lot of time stuck, as it were, to the side of the glass farthest from the light, for the species is not fond of bright surroundings, and is most active after dark. Then the fish shuffles about the floor of the aquarium, or hurries with a flurry of fins through the water, searching for food. It will suck up tiny morsels missed by other fishes, and scavenge among the plant life. The fish is omnivorous by nature, with a marked leaning towards lowly forms of aquatic vegetation such as soft algae and the like. If *P. plecostomus* is introduced into a tank the sides of which are thickly grown over by algae, it will not be long before every pane of glass is cleared of green growth.

When the fish is kept in a community aquarium, the aquarist must make sure that it receives its proper share of food by introducing finely chopped earthworms, tiny pieces of meat or a sprinkling of dried food late at night; that is, when the other fishes have stopped feeding and have become quiescent in the upper or lower layers of water. So far as

(Continued at foot of next page)

Tropical Fishes by the Ton—by Air

A BUSINESS involving the carriage of several tons of tropical fish every month has been built up by B.O.A.C. since the war, and has resulted in specimens formerly unknown in this country becoming readily available for aquarists. Many technical problems had to be overcome before the carriage of these delicate creatures could be carried out successfully.

The first consignments were brought to Britain from the tropics in York aircraft. They were in tanks placed on the floor of the aircraft, with special equipment installed to keep the water warm and aerated. There were, however, many problems associated with this type of carriage. The water could sometimes be spilled, with possible loss of fish; the problem of temperature control was a very difficult one while the aircraft was on the ground in cold climates; and specially heated vans with attendants used for ground transport of the cargoes from airport to town made the operation more expensive.

In order to simplify this procedure B.O.A.C. cargo experts co-operated in the production of the type of package



Can, heat insulating pads and carton used for tropical fish transport by air



Photos: B.O.A.C.
Reptiles as well as fishes are carried by B.O.A.C. Here a receptionist is seen handling a newly arrived fish-eating gharial from the East Indies

used to-day, which has proved to be most successful. A can, roughly the size of a four gallon petrol tin, has a screw thread glass top with two nozzles to which air lines can be attached. It can be sealed off at will. When the fish begin their journey, they are placed in water in the can and oxygen is pumped in through one of the nozzles. When a suitable volume of water has been expelled by the pressure of the oxygen, the supply is cut off and both nozzles are closed. As many as 500 small fish have been "canned" together in this way. They can live in such conditions for five days without repacking or changing the water. Constant temperature within the can is maintained by the use of a surround of about 1½ ins. of insulating material.

The advantages and simplification of this method of transport have enabled considerable reductions to be made in the charge for transporting tropical fish. Many varieties of elegant fish, including scats, glass catfish, bumble bee fish, harlequins and barbs, have been delivered to British and American aquarists in this way. Fish have been brought from India, Ceylon, British Guiana, Trinidad and Singapore, and exported to Australia, New Zealand, the United States and Canada.

Plecostomus plecostomus

(Continued from preceding page)

the writer of this article is aware, the species has not been bred in captivity, though *Otocinclus affinis* and *Loricaria parva*, two other members of the Loricariidae, have been spawned by aquarists living in the United States of America.

It is said that a male *P. plecostomus* may be distinguished from a female by comparing the pectoral fins of several of these fish: in the male, these fins are larger and stronger. Before World War II, the fish was erroneously referred to as *P. commersoni*; so aquarists intent on learning all they can about the species in books and articles published before 1939 should look for it under its old and obsolete name.

P. plecostomus is a long-lived fish, and is hardy enough to withstand a temperature as low as 65°F. without suffering any harm. It flourishes best in a temperature of about 75°F.

Cacti in the Fish House

IF any cactus plant should grow too tall it is always possible to cut the top off and so reduce the height. The top portion can be rooted for a fresh specimen and the old plant will probably send out many new shoots which can in turn make fresh cuttings. When cutting the top from any plant it is most important to see that the cut is not made too near the top or this portion will die. The type of cactus known as *Epiphyllum* is ideal for the fish-house as the moist warm atmosphere ensures that the plant is in the right medium for many large and colourful flowers to be produced. These plants are epiphytes and are found in parts of Brazil growing in crevices of trees. They are not parasites as they do not take any of their nourishment from the tree but obtain it in the trunk junctions, where there may be an accumulation of bird droppings and rotting leaves. A slightly richer compost is needed for these plants and the addition of some well rotted cow manure suits them.

Microscopy for the Aquarist—9 by C. E. C. COLE

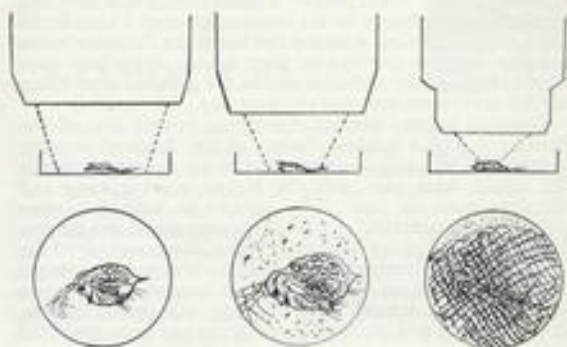
SO far, in our examination of the specimen of a *Daphnia*, we have used our lowest power eyepiece and lowest power objective. We now need greater magnification. How shall we obtain it? There are several ways open to us. We can leave things as they are, and pull out the draw tube from the body tube. We can use a stronger eyepiece with the same objective. We can use the stronger eyepiece and pull out the draw tube. We can substitute a higher power objective, and leave all other adjustments as they were. We can not only change the objective, but also use the draw tube. Finally we can change objective and eyepiece and still pull out the draw tube.

Whichever method we adopt, graded from a small increase to a considerable one, two things will be noticed. We have to lower the objective nearer the stage, and the clear area round our object becomes less. The light, too, seems to lessen. These last mentioned are, of course, contingent upon one another. If the object, which obstructs the easy passage of light rays, takes up a greater proportion of the field of view, the total amount of light which gets into the object lens is lessened, unless we take steps to increase it by obtaining a brighter source or a greater concentration in the required field. Both these methods are open to us, and will be more fully treated later on.



A male *Argulus* examined under each of the three powers recommended for use by aquarists: left, 2 in. objective, field about $\frac{1}{2}$ in. diameter; centre, 1 in. objective, field about $\frac{1}{4}$ in. diameter; right, $\frac{1}{2}$ in. objective, field about $\frac{1}{8}$ in. diameter. Note how field is restricted even with use of such low powers as these

The time soon comes when, by a combination of increases in magnification, it is impossible to see the whole of a small object, even a *Daphnia*, and now another condition becomes obvious—with other than the thinnest and flattest objects, we can only focus a part of what we can see—a part of a part. The slightest turn of the coarse adjustment throws everything out. When this stage is reached it is time to use the fine adjustment, operated by the smaller wheels near those of the coarse adjustment. These act in the same way as the slow motion dial of a short wave wireless set—a complete turn of the wheels result in only a tiny movement of the



Increasing magnification reduces the distance between object and objective, also field of view, depth of focus and amount of light entering the objective

body tube. So slight is the movement, indeed, that it takes sharp eyes to detect any difference in the image at which we are looking.

The fact that a *Daphnia* has thickness as well as width is now amply demonstrated, for only a small area in the centre of our field is in focus. The rest is muzzy. Immediately we endeavour to make it sharp, the portion which was in focus fades out. If it is necessary to lower the objective slightly in order to focus a fresh portion, we are going deeper into the object. If we raise the objective we are coming out of the depth. The same applies, of course, to our lowest powered objectives, but is passed unnoticed because with a small magnification, the whole depth and width of the creature appears equally clear. This discovery will give you an idea why it is easier and wiser to use low powers when first operating your microscope.

The use of higher powers necessitates moving the slide sideways, upwards, and downwards in order thoroughly to examine a specimen, with constant readjustment of the focus—a trying business for the tyro. You want to examine a fresh area to the right of your field of view, so you move the slip to the left. What happens? The view slips away to the right—the opposite to your expectations. Similarly you move it upwards, and the view moves downwards. It is imperative, but at first difficult, to remember that the image at which you are looking is reversed, so that you must move the slip in the opposite direction to the one which seems correct when looking down the tube.

Pelmatochromis kribensis

by D. W. G. PORT

THE first time I saw these delightful little cichlids was at a breeder's establishment, and at that time they were comparative new comers to this country. Their beauty must be seen to be appreciated—a brilliant fusion of red, blue and gold. At the earliest opportunity I purchased a pair as an addition to a community tank. Quite quickly the male adopted a bullying attitude towards the female and they had to be parted.

As the fish matured I began to wish I had purchased more than just one pair, as by this time I wanted to try to breed them. Notwithstanding the fact that cichlids like to choose

their own partners, I decided to try. An 18 ins. by 10 ins. by 10 ins. tank was prepared with a $1\frac{1}{2}$ ins. layer of fine compost on the bottom; to one side and at an angle to the front I placed a small flower pot. The tank was then filled to a depth of five inches with matured water from a larger tank, (pH 7.4). Temperature was maintained between 74° and 80°F. Only natural lighting from overhead was used.

The pair of fish was introduced together and as I fully expected were not amicable to one another. A partition was then placed across the tank; this seemed to make the fish extremely shy and they both hid behind the corner bars

AQUARIST'S Notebook



by
RAYMOND YATES

WHILST laid up earlier this year with a nasty dose of influenza I also had the bad luck to get an outbreak of white spot. When writing to an aquarist friend I happened to mention my plight and got, as one might expect, a heartless reply. He suggested that as I was so fond of trying things out I might try the white spot cure on myself and the influenza remedy on the fish. He remarked that success would mean banner headlines in all the papers and a big boost for the hobby. Some people have no sympathy.

This particular outbreak caused me a lot of trouble as it happened. Two newly purchased blue gularis were the cause. When I saw trouble developing I removed them into a small tank in which there were some week-old platys and day-old *Limia*, which I was prepared to lose. The temperature was high, about 83° F., but I was too ill to bother. I added mercurochrome and left them to their fate. The gularis did not like the high temperature but flatly ignored the tiny fish who were sharing their tank. A week later I put in two young sailfin mollies (blacks) and the next day I was horrified to find the female gularis holding a molly by the lip and shaking it terrier fashion. The molly was fighting back but obviously very upset. I got a net and removed it, but the shock killed it whilst still in the net. Mollies are very prone to die of shock in this way.

Another week went by and the gularis and the baby platys and *Limia* were still chummy, in fact they used to swim round with the gularis rather like pilot fish with sharks. At last I decided to move the gularis—horror-struck I discovered the gularis had just beat me to it—only one platy and one *Limia* remained. How they came to live with such small fish at peace for almost a fortnight I can't imagine. Meanwhile I was having trouble in another tank with white spot. I was using quinine sulphate, merely because the water was very old and to use mercurochrome would result in its complete loss. I used a strong dose of quinine and after running aeration night and day took off the aeration for about three hours on the third day. Result, several fish died, so that I had to run the aeration at full blast. All the fish kept to the surface, particularly lyretails, which seem to be badly affected by quinine.

What a blessing it would be for the hobby if a certain cure could be found for white spot that was cheap, invisible, harmless to plants and fish in any strength and which would have no effect on old matured water. As it is mercurochrome ruins the matured water and affects some plants—quinine is expensive and dangerous, the plants suffer from lack of light and aeration is a must.

I suppose just about every accident and disaster which falls to the lot of the aquarist has come my way at one time or another. I was reminded of this recently when I failed to notice a fish which had jumped out and stepped on it. It is a horrid experience and brought back memories of an occasion years ago when I trod on a wild bird which had imprisoned itself in my greenhouse. We shrug our shoulders and say at such times "Well, accidents will happen." In the main this is a form of face-saving because most of these fishy "accidents" are due to our own carelessness and nothing else.

Think of the fish we lose which jump out because we neglected to cover the tank, or because we feel sure no fish could locate and leap through so small an opening. Bitterling are most exasperating in this respect; they can and will escape through the smallest gaps in your cover defences. Then there is that stupid trick of altering a thermostat last thing before going to bed—in the morning a tank of boiled

or frozen fish. There are so many of these misfortunes: taking risks with diseases and diseased fish, guessing at chemical quantities or even at water temperatures, chancing that new and unknown fish will be sociable community members, leaving fish in with their eggs or fry for just one more day, suffocating fighters, bruising fish in transit and so on. The list is unending. It is true that by and large there is not the personal bond between the aquarist and his pets that is felt with the loss of such domestic pets as dogs, cats, cage birds, hamsters and the like. Perhaps this is just as well. After all fish are not expected to last a very long time and the feeling that they can be replaced overnight if necessary is there, admitted or not.

Fish with few exceptions look very similar to each other (i.e. the same species) and they suffer from the fact that they lack facial muscles and cannot therefore change their expression. Nature in times gone by decreed that fish were to be the first creatures on earth with what is now considered to be a face and it is not their fault that this face has altered very little in the interim. Then again they can make no sounds audible to our ears, yet another disability in the difficult process of enlisting human compassion. A few individual fish find a place in the heart of their owner by reason of a very long or lucky life, by becoming very tame or oversized specimens, or on account of a record of success at shows, but they are the exceptions.

Queensborough Fisheries of London have had the bright idea of marketing small lengths of wallpaper for use as tank backgrounds. This is a new departure but one which may appeal to aquarists with only one or two tanks who do not wish to purchase whole rolls of paper, even if it were locally available. There are two effects from which to choose, one being "Ocean Playground" which was mentioned in these notes recently. The other represents dry stone-walling in black and grey and is most effective.

The firm of Spratt's Patent Limited of 41, Bow Road, London, E.3., is well known both to dealers and hobbyists in general. This concern has always taken an interest in the aquarium hobby and usually has a stand at the larger shows. It has issued several low-priced booklets on fish-keeping and has recently published two posters for use in schools on "How to look after Aquarium Fish" and "How to look after Budgerigars," both of which are issued free to head teachers. The aquarium poster depicts various varieties of the goldfish, also bleak, bitterling, angel, neon, zebra, rosy tetra, head and tail, giant danio, fighter, Leeri, dwarf and thick-lipped gourami—all in full colour. Most members of the hobby are familiar with the range of fish foods, tank composts, glazing compounds, etc., issued by Messrs. Spratt's but probably few know they have a large department devoted entirely to the sale of water plants. These are for ponds, pond surrounds, cold and tropical aquaria and almost any type of plant can be supplied. The firm list 21 tropical varieties, 29 coldwater plants, 46 pond-side plants and 23 different water lilies. The majority of plants are available from May until the end of July.

The male nigger barb is very attractive when in full colour and well earns the German title of purple-headed barb. All too often this display does not last long, although

it is supposed to remain longer if the male and female are separated. In my opinion the secret of retaining the colour is the water. Where it is really soft (say about four degrees D.H.) with a low pH of about 6.4, the male retains his colour indefinitely, quite irrespective of the presence or otherwise of the female. Old water is a must, and a change of even a little of the tank water can mean loss of colour.

Sodium amytal is a drug that has been used recently for fish shipments as it reduces the metabolism of the fish, which then carry better. It can also be used (like urethane) for experimenting or operating on fish. A small quantity of the drug is mixed with tank water and the fish put in. Body movement comes to a stop and the fish sinks into a comatose condition, but recovers if removed to fresh water. The fish will live in this condition if necessary for days on end. About half a grain to one gallon is sufficient in most cases. Sodium amytal is not easy to obtain as it is a schedule four drug, which means that it can only be obtained on a doctor's prescription and cannot be bought across the counter in the normal way or even by signing the poison register. The reason for this is that it is one of the habit-forming drugs which have to be made as inaccessible as possible. However, aquarists should have no difficulty in obtaining one or two capsules from a friendly doctor if they explain they want it for biological purposes. The capsules are blue green in colour and each one holds three grains, so a single capsule will last some time.

Many different methods have been used by breeders to obtain good spawning results, not the least important being the spawning medium. Sea-moss, willow root and nylon wool have all proved satisfactory in certain cases. Recently I heard of what was to me a new method. In this instance the spawning medium is coconut fibre such as is sold for upholstery. It stands boiling and is softer and finer than willow root, and it does not break up so readily. It is also easier to obtain; real success in collecting willow root usually means grubbing about in waders, cold, wet hands and similar discomforts. This method is put forward by Mr. A. Renshaw of Lincoln, who discussed this point recently when talking to the Nottingham club. Mr. Renshaw is no beginner, having been 36 years an aquarist. Another of his ideas is one for sexing most *Corydoras*. Put the fish in a glass jar and examine from below. He contends that the pectoral fins are rounded in female fish and pointed in males, that is in mature fish which are about two years old.

It is now many years since the cult of inventing new colours with an animal connection such as "Elephant Grey" came into vogue. I was surprised, recently, to come across this system applied to fish by a Texas firm of pottery makers. One of their specialities is the production of aquarium furniture in fine porcelain in the form of fighting crabs, octopus, cow fish and so on. Some of these are quite large, the octopus being over nine inches in circumference, but the names which have been invented to describe the coloration used in this pottery are, to me, the major attraction. These are described as Variatus Blue, Platy Gold, Flammeus Pink, Mollienisia Black, Tang Yellow, Sargassum Brown, Discus Brown, Silica Sand White, Rasbora Rose, Betta Blue, Seaweed Brown, Shell White, Tetra Black and Neon Turquoise. There is no doubt these terms conjure up some very pretty mental images for the keen aquarist. How very different it is here—"Tank covers can be obtained in sprayed enamel in yellow, black, cream, green or blue." How very uninviting when one might be offered covers in "Lemon Tetra Yellow," "Cambodia Cream" or "Blue Gularis Blue."

Many aquarists make the mistake of always looking down on their fish. It is not easy to fix aquaria to suit everybody but the centre of the tank should be about eye level. Far

too many tanks are well below this and the result is that the fish never look their best, particularly in electric light. Some species take on added charm when viewed from below, particularly the various pencil fish, red lined *Rasbora* and most fish with a bright central stripe. Neons are an exception to this rule however. It can be tested with ease by viewing the fish from a level position or from above and then bending down to view them from below.

Many snails are killed by the unwelcome attentions of fish, large and small, and a few perhaps succumb to being in very soft water which denies them enough calcium to build up or renew their shells. Most die because they come in contact with the heater. Sooner or later they find their way to this and so end their days. You will find evidence of this in the large number of snail shells underneath or near the heater. Snails (and planarians) can be killed by adding nicotine gardening powder to the tank water (after removing plants and fish) but the tank will need a very thorough scrub-out later to ensure no trace remains of this poisonous compound.

Book Review

Breeding Aquarium Fishes, by Julius Nachstedt and Hans Tusche. Aquarium Stock Co., Inc., New York. 27s. 6d.

SOME three years ago the leading German aquarium magazine published three booklets for the use of fish-breeders. These "Datz" booklets gave detailed instructions on the care and breeding of some of the more difficult tropicals, and gave full information on what had at one time been considered German "breeding secrets." The Aquarium Stock Company, Inc., of New York, is to be congratulated on having had these booklets translated and issued in book form for the use of English-speaking fish-keepers. Altogether, some 36 different tropicals are considered in detail, the majority being of the rarer varieties, such as blue gularis, lyretails, *Aphyosemion calabaricus* and *sjoestedti*, lamp eye, glassfish, various pencils, *Copeina*, pigmy sunfish, *Apistogramma ramirezi*, harlequin and *Rasbora maculata* to mention but a few. Live bearers are excluded apart from the black and *velifera* molly.

In dealing with each fish consideration is given to the requirements of the fish in its natural state, such as acid, hard or alkaline water, spring-fed or swampy water, freshwater spawning (after rainfall) or aged water, types of rocks or plants for spawning, shaded or sunlit, temperature and food. The authors recommend that attention should be given precisely to the smallest detail of their instructions. They write at great length on the neon and have unusual methods to offer. Sailfins need a temperature between 77° and 83° F., with some salt in the water. Shimmies with this variety is usually a sign of not enough salt, or that there is too much bacteria or Infusoria present. *A. ramirezi* need 79° F. and a constant filter running to give crystal-clear water, although a pH between 6.0 and 7.5 leaves a wide latitude. They can stand up to 15 degrees of hardness. Ulreys can be sexed even when young by the fact that the males have a black band only a third as narrow as the females.

There is also an introduction to water problems, details of how to clean all-glass aquaria, preparation of glass spiral rods and beds and a new method of sterilising plants. This latter consists of a heaped teaspoonful of alum to a quart of water. Following a five-minute bath in this solution plants are rinsed in tap water, previously boiled and allowed to cool. In all a fascinating book, which runs to 127 pages and contains 33 photographs.

R. YATES.

In the Water Garden in JUNE *by Astilbes*

HAVING discussed water lilies in previous articles I feel that some information on nuphars may be of interest to many pond keepers. The nuphars are somewhat similar to the water lilies but generally speaking their flowers are much inferior to them. They have however a few uses which make them superior in other ways. For instance, it is well known that water lilies as a rule do not take kindly to running water, and the still pool is the better place for them. The nuphars can, however, thrive in fast-running water and so those pondkeepers who have been forced to make their pond in the course of a running stream will find these plants most adaptable.

Another point in their favour is that some types have many under-water leaves which can assist in oxygenating the water, to say nothing of their value as decorative plants in fair-sized aquaria. Most of the under-water leaves are of a pale rich green so different to the dark greens of many of the water lilies. These plants can often thrive in shady conditions where other plants would fail and so it can be seen that they have definite advantages even over water lilies for certain positions and conditions. The under-water leaves are usually rather tender and succulent and so it will be found that most snails will eat them with some relish.

The cultivation of the nuphars is not difficult and should be carried out on similar lines to procedures for water lilies. Some will grow in shallow water whilst others need much deeper. Some will even grow in water as deep as six feet. The plants have a rather coarse root-stock or rhizome which can be divided quite easily as long as an actual growing centre is left to each piece of root-stock. Under good conditions the plants soon get established and will make a considerable number of leaves. The flowers are mostly single and rise just above the water's surface. There are a small number of yellow or purple sepals which are fairly conspicuous but the petals are very narrow and appear almost like stamens. When planting make sure that the whole root-stock is well anchored to the pond bottom, as

once the leaves start to grow it is possible for them to exert a pull and so raise the whole plant to the surface.

N. luteum is the common nuphar found in natural waters in this country, being of European origin. The flowers are not very large and have a peculiar scent somewhat like that of alcohol, and this gives rise to the popular name for the plant of brandy bottle. It will grow in running water and can even tolerate a depth of up to eight feet. For a very small pond or for shallow rock pools *Nuphar minimum* will be found most attractive, as the floating leaves are so delicate and pretty that they lend themselves well for such positions. *N. orbicularum* is a strong-growing species from America which has float-leaves with a crisped edge. The leaves are rather pale in colour and the plant can rapidly cover a large area when well treated.

Nuphar advenum is generally known as the common spatterdock and is not uncommon in large ponds and canals in this country. It is properly a native of North America and will flower from May to September. The leaves can be as much as a foot in length, mostly round to oval. The leaves are rarely under-water ones and the majority will stand well above the water. The flowers are about 2½ inches across, yellow with purple and green tints. *N. japonicum* has both above and under-water leaves, the floating ones being long and arrow shaped, and the under-water ones are large and crisp; this plant, however, needs still water. *N. kaibianum* is an excellent plant for shallow pools as the leaves are very small, and although the flowers are also small they are generally produced in large numbers once the plant gets established.

For decorative work in the pond I would not recommend *Nuphar* in preference to the *Nymphaeae* (water lilies), but for running water or shady positions they definitely take preference. Some of the smaller types such as *N. kaibianum* are very suitable for the fairly large tank where their under-water leaves make a better display than could the smallest types of lilies.

FRIENDS & FOES No. 37

TANYPUS

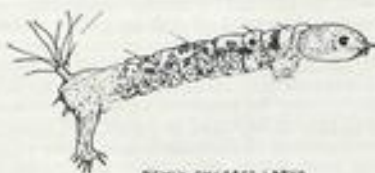
PHYLUM:—Arthropoda, from Greek *arthron*—joint, and *podos*—foot.

CLASS:—Hexapoda, from Greek *hex*—six, and *podos*—foot.

ROUGHLY translated the name *Tanypus* means a tall or long, weak creature, and refers to the long, stilt-like legs of the spotted midge. Imagines are found throughout the spring and summer months in the vicinity of most pools and lakes. The female flies lay hundreds of eggs enclosed in a tiny, semi-adhesive, transparent, and mucilaginous capsule which falls to the bottom of the pond to rest among submerged vegetation or on stones.

New-hatched larvae are no longer than one twenty-fifth of an inch, and are carnivorous. They will feed upon whatever creatures they can attack. As they grow, they favour bloodworms for food, and may frequently be found inside the mud tubes of their luckless victims. In the absence of other food, they will turn upon each other—I have watched well-developed ones swallowing new-hatched relatives. At first transparent they show greenish coloration before becoming pupae. The pupae somewhat

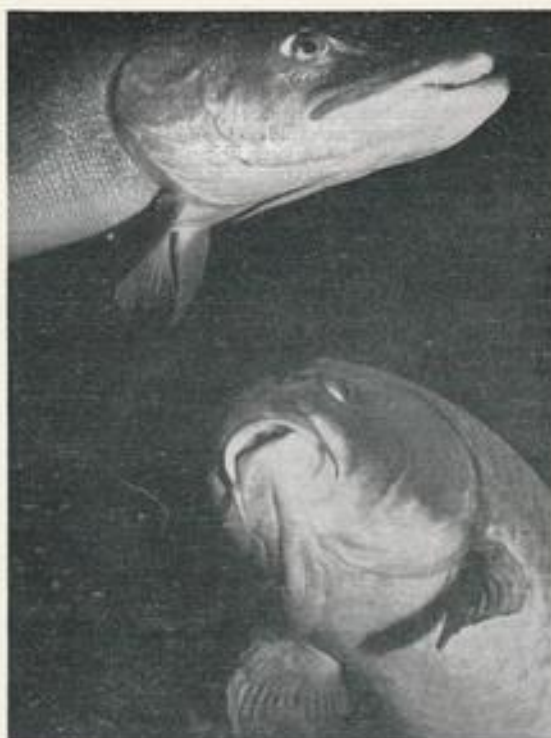
Spotted Midge



resemble gnat pupae, but are quite distinctly green. As pupae they are active and are forced to come to the surface of the water to use their long thin breathing tubes. The larvae are independent of atmospheric air and can remain at the bottom of the pond in the vicinity of their food.

Both larvae and pupae are eagerly accepted by fishes as items in their diet, and form a good, nutritious food. The long, hook fringed legs at the end of the abdomen, and the two tufts of long hairs surmounted upon projecting cylindrical processes form an easy means of identification of the larvae.

C. E. C. Cole



The 44 lb. giant carp "Clarissa" at the London Zoo Aquarium is not put off by the photo flash as she swims beneath her tank-mate—a pike

IN my work, a large proportion of which is connected with aquarium photography, I obtain a somewhat different slant on the behaviour of fish and am constantly surprised at the different reactions of species and often amazed at the different ways in which two fish of the same species will be affected by similar conditions.

When taking photographs of fish in public aquaria or where it is impossible to exercise any practical control over the fish (i.e. by the introduction of glass fillets for restricting movement) I have to rely upon a variety of methods by which the subject may be attracted to the "picture area." A small pocket mirror flickered to catch and reflect light from the tank's source of illumination is often successful and will bring neon tetras, tiger barbs and young angels crowding to the front of the aquarium. With zebras, rainbow fish and some of the gouramies the reverse effect takes place and there is a general rush for the remote corners of the tank. This is interesting but one may ascribe it to a number of possible reasons governed by the specific differences of the fish.

Recently, however, I employed the same device to coax to the front of their aquarium a shoal of *Dacyllus aruanus* at the London Aquarium. Their tank was furnished with pieces of white coral among which these little fish were playing. When I played reflected light from the mirror upon them they immediately called a halt to their game of hide-and-seek and flocked to the front of the tank to investigate. Moving along to the adjacent tank, which was similarly furnished and which contained another shoal of the same fish, I repeated the play with the mirror and was astonished at the effect it produced. Moving with greater

Reactions of Fishes to

by LAURENCE E. PERKINS

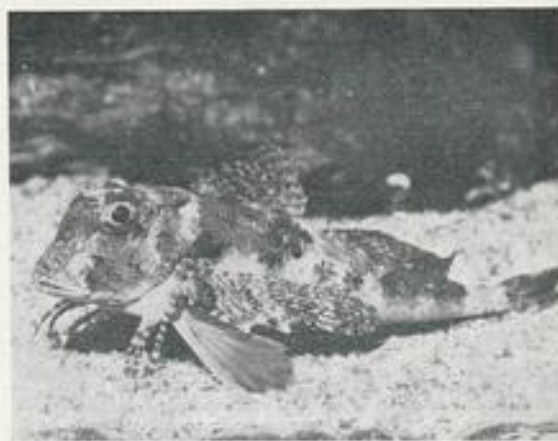
Photographs by the author

speed than their neighbours, these fish fled to the far corners of the tank where they disappeared behind groups of coral.

Electronic Flash

The duration of the flash from the electronic equipment which I frequently employ is so short that it is over almost before the reflexes of most creatures can become operative. With the greater proportion of fish there is no visible evidence that the light has been noticed at all. Some, like the gurnard illustrated, will slowly raise the dorsal a second or two after the flash has taken place, dropping it again almost immediately. Others, like veiltails and rudd, will be checked in their motion while a few will jump quite violently, as do Malayan angels and tench. Here again, however, differences occur between two fish otherwise exactly the same.

Of the goldfish varieties, only one shows any marked reaction to the flash and that is the celestial. Swimming to the front of the tank, head down in order to see more of what is directly in front, the celestial almost performs a back somersault when the momentary but intense light shines into the tank. Situated as they are, the eyes must receive the full brilliance of the light directed obliquely downwards and it is not surprising that the fish react as they do. That no severe shock is sustained is pretty well assured by the way



This red gurnard raised his dorsal fin when a first photo flash was made, and the picture above was taken immediately afterwards

Aquarium Photography



A hi-goi carp two feet in length when placed in a three-foot aquarium and photographed was undisturbed by repeated flashes

in which celestials will always return to find out what it was all about.

When photographing the giant 44 lb. carp at the London Zoo I fully expected some commotion to take place when I released the flash trigger. At that time "Clarissa" was sharing a large tank with a pike of about 30 lb. At the moment of exposure Clarissa was coming up under the belly of the motionless pike. I dearly wanted this shot but it was with tongue in cheek that I pressed the button. There was absolutely no evidence that either fish had felt the impact of light for the carp continued its upward course and eased itself past the still motionless pike.

Placid Hi-goi

The hi-goi carp illustrated here had been taken from my brother's pond during cleaning operations and was placed, with two others, in a 36 ins. by 18 ins. by 18 ins. tank. All these fish were approaching two feet in length and hadn't



Celestial goldfish are greatly shocked by the bright light of a photographic exposure since their eyes receive all the downward directed light



Young angel fish jostle one another in their eagerness to investigate the source of a light flickered at them from a small hand mirror

been in an aquarium since their very early youth when they were less than three inches long. Having had wild and semi-wild fish respond violently to flashlight, I was again anxious about risking a shot but did so as the opportunity afforded me wasn't likely to occur again. A succession of eight photographs was taken during which time the three hi-gois moved about placidly, albeit with some difficulty, in the small confines of the tank.

I once thought of compiling a set of notes for reference indicating the reactions of various species of fish to the light source and to a set of different dodges designed to attract them. This has been proved quite impractical and it would seem that every fish encountered has an individual personality just as we have.

SWORDTAIL CROSSES

My problem concerns swordtails. Whilst crossing a female gold with a first-generation red wagtall \times gold cross to produce a golden wagtall, youngsters were produced of ten types, including albino, golden wagtalls and green wagtalls. Is it possible to combine the light albino body with the black finnage of the golden wagtall? I have a full history of the parents for six generations.

It seems that the golden wagtall swordtail and the golden swordtail you mated have both been carrying an albino gene. The albino gene being a recessive to the others did not show up in the parents, but when they were mated, some of their offspring obtained an albino gene, one from each parent, and thus some albinos appeared. As far as I know it is unlikely that you would be able to produce an albino with black fins since the double recessive albino genes eliminate black pigmentation. An exception is found in the Himalayan rabbits. These animals have the pink eyes of the albino yet their extremities are black. It is quite possible that an albino swordtail from your stock mated to a simple golden swordtail would produce some golden wagtall swordtails.

Dr. Myron Gordon

OUR EXPERTS' ANSWERS TO READERS' QUERIES

As a beginner in tropical aquarium keeping, I should appreciate your remarks on the plants I should obtain to give oxygen to the water, provide a rich green background for the fishes, and look delightful to the eye.

We suggest that you plant a double row of *Vallisneria spiralis* close to the back of the tank, and along each end, sloping the plants down to within two or three inches of the front panel of glass. *Vallisneria* is a good oxygenator, is pleasant to look at under natural or artificial light, and provides a fine background for almost any coloured or unusual-shaped fish. Towards the middle of the aquarium, plant a clump or well-developed plant of *Cryptocoryne griffithii* or *Echinodorus intermedius*. If the sides still look a trifle bare, fill them up with a few short stems of *Hygrophilla* or Indian ferns.

I am keen on keeping pet fish, but up till the time of writing I have not had any success. I had a goldfish, but after a few weeks it became coated with what looked like white fluff and soon died. Then a friend gave me some semi-tropical fish called guppies. I put these in a glass jar by a sunny window, but after a few days I found these pretty little fish dead on the bottom. Can you tell me why I cannot keep pet fish?

We think you have gone the wrong way about trying to keep fish in your home. Your goldfish was probably killed by mistaken kindness: too much food, or too many changes of water. From what you said in your letter, we imagine your guppies died of cold. Although a few aquarists have succeeded in keeping guppies alive for a time at room temperature, the species is native to tropical regions of the world, and usually becomes ill and dies when the temperature of the water in which it is living sinks below 65° F. We advise you to go to your public library and borrow some books on aquarium management or, better still, seek the advice of your local aquarists' society or dealer in aquarium fishes.

Please can you tell me where I can obtain a glass spawning mat? I have read a lot about these mats, and how useful they are when spawning fishes which love to eat their own eggs.

Glass spawning mats may be obtained from many of the larger dealers in aquarium requisites. But if you have any difficulty in obtaining exactly what you want, it is easy enough to make your own spawning mat. Just obtain from a large chemists' shop a small quantity of narrow diameter glass tubing—it is usually sold by weight—and cut it by nicking with a nail file into equal lengths. Tie these lengths loosely together with the aid of lead wire or garden bass, and rest on stones placed on the floor of the aquarium. As the eggs are laid they will fall through the spaces between the tubes and so remain safe from the parent fish until they have finished spawning and been transferred to another tank.

Can you give me some information about the small cichlid *Apistogramma ramirezi*? And is it easy to breed?

A. ramirezi is not a prolific fish, but it can be bred without much difficulty. The aquarium should be furnished with some broad-leaved plants, a few pieces of smooth-surfaced rockwork, and a scrubbed flower-pot turned on its side with the opening turned away from the front of the tank. The fish will now have a choice of three spawning grounds: the inside of the flower pot, the rockwork, or the flat-bladed leaves of the water plants. After the eggs have been deposited, it is best to remove the male to another aquarium. As soon as the fry become free-swimming, they may be given large Infusoria, micro worms, and, a week or so later, tiny white worms or screened *Daphnia*. Adult *A. ramirezi* flourish best at a temperature of about 75°-78° F. The species will take any live food small enough to be eaten, and such things as scraped lean meat, finely minced butcher's offal or white fish. The fish will also take some of the better-class dried foods.

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.

Please can you give me some information about the breeding habits of *Corydoras aeneus*, and how can one tell the sexes apart?

Corydoras aeneus spawns on rockwork, the glass side of the aquarium, or on broad-leaved under-water plant life. Before spawning, the male usually cleans the surface on which the eggs will be deposited. The female carries the eggs—a few at a time—between her tight-pressed ventral fins and places them on the prepared surface. The eggs hatch in about four days; that is, in a temperature of about 78° F. The parent fish seldom interfere with the eggs after they have been deposited, but they sometimes eat the newly-hatched fry. It is, therefore, a good idea to transfer the parent fish to another aquarium after the eggs have been laid. The fry spend most of their time shuffling about on the floor of the aquarium, which should have a thin layer of brown muddy sediment covering it. The baby fish should be fed on Infusoria, micro worms and, later, white worms or sliced earthworms pounded to a pulp. A female *C. aeneus* in breeding condition may be distinguished from the male by her plumper sides and pinkish to pale red glow which suffuses her underparts. Male fish are usually slimmer and smaller than female fish, and their fins are longer and more pointed than those of the female.

I am interested in developing a strain of first-class black platys. How should I set about achieving my ambition?

First of all you should obtain a good pair of fish with as much black in the body and fins as possible. Give these fish good conditions—a spacious aquarium, nourishing live or meaty food, some sunlight or bright overhead electric light for a few hours every day, plenty of healthy plant life, rather shallow, soft water, and a temperature of about 72° F. The platy, we must point out, does not flourish very well in a very high temperature. Save all the fry you can, and as they grow and start to develop their black colour, sort them out, keeping only those which show plenty of black on the body and fins. By breeding from these fish you will be well on the way to success. But it will take time, probably a few years, before you can say you are pleased with the results of your trouble. Most fishes can be improved by selective breeding, but it requires great patience to achieve one's ambition.

In a community tank I have two angel fish, one of which has gone off its food and mopes about in the plant life and corners of the aquarium. Can you please tell me what is wrong with this fish?

Angel fish are easily upset by other fishes or by a slight chill, and soon go off their food. Your best plan is to tempt the fish to eat again by dropping tiny earthworms or white worms just in front of its mouth. If it does not respond to this treatment, try raising the temperature of the water a few degrees above normal, and keeping it that way for a few days. Of course, if you have a spare tank, it would be a good idea to transfer the fish to this tank, and give it preferential treatment until it regains its appetite and healthy activity.

In August, 1962, I had four platys given to me. The females have given birth to lots of young. Just lately, however, these female fish have developed a strange complaint. They look as

though they are wasting away, and do not seem at all interested in their food or young males. Please can you tell me whether they have contracted some disease?

Your fish have just about reached the end of their life-span. In fact, platys seldom live much above two years. And female fish, after producing brood after brood of baby fish, often go into a sudden decline. There is nothing you can do for your fish except wait for the end.

I should like to breed *Limia*, but know very little about them. Are they easy to breed, and do they need any special treatment?

Limia are very attractive livebearers, and we wish there were as many about now as there were before the war. They are not difficult to breed, and always struck us as being hardier than the majority of livebearers. Give them a thickly planted tank, shallow water, and a sunny or well-lit position and they should do well. We used to produce lots of *L. caudofasciata* during the summer months by placing a gravid female in a large glass photographic tray choked with *Riccia*. This tray was always placed on top of a tank, the heat from which kept the water at a temperature of about 72° F.

I have had my angel fish spawn several times, but on every occasion the eggs have turned white, and, in those few cases where a few fry have hatched out, these baby fish have died within a few days. I have used ordinary water from the mains to fill the spawning tank.

We advise you to use softer water than you are using at the present time. If you cannot obtain clean rain water from a wood-sided water-butt, try straining tap water through scalded peat. The eggs will stand a better chance of hatching out, and the fry will get a better start in soft water than they would in hard, chlorinated water from the mains. Another thing, do not allow a bright light to shine on the eggs. Semi-shade suits eggs and fry best.

I have succeeded in crossing a female guppy with a male black molly. The dozen or so fry are one week old. Is this an un-

usual cross, and do you think there is any chance of the hybrid fish breeding together?

Mollie × *Lebistes* hybrids are not common, though several have been exhibited at the big fish shows. The baby fish resulting from such a mating are usually very delicate, and almost always die when they are a few weeks old. Those that live are usually infertile, and so the breeder is always prevented from perpetuating a new strain.

I am always coming across references to peat in articles on aquarium management. But can you please enlighten me as to the sort of peat used to layer the bottom of a tank, or to fill a filter? I have been told that some peat contains harmful chemicals.

Always use the rough, baled peat as dug from a peat-bog. The so-called horticultural peat used as a mulch for azaleas, ericas and the like is refined and often adulterated with chemical fertilisers. If you just need peat for the purpose of creating acid conditions, you can achieve the same end by straining the water through well-rotted oak leaves taken from a wood, or sphagnum moss.

I should be very grateful if you can supply me with some information on the fish *Uaru amphiacanthoides*, which I understand is a rare species.

U. amphiacanthoides is a rare fish, and not very much is known about it. What we do know is that it is found in the freshwaters of Guiana and the Amazon basin, and grows to a length of about ten inches. Young specimens are greenish marked with a dark band along the side, and a dark blotch just behind the gill-cover. There is a similar dark marking on the caudal peduncle. It is said to be quite well-behaved in the aquarium, and will live on peaceful terms with other fishes of about its own size. It is a cichlid, and is said to spawn in the typical cichlid manner, but we have not come across any mention of its being bred in captivity. It will eat the usual meaty and live foods.

COLDWATER FISHKEEPING QUERIES answered by A. BOARDER

In the recess in my living room I am fitting a tank, 4 feet long, which I am placing on timber bearers supported by stout legs. What size angle iron should I use for the tank frame and what size glass?

For a tank as long as yours I suggest one and a half inch angle iron. This would give added strength although I daresay you could get by with one-inch angle iron especially if you place one or two struts across from front to back at intervals to stop any chance of whipping. You will be well advised to use nothing less than quarter-plate glass. The weight of water will be very great and so make sure that your tank supports are strong enough.

I have two tanks about 24 ins. by 12 ins. with three goldfish in one and three shubunkins in the other. All goes well except that the fishes keep rooting up the water plants and the only one they appear to leave alone is the *Vallisneria spiralis*. Could I use this plant only or is there another plant you can recommend for me to use?

There is no reason why you should not use all *Vallisneria*. I find that twisted vallis is one of the best I can grow in my set-up cold tanks. The other plant I have become very fond of is *Hydrophila polysperma*. This is a grand plant for the cold tank. I have been growing it for some time now and the longer I have it the more I like it. It grows something like *Ludwigia* but is pale green. With me it is a good grower but yet not one to get out of hand too quickly. The Federation of British Aquatic Societies place it in the list for tropical tanks only, but how wrong they are in this case! It is an ideal plant for the indoor coldwater tank, as anyone can see who cares to inspect my tanks. When goldfish uproot plants it is often possible to stop much of this bad practice by placing some duck weed on the top of

the water for them to eat; goldfish like some form of vegetable matter as food. Also you can place fairly large stones over the roots of the plants to prevent the fish from moving them.

I have a veiltail goldfish which has developed bladder trouble. I have tried it in salt water and after treatment when returned to the communal tank it is soon in trouble again. How can I effect a cure?

The chances of a lasting cure for the bladder trouble depend on the cause of the complaint. Some fish have the tendency to bladder disorders bred in them, when it is almost impossible to cure them. Aquarists have largely brought this trouble on themselves by trying to cure breeding fishes of this complaint and then using them for breeding. This is a very wrong practice. No fish must be used for breeding unless it is in the pink of condition and free from any tendencies for bladder trouble. A great deal of the trouble is hereditary but not all. When a mature fish develops this complaint it can often be traced to one or two causes. The extra swelling caused by the formation of eggs or milt is one reason, when the complaint eases if eggs or milt are passed. Indigestion can also cause it and a chill has been known to bring on the ailment. These latter causes may mean that you have a very good chance of effecting a lasting cure. In the first place all affected fishes appear to improve in shallow water, especially if it is about 10 degrees warmer than that from which they have come. Also no dried foods should be given whilst the fish is under treatment. Live food in the form of garden worms or *Daphnia* should be given.

I have built a pond in my garden 6 ft. by 6 ft. by 2 ft. It is now filled with water. What treatment should I give the concrete to make it safe for fishes? There are various books on the subject and nearly all vary in the advice given.

I expect my advice may vary from many others, and, of course, there is no one way to ensure the safety of the fish in a new pond. I know of several methods of treatment, any of which may be quite all right. My own pond when finished was filled with water for a couple of days. It was then emptied, scrubbed well with a stiff broom, filled with water and the fish placed therein. Some are still alive after 18 years and I had no trouble from free lime. As long as you wash off the free lime the water will be safe, but a lot depends on the amount of water the pond holds in proportion to the amount of concrete surface. The more shallow the water the greater will the concentration of free lime be. Some people use substances to incorporate in the mixture, some paint with silicate of soda, some keep filling, washing out and refilling for weeks or even months. When you have given the pond a good scrub out and have filled it again you can easily test the water for lime with a piece of the testing paper procurable from aquarists' stores to make sure the water is safe before introducing fishes.

I have hatched quite a good number of veiltail and comet goldfish from good parentage. Some have thrived from the start and others of the same age are only a quarter the size. The small ones look all right but I am wondering whether it is possible to get some good specimens from these smaller fishes or shall I not trouble with them?

It is quite possible that among the smaller fishes there may be some very good specimens. All fish do not develop at the same rate. Some of the quicker-growing ones turn out coarse and are of little use for showing. Among the smaller ones may be fish capable of turning out winners. As long as these smaller fish are in good health and eat well there is no reason why they should not make good fish. The secret in their treatment is to grade early and see that the bigger, fast-growing specimens are kept by themselves. It is surprising how soon the smaller fishes will start to grow as soon as they are away from the gross-feeding ones. The bigger chaps get to be bullies as far as food is concerned and by always getting the lion's share they grow at a much faster rate than the others and so become even larger. I have not found that these smaller fishes are any less hardy than the larger ones. It is often in the very early stages of feeding that some fishes go ahead. Perhaps a fish may hatch a day or two before others in the tank; this gives the fish a big advantage and I doubt if the other, later-hatched ones ever get a chance to catch up. Although all the eggs may have been laid at the same time some eggs may have been lower down in the tank where the water was somewhat colder and so took longer to hatch.

I have some young comet goldfish in an outdoor pond and find that none of them has developed such long finnage as their brothers and sisters of the same hatching which have been kept under warmer conditions. Is there any reason for this?

Fishes develop their finnage much quicker in warmer water. I have had fry from the same parents kept under warm conditions with fins almost twice as large as other fry kept under cold conditions. I am of the opinion, however, that this slow development of the cold-treated ones will make up for lost time at a later date when the fins may grow to be as long in proportion to the body as was the case with the quicker developing ones. Where a large development of finnage is required it pays to rear the fry at a temperature of about 70° F., whereas for fishes needing smaller finnage a temperature of ten degrees lower will suffice.

I have a tank 36 ins. by 12 ins. by 12 ins. and I would like to keep one pair of each kind of fancy goldfish in it. Could I do this? I am not really interested in breeding them.

There is no reason why you should not keep several pairs

of fishes in your tank. I doubt very much whether you are likely to be able to breed many fish in the tank under communal conditions. If they did breed there would be no means of keeping the separate pairs of fishes to themselves, as all males would join in the spawnings and all sorts of crosses would be possible among the young. It would be possible to keep a pair each of veiltails, fantails, moors, shubunkins and common goldfish as long as none exceeded three inches in length over all.



Photo:

Laurence E. Perkins

Dragon fly newly emerged from the nymph case shown lower down the stick

I found some rather long-bodied creatures crawling on the bottom of my pond. Can you identify these please?

It is possible that they were the larvae of dragon flies. In the photograph reproduced here there is a dragon fly which has just emerged from its nymph stage below. This lower shape you can compare with the type of creature you may have found in your pond. The dragon fly lays eggs in or near the water. Small larvae come from these and after feeding for some time change into a nymph, and when ready this climbs up a stalk and the perfect dragon fly emerges from the split skin. The larvae can eat other water creatures, fish included, and so should be caught and destroyed if seen.

I am puzzled about one of my golden orfe. I noticed it floating on its side in the pond. I caught it and placed it in a bowl of fresh water. This seemed to revive it but I then noticed some black marks on the head and back. Are these the cause of the trouble? I could see no signs of fungus.

The black markings on the orfe are not the signs of disease. Many orfe develop these markings as they grow older. Some strains do this more readily than others. I should say that your fish was suffering from lack of oxygen. The pond water may have become too warm, when some of the oxygen was driven out, or there may have been something in the water which was decomposing and causing foul gases to form. Thundery weather can cause orfe to float on their sides and they may even die if fresh colder water is not given them immediately.

our readers

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.



write

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

Oil Pollution

LONGER days and warmer weather turns our thoughts towards the holiday season, and perhaps this is an appropriate time to wonder how many of those who will visit our coasts this summer will find cause for annoyance through oil pollution? At first sight it may seem strange to find an aquarist drawing special attention to this subject, for no doubt most of us are only familiar with the more obvious aspects—spoilt clothes and suffering birds. Nevertheless, as students and lovers of underwater life we should feel special concern.

It has been pointed out that we have allowed our rivers to become sewers in which fish and plants cannot live and that we must watch and guard against similar effects round our shores. Inshore fishermen find that there are occasions when they cannot wash their catch at sea—because one case of condemnation through oil contamination would adversely affect our tables and pockets for a long time. Dr. A. Vedel Tanning (Director, Danish Fisheries and Marine Research Institute at Copenhagen) is reported as emphasising the great loss of the sea's riches by the destruction of plankton and other sea organisms and fish ova.

To abate the nuisance the long-term plan is to prohibit the discharge of oil-residues at sea, for the palliative of a limited zone is not an answer. Many ship-owners and oil companies agree with this view but only strong public pressure can move Governments to immediate and effective action. We aquarists can take a really effective part in this work by supporting such organisations as the British Section, International Committee for Bird Preservation (c/o British Museum, London, S.W.7) by taking note of cases of pollution and sending the details to the committee and also by writing to the newspapers. The nations who attended the 1953 London Conference and the further conference in 1954 represented about 95 per cent. of the world's shipping tonnage and they have agreed to meet again in 1957. Public opinion must press this coming conference to prohibit entirely the discharge of persistent oils at sea.

H. J. VOSPER,
Secretary, Forest Hill and District
Aquaria Society.

Pond Illumination

IN a query, published in the April issue of *The Aquarist*, a reader asked about underwater illumination for ponds. My own pond has been illuminated in this way for several years, and I can say that bulbs inserted in "waterproof jars" will deteriorate and give constant trouble. On mains

voltages this method is out of the question, for condensation will cause short circuits and blown fuses.

I have found that car headlamp bulbs, say 12 volts, 36 watts, immersed directly in the water, together with their standard S.B.C. bulb-holder, will give perfect satisfaction at low cost and perfect safety. The cable (polyvinyl chloride or tough rubber-insulated) can be buried in the sub-soil or even laid in the concrete sides of the pond. A suitable transformer for the mains voltage can be purchased at reasonable cost from any government surplus stores, but the "auto" type should not be used.

S. C. FUDGE,
Stafford.

Fin Rot in Swordtails

A NOTE in the April issue of *The Aquarist* gave the cause of fin rot in black swordtails as malnutrition, unhygienic conditions, etc. In the lecture given by Dr. Myron Gordon in Glasgow in 1953, it was stated that the rotting of fins in these fish is caused by the condition commonly known as black cancer, and it was shown that in specimens kept in Dr. Gordon's experimental aquaria in New York, the cancerous tissue is not unlike that found in humans with this type of cancer. This type of cancer is not contagious to other fish or to humans, and I have found that the less black pigment present in the fins of swordtails the more chance there is of their survival.

A. MORRISON,
Kilmarnock, Ayrshire.

Sticklebacks in Aquaria

I HAVE kept sticklebacks in aquaria for a number of years now and, for the past three years, have succeeded in breeding them in a 20 ins. by 10 ins. by 10 ins. tank in full view of a class of 40 boys. During that time I have never noticed them using their spines as offensive weapons, although I have witnessed frequent sparring matches in which the mouth was used.

Most books on the subject say that the spines are used when fighting, and I should very much like to hear from any of your readers who have actually seen sticklebacks using their spines in this manner. In fact, any observations on the subject would be most welcome.

W. ASHLEY,
Bristol, 4.

Callichthys Nomenclature

"Pisces" writes: I apologise to Professor G. S. Myers for accrediting the translation of *Callichthys* appearing in Innes'

Exotic Aquarium Fishes to him. This was particularly unfortunate inasmuch as he disagrees with it, supporting Mr. Hervey's contention that it means "pretty" or "beautiful" fish. I would also like to thank him for shedding a little light upon the original application of the name. My personal desire is still to call the Callichthyidae "hard-skinned" instead of pretty, but for the sake of harmony, and accuracy, will resolutely subdue my inclination.

Water Hardness

IN a reply by your expert to a reader's query on producing soft water, it is stated that to pour tap water on to an inch of scalded peat and leave it for a few days will bring the desired result. This is, of course, not correct. In a test, employed by four members of this society, using the "Schwarzenbach" test equipment for water hardness, no measurable difference could be read even after water had been allowed to stand for two months. It appears again as though hard grade and pH have been confused.

B. CALBOW,
Hendon Aquatic Society.

It is regretted that this mistake was overlooked. Peat will make water acid, of course, but this does not reduce the hardness figure as well—EDITOR.

Encouraging Schools

IT seems to me that aquarists could increase the interest in their hobby by starting with the children at school. Clubs could assist schools in their areas by offering advice to teachers who are responsible for aquaria, and even by helping with plants and surplus fish where possible. Schools are sometimes provided with a tank or two and maybe the children have dug a pond, but it is usually the teacher who provides the fish, etc., and where the teacher is not an aquarist, if the tank goes wrong and fish die, there is a chance that fishkeeping will be looked upon as rather difficult; whereas, with help from local aquarists, fishkeeping, and even breeding, as well as all aquatic life, could become a study full of interest and thrills to the children.

Many youngsters introduce the hobby at home, but unfortunately the price of an aquarium is usually far beyond the purse of a boy or girl so many can never possess a tank of their own; and so the tanks at school are watched with eagerness. Could I appeal to those who have surplus fish, tropical or coldwater, reptiles, or any type of unwanted equipment which could be spared, and I will pass it on for use in the schools in this district.

G. B. TAPPENDEN,
22, Nora Hill, Basingstoke, Hants.

Audiences and Lectures

LAST week I visited the South Bank Aquarium to hear three lectures, given by the Hendon Aquatic Society. About 300 aquarists attended, and obviously not a word from the three lectures was wasted. It has occurred to me that in these days of falling club attendances, and of the ever-present dearth of good lecturers, that much greater use could be made of the available speakers, if the F.B.A.S. followed the lead of the Hendon Society, and brought aquarists to the good lecturers, instead of sending speakers to poorly attended single club meetings.

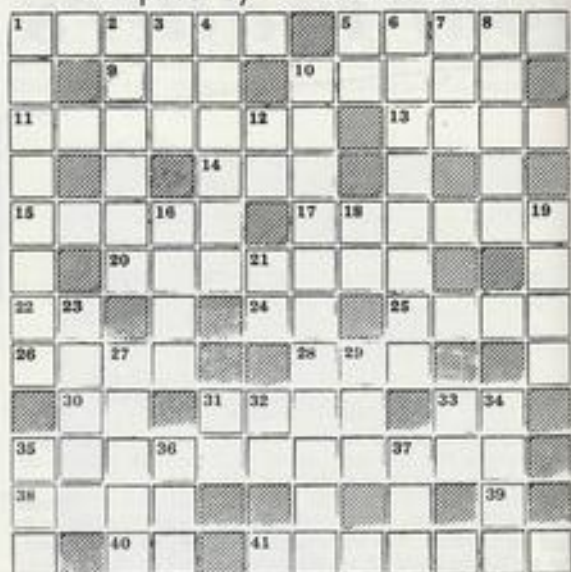
B. J. CORVELL,
Harrow.

PICK YOUR ANSWER

- "O flesh, flesh, how art thou fishified!" is from Shakespeare's: (a) Hamlet. (b) Macbeth. (c) Othello. (d) Romeo and Juliet.
- The moose goldfish is known to the Japanese as: (a) Demekin. (b) Maruko. (c) Ryukin. (d) Shokin.
- In the wild *Plecotomus plecostomus* will reach a length of about: (a) 8 ins. (b) 12 ins. (c) 16 ins. (d) 20 ins.

The AQUARIST Crossword

Compiled by J. LAUGHLAND



CLUES ACROSS

- Barbus barbus* (6)
- Scalare, and less faintly than it sounds (5)
- Organ of balance rather than of hearing in fish (3)
- What the angler has in the bottle? Hurrah! (5)
- Parasitic snake-like fish of which a British king was too fond, with fatal results (7)
- Highlight of the aquarium (4)
- Fry of the devil fish? (3)
- I leave the drug for large British bird and noted fisher (5)
- Traditional duelling weapon; hence the swordfish is also known as the —fish (6)
- Grief largely from *Anguilla*, the eel (7)
- What the American aquarist may say when he finds most of his spawn has vanished (2)
- The Silent Service (1.1)
- Old (4)
- Dare or dart (4)
- Long limb of the water boatman (3)
- Tadpole begins to express gratitude in a slangy way (2)
- Moslem judge sad to leave a *Caddis* (4)
- but the Christian era is in his heart (1.1)
- The perch-like fishes (11)
- Therefore the gore is upset (4)
- Half the *Esox* is not fish at all! (2)
- May be of water or angler's imagination (7)

CLUES DOWN

- Miller's thumb (8)
- Sucking-fish; or serpent (6)
- Scotch roll (3)
- Herring is mistaken in dropping an aspirate (6)
- British equivalent of 22 across (2)
- Great white water-lily (8)
- Horse, in a slangy way; but not seahorse (3)
- Flat away; or what the cockney did on 7 down (5)
- Microcyprini* (1.1)
- Little Emmie halves them (2)
- A hundred goes into one, but not often (4)
- This is as shown (2)
- Poles for perch, perhaps (4)
- City of the Chaldees (2)
- Fish are in their element in this (5)
- Ship's load (5)
- Fish need this, even in 23 down (3)
- Congers start a little company (2)
- Day starts as bream ends (1.1)
- See 5 down (2)
- Sucker of octopus, perhaps (4)
- If a fish is one it may return in tepid water (3)
- A hundred 40 across guide the boat (3)
- If this dish is made of fish it will be three parts pike (3)

- Gambusia pinnata* is native to: (a) Cuba. (b) Panama. (c) Texas. (d) Venezuela.
- Which is the largest of the following species?: (a) *Limia caudo-fasciata*. (b) *Limia heterandria*. (c) *Limia nigrofasciata*. (d) *Limia vittata*.
- The popular name of *Cardamine rotundifolia* is: (a) American brooklime. (b) American cowslip. (c) American frogbit. (d) American watercress.

G.F.H.

(Solutions on page 58)



Fishes at a table show, staged by the Cambridge District Fishkeepers' Club, being judged by Messrs. S. Wright and C. K. Lambert. Secretary Mr. R. F. Thurston, is looking on. At the show the "Cambridge Daily News" Cup, for most points gained at four quarterly shows, was awarded to Mr. C. Fuller

Extra Special B.A.F.

ANOTHER British Aquarists' Festival is to be staged by the Federation of Northern Aquarist Societies this year (5th to 9th October) at the Belle Vue Zoological Gardens, Manchester. A special item of interest at the event will be the arrangement of entries from societies as individual artistic displays, an innovation for aquarium shows first given a successful trial at the Autumn Assembly of the F.N.A.S. last October (see *The Aquarist*, November, 1954). For the class covering these society displays, cash prizes of

Twenty-five pounds (first)
Fifteen pounds (second)
Ten pounds (third)

are being offered by *The Aquarist*, which, as in previous years, will be collaborating with the F.N.A.S. in presenting the exhibition. These cash prizes are in addition to the unusually fine collection of trophies and awards presented at the B.A.F. in the past, and they are offered in recognition of the expenditure which is involved for societies preparing novel and attractive displays of the standard set by northern societies last year. As usual, entries are invited from all British aquarist societies; one London society, *Bendon A.S.*, has already announced their intention of taking part. Schedules of classes are now being prepared, and further details will be published in *The Aquarist* next month. Inquiries relating to the Festival should be addressed to Mr. S. W. Cooke, Spring Grove, Field Hill, Badley, Yorks.

Secretary Changes

CHANGES of secretaries and addresses have been reported from the following societies: *Basingstoke Aquarist Society* (Mr. M. G. Fuller, 25, Cuddesden Road, Basingstoke, Hants.); *Horley and District Aquarium and Pondkeepers' Society* (Miss D. Morris, 66, Balcombe Road, Horley, Surrey); *North of Scotland Aquarist Society* (Mr. G. Kidd, West Lodge, Danestone, Woodside, Aberdeen, Scotland); *Perth and District Aquarist Club* (Mr. W. T. Murray, 8, Croft Bank, Craigie, Perth, Scotland); *Redhill and District Aquarist Society* (Mr. B. C. Robinson, 21, Bichings Way, Woodhatch, Reigate, Surrey); *St. Helens and District Aquarist Society* (Mr. R. J. Charnock, 81, Owen Street, St. Helens, Lancs.).

June, 1955



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.

Aquarist's Calendar

9th-11th June—National Aquarium Exhibition at Royal Horticultural Hall, London, S.W.1.

18th June—Cambridge and District Aquarists' Society members' show at Tracey Hall, Cockburn Street, Cambridge.

20th June—British Herpetological Society (London Group) meeting: "General Anatomy of Reptiles," a talk by Dr. Malcolm Smith, 7 p.m., at the Linnean Society's Rooms, Burlington House, Piccadilly, London, W.1.

23rd-25th June—Southampton and District Aquarists' Society sixth annual open show at Avenue Hall, Southampton. Entry forms and further details available from show secretary, Mr. E. C. Goleworthy, Westways, Romsey Road, Nursling, Southampton.

7th-10th July—Chester and District Aquarist Society annual open show at St. Peter's Parish Hall, Chester. Schedules from show secretary, Mr. C. Morrison, 22, Belgrave Place, Handbridge, Chester.

15th-16th July—Macclesfield Aquarium Society fourth annual exhibition at Brocklehurst Memorial Hall, Queen Victoria Street, Macclesfield, Cheshire. Particulars of open club furnished aquaria class from show secretary, Mr. S. B. Cass, 20, Duke Street, Macclesfield.

16th July—Standard Kolster Aquarist Society annual open show in conjunction with Standard Kolster Pets.

21st-23rd July—Bath Aquarists' Society third annual open show at the Concert Hall, Pump Room, Bath. Schedules available from show secretary, Miss A. Gurney, 41, Sydney Buildings, Bath.

28th-30th July—Portsmouth Aquarists'

Club annual open show at Royal Engineers' Drill Hall, Portsmouth. Entry forms from show secretary, Mr. G. Elverson, 24, Bertie Road, Southsea.

30th July—Bedford and District Aquarist Society open show in conjunction with Marston Valley Brick Company's Show and Sports. Details and schedules from secretary, Mr. R. R. Pope, 51, Aylesbury Road, Bedford.

2nd-3rd August—Leicester Aquarist Society display of aquaria at Leicester and Abbey Park Show in horticultural marquee.

10th-13th August—Hendon and District Aquarists' Society annual open show. Details and schedules from Mr. Hartrop, 37, Park Mansions, Vivian Avenue, Hendon, London, N.W.4.

19th-20th August—Kirkcaldy and District Aquarist Society first annual show at Boys' Brigade Hall, Kirkcaldy, Fife. Schedules from show secretary, Mr. A. Blair, 14, Miller Street, Gallatown, Kirkcaldy, Fife.

20th-21st August—Leyton Aquaria Society annual open show (in conjunction with Borough of Leyton Show) at Coronation Gardens, Leyton. Saturday: 3.30-9 p.m.; Sunday: 12 a.m.-8 p.m. Schedules from show secretary, Mr. R. Bergdahl, 49, Overton Drive, Wanstead, London, E.11.

25th-27th August—Midland Aquatic Show at Bingley Hall, Birmingham.

31st August-1st September—Leicester Aquarist Society annual show at St. Mark's Schoolroom, Belgrave Road, Leicester. Show secretary, Mr. H. L. Matthews, 61, Almsdale Road, Leicester.

31st August-10th September—Nottingham and District Aquarists' Society annual show. 8th September—Yeovil and District Aquarist Society furnished aquaria exhibition at Yeovil Agricultural Show.



Photo:

J. L. Anderton

Members of the Rochdale and District Aquarist Society and their families photographed together on a day's outing to Bridlington and Driffield, Yorkshire, where they visited the fish hatcheries of Miss M. Wardlow

Opening of the TORQUAY Aquarium

by A. FRASER-BRUNNER

"A VALUABLE new amenity for our beautiful town" is how the Mayor of Torquay described the new aquarium opened to the public on the 3rd March. He was speaking at a luncheon following the opening ceremony, which was performed by Mr. George Cansdale, the well-known lecturer and television star.

This new aquarium owes its existence mainly to the foresight and energy of Mr. H. Sinclair, whose long experience at Paignton and Southsea has been invaluable to the enterprise, and his partner, Mr. G. Dixon, also of Paignton. Together they have transformed an old and unsightly coal store into a very attractive and dignified exhibition. The capacious stone building was excellently suited to the purpose once it was emptied and cleaned, and ingenious planning made the fullest use of the floor space.

Situated on the harbour-side, the regular supply of sea water and local marine life (which is rich and varied) presents no problem. The fishermen, who take a keen interest and even make special trips to collect specimens, can bring their catches to the very threshold of the building. The local Aqualung Club is also interested, and when warmer weather comes the members will dive to find interesting exhibits. This use of the local resources is well justified, for most of the inhabitants of Torquay are unaware of the interest that lies beneath the water over which they gaze each day.

This applies even to the fishermen, one of whom greatly admired a fine display of plumose anemones in one of the tanks and asked where they came from; he did not recognise the "bits of jelly" that had come up in his own trawl a day or two previously and had been rescued by Mr. Sinclair. The institution is not, however, by any means confined to a show of the native fauna. Already a hawksbill turtle is on show, and when the installations are complete many species of fish from tropical seas will be imported.



On entering the building through handsome swing doors with engraved glass panels, by way of the appropriately decorated lobby and turnstile, one finds oneself in the spacious freshwater hall, in which both cold and tropical species are exhibited. The tropical section is not yet completed, but already a number of unusual specimens are on show, among them some very fine *Barbus schwanenfeldii*, *Labeo bicolor* and *Mastacembelus pancalus*. Owing to the delays in completion of this section, a considerable number of fishes have been temporarily accommodated by members of the Torquay Aquatic Society, who have given every possible assistance to the project.

In the coldwater section varieties of goldfish, golden orfe, golden rudd, carp, roach, bitterling, axolotls and other well-known species are exhibited. Passing into the marine hall, a fine range of large tanks contains nursehounds, spotted dogfish, skates and rays, gurnards, pouting, flatfish, anglerfish and many other native sea-fish, while smaller ones contain dragonets, blennies, sea-anemones, crabs, lobsters, and shell-fish of many kinds.

Throughout the aquarium the tanks are built-in, of concrete, and even the smallest are of ample proportions. All are illuminated by electric light, and all are provided with aeration. Only those who have had the experience can realise the thought and labour that has gone into the making of this exhibition, and the difficulties that have had to be overcome. Mr. Sinclair was naturally disappointed that it could not be completed and fully stocked on the official opening day, but all who saw it were impressed nevertheless, and there is no doubt that before the summer season commences it will provide a display that will compare favourably with any other of its kind.



Photos:

A. Fraser-Brunner

In the picture at the top of this page, Mr. George Cansdale is seen officially opening the new aquarium at Torquay, watched on the left by the Mayor, Mayoress and Deputy Mayor of Torquay

Outside the main entrance to the aquarium are seen its directors and their wives. Left, Mr. and Mrs. H. Sinclair; right Mr. and Mrs. G. Dixon

Crossword Solution

B	A	R	B	E	L	A	N	G	E	L
U	E	A	R	C	H	E	E	R		
L	A	M	P	R	E	Y	N	E	O	N
L	O	I	M	P	U	I	D			
H	E	R	O	N	R	A	P	I	E	R
E	A	N	G	U	I	S	H			
A	W	C	R	N	A	G	E	D		
D	A	C	E	O	A	R	S			
T	A	C	A	D	I	A	D			
P	E	R	C	O	M	O	R	P	H	I
E	R	G	O	N	I	S				
T	O	X	S	T	R	E	T	C	H	

PICK YOUR ANSWER (Solution)
1 (d). 2 (a). 3 (c). 4 (a). 5 (d). 6 (d).