

# The AQUARIST AND PONDKEEPER

Founded in 1924 as "The Amateur Aquarist"



THE BUTTS, HALF ACRE, BRENTFORD,  
MIDDLESEX

Telephone: HOUnslow 9301

PUBLISHED MONTHLY

SUBSCRIPTION RATES

The *Aquarist* will be sent post free for one year to any address for 19/6. Half-yearly 9/9. Canada and U.S.A. \$3.00 yearly; \$1.75 half-yearly.

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

Correspondence with intending contributors is welcomed.

MSS. or prints unaccompanied by a stamped, addressed envelope cannot be returned, and no responsibility is accepted for contributions submitted.

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VOL. XX No. 1

1955

## Editorial

SOMETIMES people are heard speaking of the present popularity of aquarium-keeping as something quite new in this country. This is not true, for although the number of people at present attracted to the hobby is almost certainly the highest ever, a great wave of interest which probably gave the foundation for home aquarium-keeping occurred about half way through the last century. After the decline of that interest, which strangely enough was largely directed towards marine aquaria, a small but substantial band of enthusiasts was left.

It is interesting to seek reasons for the greater success of the aquarium movement renaissance, linked as it has been with increasing education and changes of social structure. However, it is not this aspect which attracts our attention to-day, but another phenomenon bringing reminders from the last century. That is the growing establishment of collections of aquaria open for public viewing. In London, the deservedly popular South Bank Aquarium opened last year. This summer new aquariums open at Southend, Torquay and Paignton. Other holiday resorts which have tried small aquarium exhibitions are acknowledging their popularity by making more permanent and serious displays. Most of them, it should be noted, are in the hands of private individuals or companies. During the nineteenth century aquarium phase too, many large displays were opened, but few survived; more often than not municipal or public authority ventures, these included aquariums founded at Liverpool, Manchester and Brighton.

Perhaps those early aquariums grew too quickly or too soon, mistaking the extent of the public interest on which they had to rely for support; perhaps they did not get a fair trial before dissolution. Whatever the reasons which belong to history, let all aquarists look to the present and future to see that every worthy aquarium open now is supported and encouraged to expand. As well, let the aquariums follow South Bank's example of full co-operation with aquarists' societies—there is great scope here.



Photo:

J. West

Angel fishes belonging to Mr. R. M. Woodhard (Guernsey) spawning on a strip of slate placed in the aquarium. Breeding methods are discussed in this month's "Refresher Course" article on page 267.

April, 1955

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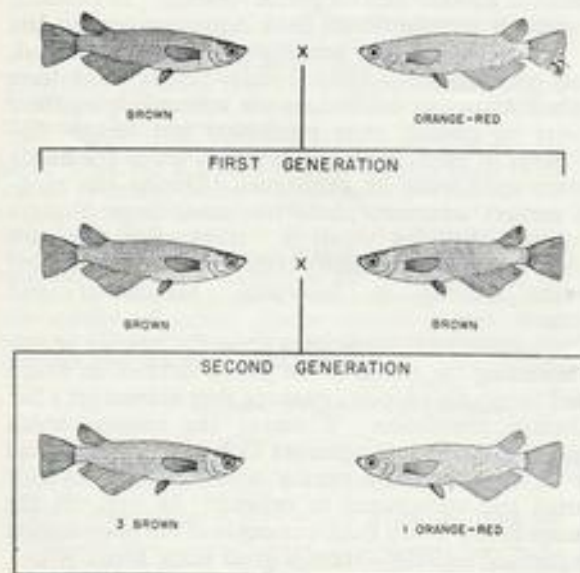
# Dobutsu-gagu-Kogi — A Japanese Book in which was found the First Account of Mendelian Inheritance in an Aquarium Fish.

by Dr. MYRON GORDON  
Geneticist to the Aquarium, New York  
Zoological Society

JUST forty-two years ago the first experiments designed to test Mendelian principles of inheritance in fishes were described by Chiyomatsu Ishikawa. In his book in Japanese entitled *Dobutsu-gagu-Kogi* or *Lectures in Zoology*, he revealed that *Oryzias latipes*, the medaka, the little, native killifish of Japanese ponds, rivers and rice paddy fields, has two contrasting colour phases, one dark or blackish-brown, the other quite light or orange-red. When Professor Ishikawa mated the dark-coloured medaka with the lighter one he found that the members of the first generation were all dark. When he mated the dark members of the first generation together, that is, crossing a dark brother with its dark sister, the professor found that among the young of the second generation, there were three times as many dark medakas as light-coloured ones.

Ishikawa in his book presented his results in Mendelian terms which may be expressed as follows. The brown medaka's coloration was referred to a dominant hereditary factor or gene called *B*; its recessive factor for the contrasting, and lighter orange-red colour, was referred to the recessive gene *b*. When a pure-breed brown medaka (*BB*) was mated to the orange-red one (*bb*) the cross was expressed as follows:

Parents ( $P_1$ ) =	Brown <i>BB</i>	Orange-Red <i>bb</i>
First Generation ( $F_1$ )	Brown <i>Bb</i>	Brown <i>Bb</i>
Second Generation ( $F_2$ )	Brown 1 <i>BB</i> , 2 <i>Bb</i>	Yellowish 1 <i>bb</i>



The results Professor Ishikawa obtained in the second generation, namely, three brown to one light medaka, may be explained by use of the Punnett Squares, keeping in mind that the hereditary constitution of the members of the first generation are *Bb*. Although they are dark in appearance they are not true-breeding browns.

The sperms that are produced by a brown male (*Bb*) of the first generation are of two kinds, *B* or *b*. About 50 per cent. of his sperm cells carry the *B* gene, while the remainder carry the *b* gene. Similarly, the ova that are produced by the brown female (*Bb*) of the first generation are of two kinds: half carry the *B* gene, the other half carry the recessive *b*. Thus, when a *Bb* male mates with a *Bb* female, the way the sperms and ova unite with regard to the pairing of their hereditary factors may be represented by the following diagram.

	Sperms	
	<i>B</i>	<i>b</i>
Ova	<i>B</i>	
	<i>b</i>	

When the sperms with *B* or *b* genes fertilise the ova with *B* or *b* genes all possible combinations will be found in the appropriate squares, as follows (in essence it is an exercise in multiplication):

	<i>B</i>	<i>b</i>
<i>B</i>	<i>BB</i>	<i>Bb</i>
<i>b</i>	<i>Bb</i>	<i>bb</i>

The above results indicate that there are three squares containing at least one capital *B* to one containing only small *b*'s. This may be taken to mean that there are three brown medakas, 1 *BB* + 2 *Bb* to one orange-red, *bb*.

I am deeply indebted to Dr. Makoto Ishiwara of Kyushu for bringing Professor Chiyomatsu Ishikawa's book to my attention. By sending me a copy of his own report on the inheritance in the medaka in which he explained how he created a blue-black variety starting out with a brown and white, Professor Ishiwara referred to his predecessor's work on this fish. That is how I learned about it. The results of Professor Ishiwara's experiments will be described in a forthcoming article in this series devoted to inheritance in the medakas.

## In the News

A FEMALE coelacanth, the first of the sex in this species of fish, long believed to be extinct, that has been examined, was captured off Madagascar and taken to Tananarive last month. The fish was 5 ft. 8 ins. in length and when opened was found to have within it 60 eggs.

SOUTHEND pier is to have an aquarium open for visitors by Whitsun this year. Work on the aquarium began last month; included in the design is a large room which may be used as a lecture room and will accommodate parties of school children and members of societies.

# Angel Fish

(*Pterophyllum eimekei*)

ORDER:—Percomorphi, from Greek *perke*—perch, and Greek *morphe*—shape.

FAMILY:—Cichlidae, from Greek *kichle*—a kind of sea-fish.

SPECIES:—*Pterophyllum*, Greek *peron*—fin or wing, and Greek *phyllon*—leaf, *eimekei*, after Eimeke, an early, probably the first, importer.

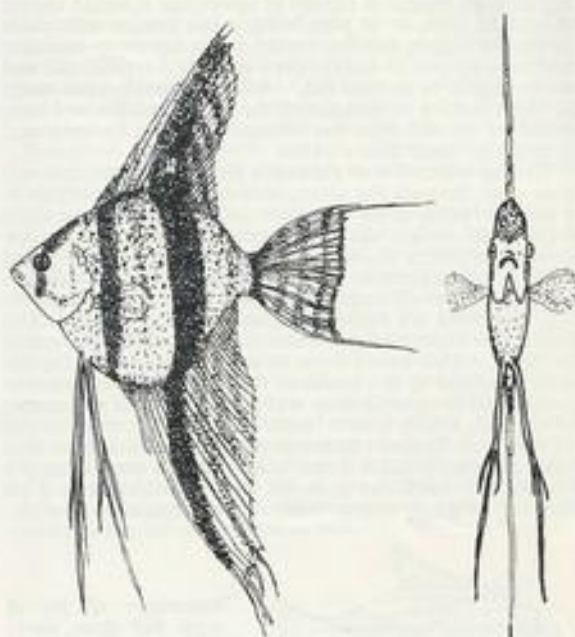
THE angel fish might truly be described as a missionary fish, for unquestionably it has been responsible for converting untold thousands into aquarists, or at least fish-keepers. Even now I can still recall the thrill I received when I first set eyes upon a group of a dozen, in a deep, well-planted aquarium, moving serenely about in crystal-clear water. They possessed a dignity entirely their own, and a grace which proclaimed them as aristocrats. My companion at the time tapped the frame of the aquarium, and the fishes disappeared simply by turning to face us. Their elongated shape and wafer-thin bodies merged so well into the background of strap-like leaves that only the sharpest eyes could make them out.

Although one or two angels are kept in the aquaria of the majority of present day aquarists, together with a heterogeneous collection of other species, and live in perfect harmony with their companions, they are worthier than most species of an aquarium of their own. With special attention they can grow quite large, with bodies about four inches deep. The well-developed dorsal and anal fins can easily add a further five to seven inches to the overall depth. From this it is at once apparent that a tank of more than the average depth is of great importance. Nothing looks worse than a well-grown specimen of angel fish in a small tank, forced to keep its fins partially folded in order to avoid their extremities emerging from the water or scraping the sand at the bottom of the tank.

I suggest a *minimum* water depth of 15 inches. With compost the overall depth will be in the region of 18 inches. Depth in this case is more important than length or breadth. As might be expected with such a popular and striking fish, breeding habits and requirements have been intensely studied. For many years following their first introduction to aquarists, success was practically unobtainable, but of recent years much better results have been obtained. We no longer have to rely upon the Amazon to provide us with specimens—nor do we have to pay outrageous prices to procure young English-bred fishes.

The best procedure to adopt, therefore, is to invest in half-a-dozen young fishes—body sizes about that of a shilling, and place them in a tank on their own. Plants should be of the strap-leaved species, such as *Vallisneria*, *Sagittaria*, *Cryptocoryne*, Amazon sword, *Aponogeton*, etc. Temperature should be rather high—from 75° F. to 80° F. Some variation is desirable, making for hardier fish. One constant temperature tends to make them soft, unable to withstand any accident with thermostat or heater. The addition of aeration is desirable if the fishes have come from an aerated tank—otherwise it is not generally required.

If your young fishes have been weaned from live food, and readily take good dried food, you can continue to feed them this, but growth and health will be better if a large



proportion of natural live foods are given. *Daphnia*, gnat larvae and pupae, mayfly larvae, *Gammarus*, *Cypris*, blood-worms, *Tubifex*,—all are much appreciated and rapidly consumed. Many aquarists are much troubled by *Cypris*—the little bean-shaped creatures that run over the bottom of the tank and swarm over the plants, and the very best way of getting rid of all those hatched is to introduce an angel fish into the aquarium. The eggs of the *Cypris* will remain uneaten, to provide a further meal later on. Angel fishes are easily tamed, and in a short time can be persuaded to accept tit-bits from your fingers, always provided your fingers are held still and not suddenly moved around in the water. Sudden movements startle the fishes considerably, and if sufficiently shocked, all colour will drain from their bodies and they will lie on their sides on the bottom until they have recovered.

If in first-class condition the fishes will begin to feel the breeding urge when they are about twelve months old. First signs will be the manifestation of increased interest in one or more of their companions. They may lock their jaws together and indulge in what appears to be a trial of strength, tugging each other backwards and forwards across the aquarium. Occasionally, one fish will be markedly stronger than another and in this case the weaker will in all probability be driven away from the group—rejected as unworthy to carry on the race. He or she still has hopes, however, if among the group he can find a companion of the opposite sex who is more or less evenly matched in strength. It is not uncommon for two or three pairs of fishes to live harmoniously together in one aquarium, provided it is a large one.

When a mate is found, the pair will commence to clean leaves of the plants in preparation for the reception of eggs. Many aquarists place glass rods, pieces of slate, a bamboo twig, etc., in the aquarium, and the fishes select these as egg depositories. The pH of the water has, it is claimed,

a definite bearing upon the fertility or otherwise of eggs laid. For years the controversy has gone on—should the water be alkaline or acid, soft or hard, old or new? Looking through dozens of reports of spawnings it would appear that some latitude is permissible—one person will claim success in slightly alkaline freshly drawn tap water—another will state equally as firmly that a pH of 6.8 is essential, and water should be months old. A third claims neutral water as ideal, making no mention of the age of it. So far I have heard of no-one who has obtained success in untreated London or South Essex water.

Having selected and cleaned a site, the female fish will pass eggs through the short, rounded ovipositor which is now protruding from her vent, and these will normally stick to the surface she has chosen. The male follows her closely, fertilising the eggs through a longer, more pointed tube. The temperature of the water should be about 78° to 80° F. Five or six hundred eggs are laid at a single spawning, and these are fanned constantly by the parents. The nearer the surface of the water the shorter the time taken to hatch. This varies from 48 to 72 hours. The fry are able to adhere to the leaves of the plants, where they stay quiet apart from a vigorous and almost constant movement of the tail, which creates quite a current of water in the vicinity. At frequent intervals the parents suck them into their mouths, about a dozen at a time, roll them around a bit and spit them out again on to a fresh location. This washing does not destroy their adhesive qualities.



Appearance of fry of angel fish three weeks old (shown enlarged)

It is almost a week before the fry become free-swimming, and it will be seen that they in no way resemble their parents at this age. Nor will they until several weeks later, after their bodies have deepened considerably. Infusorians are the best first food, to be followed in about ten days from the time they are free-swimming by new-hatched brine shrimp, *Cyclops nauplii*, tiny *Daphnia*, new-hatched mosquito larvae, micro worm, chopped enchytraea, etc., etc. All small living creatures are consumed with eagerness, but the appetite of the fry grows faster than its body, and it frequently becomes a problem to provide sufficient live food to support the large family.

Aeration provided just beneath the meniscus of the water will enable dried food to be given with a greater chance of being accepted, because the gently moving water will keep the particles of food in suspension for quite a time, at the same time causing them to move. Movement first attracts the attention of the fry. A good substitute for live food is dried food soaked in the juices of earthworms. In this case, however, the food will sink to the bottom of the tank, where the fry will be attracted by the smell.

It is always a problem whether to remove the parent fishes after spawning and leave the eggs to hatch on their own, or trust to the parental instincts of the fishes. The trouble is that they are potential cannibals, and are as likely as not to consume the fry. Consequently, many breeders remove the egg-laden weeds or the glass rod, bamboo stick, or piece of slate, to a hatching tank especially prepared.

Water in this is shallow—four or five inches being adequate, and the fanning by the fins of the parents is simulated by gentle aeration. Sand or compost, or plants, are unnecessary. It is important, however, that the water should have come from the spawning aquarium, and be (at least at the moment of transfer) exactly the same tempera-

ture. When the fry hatch, they will have to get along without the frequent washing to which their parents would have subjected them. Whether this washing serves to remove excess stickiness from the fry is a matter of conjecture, but if not subjected to it the fry frequently seem to get stuck together head downwards in the sand or at the bottom of the tank. It is recommended that should this be observed, the water should be agitated violently enough to separate the bunches into single fry—otherwise they will probably perish. The dead fry will pollute the water and the whole spawning may be lost.

Some painstaking aquarists wash the fry themselves, by drawing them into a pipette equipped with a rubber bulb. After one or two slight squeezes of the bulb, which results in the fry being drawn up and down in the tube, they are squirted out into a fresh, previously prepared aquarium. This procedure may be tedious, but an enthusiast will not notice that. When angels were 50s. each it paid well, and many a pair were raised which otherwise would have been lost to us.

There is a parasitic roundworm which has been found in the intestines of angel fishes, and the presence of a number of these may account for many of the deaths of half-mature specimens. The genus of worm is *Capillaria*, which also troubles the musk-rat, and the species *pterophylli*. Unfortunately, the full life cycle is still not known—neither is any way of combating them.

Angle fishes make excellent specimens for exhibition purposes, but they must first be acclimatised to show conditions—weedless tanks, etc. Placed in a small aquarium containing nothing but water they will frequently dash madly about, banging themselves on the glass sides so violently that they seriously damage mouths or bodies, or break hitherto perfect fins. Before exhibiting—well before the show date—net them out and put them in a large weedless tank—gently and without fuss. A little *Daphnia* will help them to settle down quickly. When netting them again for replacement in their original tank, do not chase them wildly with the net—proceed quietly and without fuss with the largest net you have got, and as likely as not they will swim into it. Once used to the large weedless tank they can be placed in a smaller one without trouble. If possible take sufficient water from their home tank to fill the show tank, for this ensures the least possible change in their environment.

## Cacti in the Fish House

AT all times cacti will delight in all the sun and light they can get and so it is essential to see that the windows of the fish-house are cleaned often so that as much light can enter as possible. If they are standing on the glass tops of tanks it is a good plan to put a saucer underneath them to prevent the water which drains away from entering the tank. If a saucer is used there must be a layer of gravel on it so that the drainage hole of the pot is kept open. If flowers are produced it is a good plan to pollinate them with the aid of a small brush so that seeds may be fertilised. This often brings a fine crop of seed pods or berries which will be an added attraction to the plants. Some species, such as *Mammillaria prolifera*, will hold their red berries for a whole year and nothing looks brighter than a good crop of these fruits during the dull days of winter. All types of cacti do not keep the fruits plump for so long, as most fruits will start to shrivel as soon as the seed is ripe. If any is needed for sowing it is advisable to wait until the pod has shrivelled before removing it. The seed can then be cleaned from the pod and stored for sowing in the spring. The container for such seed must not be airtight and the seed should be stored where it is not too hot or damp.

# North American Aquarium Sunfishes

by A. BOARDER

THE fresh-water sunfishes or basses belong to the family Centrarchidae, and there are at least 22 different species. They are found in the freshwater rivers and lakes of North America and may be likened to the perch of this country in style and habits. They are all carnivorous and most can only be reared on live foods. A few kinds can be educated to take other foods such as dried shrimp and strips of meat, but some species will eat nothing that does not move.

There is always considerable difficulty in dealing with the nomenclature of these sunfishes as so many local names are given to certain species in various parts of North America. Added to this is the fact that Americans appear to love giving pet names to most living things and as these pet names may be used in different parts of the country for totally different fishes it can be well understood what confusion exists over the names of these fishes. As an example of this pet-naming can be quoted the various names given to the calico bass (*Pomoxys sparoides*); they are:—crapet, razorback, spotted trout, sand perch, roach, sun perch, straw bass, speckled bass, millpond flier, black crappie, tinmouth, white perch, silver bass, bachelor, barfish, calico bream, grass bass, bitterhead, chinquapin perch, banklick bass, crappie, Dolly Varden, rockfish, goggle-eye, lake bass, and several others. In different districts of North America the above fish might be recognised by one or more of these names but not always so, as the same pet names might be given to a different species not many miles away.

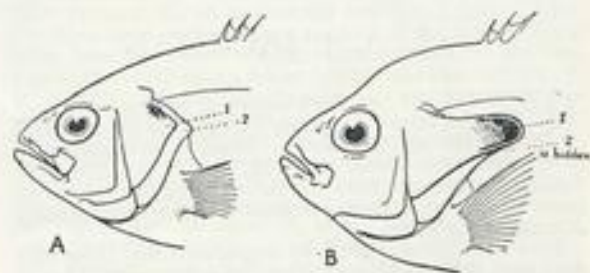
## Confusion of Names

For instance, some of these fancy names given to the calico bass are also given to the crappie (*Pomoxys annularis*), for in some parts it is also known as: bachelor, tinmouth, chinquapin perch, white perch and crapet. When it is realised that some of these names are also used quite freely for quite different sunfishes it can be easily understood how hard it is for aquarists in this country to be able to recognise many of these fishes where the correct scientific name is not used. Although the scientific names of fishes in our own country are not in general use, it is certain that any of the fish such as roach, perch, pike, dace, bream, gudgeon, bleak or rudd could be immediately recognised by such names without having to refer to their technical names. Occasionally, local names are given to some fish in this country but they are very few. More confusion has been made over the naming of some of the North American sunfishes because many different people have had a try at naming them and the differences in the fishes have been so small that the issue remains as confused as before.

If scientific names only were used for fishes imported into this country it would make the matter of recognition far more easy. Some sunfishes might be recognised by their popular names used here, such as: black-banded sunfish (*Mesogonistius chaetodon*); common sunfish (*Eupomotis gibbosus*); peacock-eyed sunfish (*Centrarchus macropetrus*) and diamond bass (*Enneacanthus obesus*), but how many aquarists could recognise the following?: crappie (*Pomoxys annularis*), calico bass (*Pomoxys macropterus*),

Sacramento perch (*Archoplites interruptus*), rock bass (*Ambloplites rupestris*), mud bass (*Acantharcus pomotis*), war-mouth (*Chaenobryttus gulosus*), chinquapin bass (*Apomotis punctatus*), Mississippi bass (*Apomotis symmetricus*), red-spotted sunfish (*Allotis humilis*), yellow bass (*Eupomotis microlophus*), long-eared sunfish (*Xenotis megalotis*), bluegill (*Lepomis macrochirus*), little sunfish (*Enneacanthus obesus*), scarlet sunfish (*Sclerotis miniatus*) or small-mouthed black bass (*Micropterus dolomieu*).

It is very doubtful if there are many who could recognise these fishes from a casual glance and it would be probably necessary for them to refer to a text book so that varying features could be compared before exact recognition could be complete. There are fortunately a few deciding features which enable one to name these fishes, but unless one has an excellent memory, reference to a book or picture would have to be resorted to. One good distinguishing feature of the sunfishes which can be readily recognised is the long or short "ear"; this is not an ear at all but the name given to a kind of elongation to the rear of the gill-plates. The long-eared sunfish has this feature particularly well developed, as also has the bluegill. Another distinguishing sign which is useful in identifying a fish is the fact that the anal fin shows certain variations in differing species, and this can be used as a key for recognition as well.



Diagrams to show the gill cover appearance in A, a normal sunfish and B, a "long-eared" species

The anal fin of all the sunfishes is well developed and quite conspicuous. It usually consists of three or more strong prominent spines at the front with a fuller, closer-webbed rear portion. The number of spines in the front portion of this fin can be taken as a guide when endeavouring to name a particular fish. When this is taken in conjunction with the long or short ear-flap (elongated gill-plate), the task of recognition becomes somewhat easier. Most of the common sunfishes will be dealt with in this series of articles and special features or necessary conditions will be given in turn, but it may be as well to deal with the general treatment for this group of fishes and so save space when actual fishes are described.

Coming from fairly cold regions, these fishes may be treated in a manner similar to that given to goldfish in this country. Most of them could be wintered out of doors here as long as the pond was of sufficient depth. At least one part of the pond would need to be two feet six inches deep, but this is not the only requirement. It is absolutely essential that good, clean conditions prevail in the pond during the winter months. As some of these fishes inhabit the rivers it can be realised quite well that they need a well-oxygenated water. A foul pond in the winter is very dangerous to these fishes as the ice forming on the surface

would trap impure gases from decomposing matter at the bottom of the pond and fresh oxygen would be unable to enter the water.

In order to keep part of their pond open a type of cable heater for the pond would be a great improvement. This heater would not be expected to warm the water much, in fact this is unnecessary, but it would keep one portion of the pond free of ice and make for safer conditions. Small ponds would be of little use as these fishes can grow to a fair size, some to ten inches or more, and so they must have space in which to develop. Some species can be kept together, but as many are rather pugnacious when breeding it is recommended that differing species be kept to themselves. When small, some kinds may be kept in a fair-sized community tank and will agree quite well together. If, however, breeding is intended the pair of fishes should have a tank to themselves. The following can be kept in community tanks if breeding is not contemplated: the peacock-eyed, diamond, black-banded and orange-spotted sunfishes.

The natural foods of most of the sunfishes are: water snails, worms, fresh-water shrimps, small fishes, tadpoles, the larvae of various insects such as mosquitoes, and a little vegetable matter such as algae and soft plant growths. Many of these foods are obtainable for the fishes kept in captivity and the ordinary garden worm is a food which is generally

taken by all species of sunfish. Very clean *Tubifex* worms can be used and white worms form a fine food for the smaller fishes. *Daphnia* will be taken readily and any spare guppies will be accepted with avidity.

#### Other Acceptable Foods

When it is difficult to obtain live foods the fishes can be tried with dried shrimp, chopped raw fish, strips of meat, liver, heart, and sometimes Bemax, when well mixed with other food such as mashed liver, will be eaten. One point should be remembered when dealing with any species of sunfish and that is, it is far better to obtain your specimens when they are small than to wait to acquire them when almost fully grown. If you start with young fish you are far more likely to succeed with them, as you may gradually educate them into taking most ordinary fish foods, but if you get a well-grown fish you may not be able to provide it with the types of food on which it has been reared and it may never learn to readily accept the foods you are able to offer. A small shoal of any of these fish makes a grand sight in a well set-up tank as they are usually quite bright in action and are very inquisitive. They may be tamed quite easily, especially by offering them small worms in the fingers.

(Continued next month)

## The First Aquarium-hatched Marine Bass

by L. A. J. JACKMAN

RECENTLY I had the pleasure of rearing some bass (*Morone labrax* L.), from the egg, and the results of this work have just been published as a scientific paper (*Proc. Zool. Soc. Lond.*, Vol. 124, Part 3, p.p. 531-534). Behind the scientific facts and figures lies a story that may prove of interest to marine aquarists, and perhaps provide stimulation to others.

First and foremost let it be emphasised that these bass eggs were reared without any special equipment. That in itself should be a proof that marine aquaria are not as difficult to maintain as many would have us believe. Through the kind help of the Marine Biological Association U.K., we were able to secure the eggs—for it is highly unlikely that fish of a mature size would spawn in small tanks. Those eggs were transported over 30 miles in Kilner jars, suffering considerable jolting and general "bad handling." On arrival at home they were installed in a two-foot tank with nine inches of fresh seawater in it, and at first no aeration was given simply because none was available. Since the eggs of this species are buoyant in sea water there was no point in having deep water, and this also helped the renewal for supplies had to be carried in gallon glass jars from the shore.

To avoid "having all the eggs in one basket," they were divided between two tanks, with approximately 500 eggs in each. Water temperature was tested and found to be around 54° F. When rearing sea fishes from the egg great care must be taken to ensure that no sudden rises or falls in temperature occur, as these can be fatal immediately. It is best to keep them in a cool room or outhouse so that the temperature can be as low as possible. Each evening fresh sea water was placed in the tanks, having previously removed about half the "old." Before doing this, the water was allowed to stand until it had reached exactly the same temperature.

Aeration was introduced on the second day, just a gently flowing line of large air bubbles to keep the water circulating

without whirling the eggs around within the tank. Large numbers of eggs proved to be infertile, and these were recognised by the fact that they sank to the bottom, which incidentally had no sand at all. Other embryos died and were removed daily. By the fourth day hatching commenced and the young post-larval stages were 3.8 mm. in length. Since they have yolk sacs attached no feeding was necessary.

At six days old, the larvae avoided the approach of a pipette and so had to be caught in a desertspoon before examination under the microscope. For the first week after emergence from the egg casualties were heavy simply because we never took the trouble to sieve the water and thus introduced planktonic forms that preyed on them. After about fourteen days the number of living fry was reduced to some 50 specimens, and feeding became necessary. Believe me when I say that rearing young sea fish is no job for the aquarist who likes his bed!

Food was provided in the form of plankton caught in a plankton tow-net, by the rather primitive method of wading knee-deep along the shore towing the net behind us. The catch was then strained through very fine silk mesh to exclude the larger forms that might have attacked the youngsters. After three weeks the last one died. And that you might say was a pretty poor show. Well, perhaps it was, but if only we had had more ample aquarium space we are sure we could have reared them through to the fry stage.

Before closing let me give a word of encouragement to those of you who have long wanted to try marine aquaria. Try it. Begin with a few hardy specimens such as prawns, hermit crabs and anemones and do not overcrowd your tank. Provide aeration and filtration and feed only twice every eight days. I have tanks that have been running as long as a year *without any change of water*, and are as good to-day as they were when first established.

For the marine aquarist there is a wide field of investigation open if only the fear of "difficult to keep" can be overcome. Try it for yourself. If we had sat back and not done just that, we should not have reared the first larval stages of the bass in this country.

# AQUARIST'S Notebook



by  
RAYMOND YATES

As some readers will know, the Union Assurance Society Ltd. is prepared to issue policies to aquarists covering them against the risks of fire, theft and accidental external damage, including loss due to the failure of the heating, aeration or thermostatic apparatus. This policy was very carefully thought out with representatives of the hobby about two years ago, and since then it has not proved necessary to introduce any modifications. Many leading aquarists have one of these policies and I have one myself. The major points raised by the fancier when insurance is suggested are (1) What is covered? (2) What is not covered? and (3) What will it cost? I will try to make these points clear for the benefit of those who are quite "at sea" when confronted with the legal jargon found in proposal forms and specimen policies.

In the first place one of these policies will cover your tanks and equipment and the fish, plants, etc., against loss or damage by fire or theft. Damage done by burglars is an item to be reckoned with in these days. In addition accidental external damage to the aquaria is covered as well as the loss of the contents (fish, plants, etc.) as a result of a defect in the heating, aeration or thermostatic apparatus. This is a very wide cover and the underwriters are to be complimented on offering such an opportunity to the aquarist. What is not covered? Well, the usual clause appears excluding damage as a result of war, riot, civil commotion, enemy action, common to all policies. Loss or damage following wear and tear, gradual deterioration or cleaning is excluded also. Death of the fish is only covered if the result of fire, thieves, or failure of heating, aeration or thermostatic apparatus—obviously the company cannot be expected to be liable for losses following disease, over-feeding, underfeeding, jumping out and so on! It is important to notice that no fish is considered to be over ten shillings in value unless specifically declared to the company. The policyholder is expected to pay the first twenty shillings of any loss except where it results from fire or damage done by thieves. The cost of a policy is very cheap, the rate of premium being twenty-five shillings per cent., which means you pay £1 5s. for £100 cover and in proportion. The lowest premium the company will accept is one pound, for £80 cover.

A few points of interest may be mentioned here. If you glaze your own tanks they can be insured if the frame is of proprietary make. Damage done by thieves is covered even if nothing is actually stolen. One risk is that of power cuts and blown fuses. These are covered but the insured is naturally expected to take reasonable care. Loss or damage by flood is covered, including the contents of the tank. In the main the policy is intended to cover up to five tanks of standard size, which means tanks of a size ordinarily obtainable from an aquatic trader without being specially made. The policy is intended for aquarists with whom the keeping of fish is a hobby, and is not intended for dealers, who have other means of insurance open to them. Alterations in a collection, if large, should be notified to the company, and the policy sent for alteration; trivial changes in fish and plants of an inexpensive nature need not be notified but always see that the value of the equipment and contents of each tank are within the value shown in your policy. Alterations in equipment should always be notified. Aquarists who are interested should write up for a proposal form, which gives full details. If they want a quotation they can then fill in their particulars and mark the proposal form "For Quotation Purposes." This will put them under no obligation. Applications should be

made to the City Office of the company, 1 and 2, Royal Exchange Buildings, London, E.C.3.

An aquarist's life is not always a happy one and one of the most exasperating things which happen is the way rare fish you have just bought, probably the first you have ever had or even seen offered for sale anywhere, die on you a day or two later. You look in your tanks and there, swimming round in the most disgustingly healthy way, are the so and so's Aunt Martha gave you five years ago. It is the way of the world. What we want most we lose; what we least value remains with us.

How often is it true that when the aquarist sees a dead fish on the bottom—he murmurs a prayer hoping it won't be such a fish. He takes a quick look—he knew it, of course, of all the fish in the tank he didn't want to lose, but there it is, stark staring dead as only a fish can be. In time we learn to take these blows, in fact, almost expect them. If we think about it we should realise that new arrivals are more prone to die on us than old established fish. As for the other cases, well, it is just the luck of the hobby. How often have we visited another aquarist who has moaned that he can't keep such a fish and loftily told him "I NEVER have any trouble with them, my boy," and so on, only to find ours die on us a week later. Next time you feel like talking this way touch wood, or better still, don't say it.

Of course, we all have our jinx variety or varieties which simply will not thrive with us whatever we do although they prove prize-winners with the chap next door. There is nothing we can do about it, except accept the fact and leave these jinx varieties (to us) alone. I don't know what your troublemakers are but, personally, I cannot keep leeri gouramies or fighters, not even a few days. It is just one of those things. I have tried many times but although an odd case may last a month or six weeks that is all. Generally, two days is the limit. Others I have met have moaned about their pet troubles such as *A. ramirezi*, angels, tiger barbs, mollies, *H. serpaes*. It is very much the same in gardening. There are plants you simply cannot grow although the garden next door is full of them, mocking you over the fence. Keep to what you can do and don't bother wasting time on fish which, for reasons unknown, refuse to live under the same roof with you.

I often advise aquarists that one good method of treating disease is to leave things alone and do nothing. After all nature knows best and this method often pays dividends. It is a very wise course when dealing with angels, who object to being doctored or moved about. Sometimes the eyes of fishes get a film thereon, and by leaving them alone this often fades away. Tumours are quite common, particularly on mollies and angels. They are best left alone. Very rarely are they passed on to other fish, even other angels or other mollies. As a rule they fade away but may appear elsewhere on the same fish. They are not fatal and need worry no one. Many fish look dejected because they want some fresh water (mostly tetras), others because the bottom has not been siphoned off or because there is dead and decaying plant life in the tank. Overfeeding live food will produce minute organisms which make the fish feel

off colour. Keep the tank properly serviced and most of these worries will cease. Wounds caused by other fish or rockery and the like usually heal up without trouble. Unless an actual parasitic infection is visible (such as white spot, fungus, gill worm or fin rot) more may be lost by doctoring than by leaving things as they are. Hobbyists should also realise that some fish take a delight in pretending to be ill, looking as if they were at their last gasp and so on when all the time they are quite A.I.

What to do with the back of the tank to obtain the maximum effect is rather a vexed question. After all, it is merely a matter of taste. Some aquarists paint the background a dark colour and rely on artificial light to produce the desired effect. Others use black paper or even painted glass reared up at the back of the tank. Yet again some merely allow algae to have its way, and others leave the back clear, although this has its limitations. The Columbia Aquarium Inc. of New York have another answer for this problem in the form of a real paint transfer which is first submerged in water for several seconds and is then transferred to the clean wet back glass, the backing paper being peeled off. Any air bubbles are removed and the transfer is thoroughly washed to remove any excess of adhesive which still remains. The size supplied is 20 inches by 12 inches and the transfer can be cut down for smaller tanks. For larger aquaria two transfers can be used end to end, and any surplus used on the sides. Where the tank is higher than 12 inches the transfer is fixed to the upper portion of the back glass and the sand and gravel in the tank sloped up to meet the bottom of the transfer. This gives a dramatic illusion of depth. For fixing so large a transfer (called in U.S.A. a "Decal") it is advisable to use a squeegee, and the glass surface must be flat. Frosted glass is useless for this purpose. The actual scene depicted is a fine gravel with a delightful grouping of nine aquatic plants and rockery, the background being a translucent sea-green. There are no fish, snails or, in fact, anything which could possibly be considered out of place or garish. Perhaps some enterprising British dealer will one day be able to offer us something in this line. There is no doubt that, once seen, there would be a great demand.

The general public (who really are the people who make shows pay or not) are mainly interested in furnished aquaria and, as far as they are concerned, this is the main item of any show. All too frequently of late the number of furnished aquaria on display, or the quality, has left much to be desired. The last shows held by the Lancashire Aquarist Breeders' Society at Bolton and the Halifax show displayed furnished aquaria which were very good indeed. The reason was not hard to find. Instead of the usual cups, plaques, diplomas and what have you, there was a prize value £5 in the first instance and £5 cash in the latter. A good idea at Halifax was that no programme was issued. After all, most people don't want one—the names of the fish and exhibitors are meaningless to them. The club saved expense and trouble in printing these but provided the information for those interested in typewritten lists which were fixed on the walls at various points in the hall. I had a long yarn with the club chairman, Mr. J. Stott (a well-known contributor to this magazine), who told me he has recently removed. At his new address, high up on the wild moorland, he hopes to set up a form of fresh-water biological station. I asked him about the water there and he mentioned that the pH of the moorland stream water was as high as 7.8, whereas the well water registered a pH of 6.6. He has some advanced ideas on the feeding of white worms, particularly the type of milk used. He considers they should have a predominantly protein diet, and in this respect he favours the use of shrimp.

Some time ago I was talking to a dealer in the Morecambe area and he surprised me by remarking that he thought he was the only dealer between there and Birmingham who dealt in nothing other than fish and aquarium supplies. I had not realised until then the way most of our aquatic traders have extended their interests to other pets. Apart from reptiles, those most commonly encountered are cage birds, a type of pet whose popularity never wanes. As a rule the type of shop which deals in the canine fancy is not one which caters for the aquarist, although one or two such mixed dealers exist. On the other hand the sort of shop which has a wide assortment of pets available is on the increase, and in such a shop one can find not only tropical and coldwater fish but also caviars, hamsters, rabbits, monkeys, tortoises, mice, reptiles and cage birds. There is a very happy feeling in such a shop because, whatever our failings, as a race we are really fond of animals. Nevertheless, I deplore the gradual passing of the shops which deal in aquatic supplies only. Let us hope that those which still remain will be with us for a long time yet.

Glass wool is commonly used by some fanciers for filtration purposes and it does a good job. It must be realised that this is a very dangerous thing to handle, however, and extreme care must be taken in doing so. Glass wool when crushed breaks easily and can quickly find its way about the room—it should not be opened or used where food is about because there is the danger of crushed particles getting on to food, with dangerous possibilities. Powdered glass in food is usually lethal, so the utmost care should be taken to see it is kept away from the kitchen or children. Even the hands can suffer from tiny particles being pushed into the skin.

There was a time during the war when goldfish were almost worth their weight in gold. Now, happily, they are more reasonably priced although still more expensive than in Japan where they cost about ten yen (about three-halfpence). The rag dealer who gave goldfish for old clothes can no longer do this but their sale in the pet shop is still considerable. There must be few homes which, at some time or another, have not housed one or more goldfish. This fish seems to defy all the piscine laws and survives when it should have died long ago. This is not to say that some people are not unlucky with their purchases. Many of the cheap fish offered for sale are continental in origin, brought up in warm and running water. It is small wonder that they fail to survive the rigours of life in England. The fancy types of goldfish are in a class by themselves. Price puts them out of reach of the child who merely wants a goldfish, and the supply and demand depend upon the whim of the local fanciers.

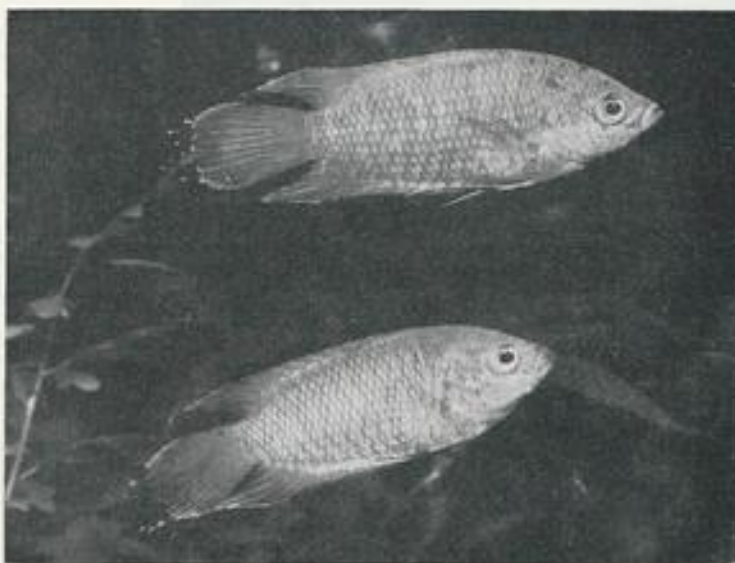
It is a very queer thing that the cult of the fancy goldfish is very localised in Britain, being restricted in the main to London, the Midlands and the Bristol area. In these districts the goldfish holds its own with the tropical, and shows in these areas have large numbers of entries in the goldfish classes, often as many as for tropical fish. Outside these areas the goldfish becomes a poor relation who appears at shows on sufferance only. Why this should be so is a mystery but the fact remains that north of Nottingham few dealers will stock much in the way of fancy goldfish. Apart from an odd fancier here and there, there is no demand. It is not a matter of price; however cheap they just do not sell. Shows in the north include a section for goldfish, frequently just one class for any variety and then are lucky to get half-a-dozen entries. It is true, by and large, that tropical enthusiasts are not keen on cold-water fish and goldfish fans have but a lukewarm interest in tropicals, but this does not explain why this apathetic attitude to the goldfish exists in the north. Has any reader a reasoned explanation to offer?



## The Comb-tail: *Belontia signata*

by

JACK HEMS



**T**HIS handsome, intelligent-looking fish comes from Ceylon. It is a member of the family Anabantidae—the air-breathers—and at a quick glance looks very much like a species of *Macropodus* (paradise fish). It has the same, rather long, laterally-compressed body, and similar-shaped fins. But closer, and more studied inspection reveals that both sexes have dark extensions to the rays of the caudal fin, more pronounced in the male than in the female, which have given rise to the fish's common name; for these extensions or filaments form what looks like a long-toothed rake or comb. Each scale has a dark border. The eyes are rimmed with a lovely, shining blue-green pigment.

The body colours are hard to describe, for they are quick to change under different lights, conditions, and mood. It is safe to say, however, that the back is reddish-brown, paling to pinkish-white on the underparts. Faint vertical bars may be discerned on the side, which is overcast with a greenish sheen. The dorsal and anal fins are blood-red with a pale green border. The tips of these fins are black. The caudal fin is red, shading to green at the margin. The protruding ends of the rays, as mentioned above, are black. The ventral fins are red, lightening to greenish-white as they terminate into hair-like filaments. As in the paradise fish, the fins of the male are longer and fuller than those of the female. His colours, too, are richer at all times, especially when displaying before the female, or when the temperature rises above 80° F.

### Breeding Habits

Generally speaking, the comb-tail does not need a high temperature. 70° is quite warm enough for the winter months, increasing this to 75° to 78° F. during the spring and summer. The breeding habits of this species differ from the majority of the air-breathers in that the eggs are not placed in a previously constructed nest of collected fragments of plant life or mass of frothy bubbles, but are scattered loosely at the surface, where they float until they hatch out. The fish usually choose to spawn among plant

life growing at the top of the water, and just a few sticky bubbles may be blown to keep the eggs confined to one small area. The eggs are larger than the eggs of the gouramis, paradise fish or *Betta*, and when the fry hatch out they measure above an eighth of an inch long. They become free-swimming in under two days. It is advisable to transfer the parent fish to another tank as soon as the baby fish are free of the eggs. Some aquarists report that the male fish is very vicious towards his mate both before and just after spawning, but I have not found the species is any more difficult in this respect than any other member of the family.

I think the size of the aquarium the fish are kept in has a lot to do with maintaining a state of married bliss. In a small tank, the male does sometimes behave in a tyrannical manner, chasing the female into the plant life and keeping her away from food. But in a tank of at least two feet long, a pair will usually live in harmony.

But to return to the baby fish. As they are quite large when they hatch out, they do not need microscopic live food (infusorians) for more than a week. Tiny *Daphnia*, micro worms or brine shrimps are more to their liking, followed by fine-grained dried food and chopped *Tubifex*. Adult fish are easy to feed. They will eat any live food or dried food, and such things as minced heart, "lights" or shell-fish.

The species is quite long-lived and, given plenty of space to develop in, will attain a length of between four and five inches. Although not a suitable fish to place in an aquarium containing tiny livebearers or tetras, it is less quarrelsome than the paradise fish, and will cause no trouble if placed in the company of larger barbs, gouramis, and fairly peaceful cichlids such as *C. festivum*, or *C. macki*. When first obtained, *B. signata* are rather retiring and will stay at the back of the aquarium, ready in an instant to dash away and hide in the plant life. But so soon as the fish grow accustomed to their surroundings, and their owner, they will venture forth from their hiding places, and swim to the front of the aquarium, where they will wait for any tit-bits which may be dropped into the water for their benefit.



Two divers with the "aqualung" reach the bottom after a 50 feet dive

"WHY in the world do you want to go down into the sea?" Cousteau was often asked. The same question is still being asked in this country of those who, like him, take pleasure in diving beneath the waves. But often questioners suggest an answer, "To hunt fish?" It is indeed remarkable how frequently the use of an aqualung is associated with that of a harpoon or underwater gun. The correct answer for the large majority of divers can only be appreciated by those who have had the same experience. It is the experience of becoming a fish, or as much like a fish as man can become.

The apparatus which enables man to undergo this metamorphosis is a heavy piece of equipment. A strong cylinder containing air under considerable pressure (120 atmospheres) is the largest part. It is attached by harness to the back, and connected by a tube over the shoulder to the mouth. A special double valve delivers air to the tube at the same pressure as that which surrounds the body in the water. A belt with lead weights is fastened round the waist, to counteract the buoyancy of the cylinder. Finally, rubber flippers are attached to the feet and a mask over the eyes and nose. The diver stands up, burdened and awkward, an object of pity, surprise or ridicule to the uninitiated.

But now his moment has come. Turning round on the boat or rocks where he has put on the gear, he falls backwards into the water. Suddenly all is changed. He has no "weight" but hangs suspended in the water. It is as if gravity has been removed. There is no tendency for the body to move either up or down. This is indeed a new sensation for man, but it is merely the norm for fishes. The medium, too, offers a strange experience—it is strange

## Passport to Wonderland

by E. J.

(with three underwater photos)

because it offers such resistance to movement. But this resistance can be used also to promote movement. Progress is slow, but easy and graceful, indeed almost effortless.

### Beneath the Waves

As the novelty of these experiences wears off, the diver can take stock of his surroundings. In my own case, these were the shallow waters of a beautiful little bay in the south of France. I went as a member of the British Sub-Aqua Club on a party to Le Trayas, an unspoilt mountainous region half way between Cannes and St. Raphael. The mountains come down to the sea, and in places it is possible to dive into 30 feet or more from the rocks. The scenery is beautiful; but it is soon forgotten in the scenery beneath the waves. The water is very clear and much can be seen even in 40 feet or more; but it is bathed in a light to which we are unaccustomed and which lends to everything a strange or unreal appearance. The rocks are there, but mottled with encrusting growths. Round about are large tufts of eel grass, like panicked sedge, which run together in the deeper water to give a continuous, luxurious carpet.

Soon other shapes are seen darting about; and it is not long before the diver finds new companions by the score. The number and variety of fishes in places is really astonishing; it is like being an aquatic Alice in a new Wonderland—a giant overstocked aquarium. A common fish was the sargos, with flat silvery sides and a dark spot near the base of the tail. A variety of fishes kept to the rocks and one in particular comes to mind on account of its colour, a brilliant purple. Scorpion fish were rather frightening in appear-

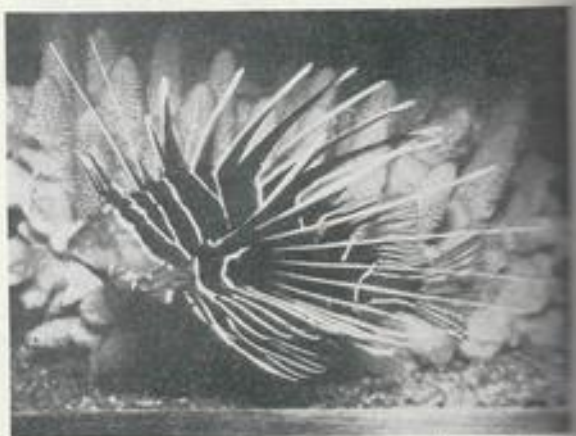


Photo:

Laurence E. Powell

Scorpion fish (*Pterois russelli*). Its brilliant red coloration and lack of lobed fringes to pectoral and dorsal spines distinguish it from the related scorpion fish *P. volitans*.

# d with the "Aqualung"

CHFORD

taken by BARRY BLAIR)

ance but quite harmless and were themselves easily frightened. The only species which might have proved dangerous was the moray eel; normally they are found in holes and under ledges of rock and are apt to bite a hand probing for other specimens.

Added to the interest in the fish themselves, there was the unique opportunity of watching them in their natural surroundings. This is a pleasure which cannot be experienced by the aquarist at home. He can only create artificial



An octopus, speared on the sea bottom by an "aqualung" diver.

conditions, or ones which approximate to those found in nature. Still less can he share those conditions with his fish. But with an aqualung these limitations are removed. The fish themselves are not frightened of the diver if he moves slowly. In fact it is often possible to approach them so as almost to be able to touch them. One is accepted, if one behaves in a way that does not attract attention, as part of the environment.

### Urchins and Octopus

The sea also offers a wide range of invertebrates. The two most obvious species were a large, almost black, sea urchin and a still larger and blacker "sea cucumber" (*Holothuria tubulosa*). Both belong to the phylum Echinodermata, the "spiny skinned" animals. In this case, the sea urchin does full justice to its group. The spines are extremely sharp, and easily pierce the skin; but they are also very fragile, and in breaking on removal leave the points behind. As the rocks are so densely populated with them, the diver must treat his *terra firma* with care. The sea cucumbers look very different, slimy and wormlike, but putting out short branching tentacles around the mouth.



A small shoal of fish, sargos, swim above rocks populated with sea urchins

They were usually seen on the sandy patches between the seaweed; but they did not respond well to handling. The normal reaction is that they throw out part of their internal organs, forming a tangled mass. Other echinoderms were present. The common starfish is here represented by a bright red form (*Echinaster sepositus*). Large numbers of brittle stars were hidden under rocks and stones, only to be seen if exposed; they then walk with surprising agility for the nearest cover.

The octopus is common but also apt to be overlooked, half hidden in its hole. They were not dangerous in themselves, but unarmed I did not care to disturb them; I had visions of being anchored to the sea bed while the air in my cylinder ran out. However, when they were disturbed near the shore, they presented a fascinating sight, shooting through the water by jet propulsion. The impetus comes from the contraction of the "mantle," throwing water from a cavity inside, while the arms are left to trail behind.

The sedentary animal life deserves special mention on account of the colours and the decorative effect which it gives to the rocks. In places it was almost enough to take one's breath away (fortunately this did not occur!). The best situation was under overhanging rocks or on the roofs of caves. There, may be seen a bright yellow-orange sea anemone, carpeting the surface like a field of flowers. A large solitary sea squirt (*Cynthia papillosa*) had the appearance of rosy cheeks. Elsewhere, the rock may be encrusted or eaten away by a mass of sponges and other organisms forming an exotic honeycomb. This in its turn provided a refuge for more active animals, while small fish seem to play a game of hide and seek as the diver examines the surface, prodding with his snort tube. In another situation, a sandy bed, a large clam (*Perna nobilis*), a foot or more in length, was found housing a lobster-like crustacean (*Pontonia tyrrhena*) within its shell; the latter does not harm its larger partner but lives as a commensal.

Some aquarists, on reading this account, may perhaps be thinking that aqualung diving is all very well for those who

(Continued overpage)

## Microscopy for the Aquarist—7 by C. E. C. COLE

LAST month I left you preparing to take your first look through a microscope. It is instinctive to close one eye when using a monocular, or single eyepiece, microscope. Ideally this should not be done, but it certainly takes a lot of practice before both eyes can be kept open, so we will excuse you if you shut the one you are not using. But do, please, close the proper one—it is surprising how many people close both, or the one they want to look down the tube with. "I can't see a thing," they murmur—and small wonder. A simple way out of this difficulty is to place one hand over the unwanted eye, and still keep both eyes open. An alternative would be to wear an eye-shade, or make a simple shield to fix on the microscope tube.

Even when you look down the tube successfully, you may not see what you expect—remember the dealer focused the object on the stage to suit his own eyes. He is not to know whether your eyes are the same—usually they are not. But if you can make out anything at all, it is now up to you. Take the coarse adjustment wheels between your fingers and rotate them slowly. Should the object become fainter, turn them in the opposite direction, and watch the object become plainer and plainer. Continue turning until the image begins once more to fade. Again reverse the turning to increase clarity. Once or twice doing this and you will begin to know when the image is sharply focused.

Many of you wear glasses. I myself did for many years, but I found that I could take them off without any ill-effects when I used the microscope. Not everyone is able to, however. In the normal way spectacles will interfere with the field of view, for the eye has to be farther removed from the ocular, so that much of the light from the object goes outside the human eye-lens. Fortunately, some eyepieces are made with what is called a "high eye-point"—especially for use by be-spectacled people, so if you are one



Left, microscope field seen with ordinary eyepiece and 2 in. objective. Right, field with "wide field eyepiece" and 2 in. objective

who must wear glasses, try to obtain the special eyepieces. Beck manufactures a  $\times 10$ ,  $\times 12$  and  $\times 15$ , calling them Wide Field Eyepieces. They cost £4 each, when new.

If you are satisfied with what you see with your first objective, test the others in like fashion, using the same slide. You will notice that when you use the 1 in. objective after removing the 2 in., the objective will be much nearer the stage of the microscope before the image of the object is apparent, and that when this comes into view it will appear much larger. Also it will take much less of a turn to cause the image to deteriorate in quality than it did for the 2 in., and finally, the light surrounding the object appears to be less. When the  $\frac{1}{2}$  in. objective is fitted, the position appears worse as far as light is concerned, and if the object being examined is any size, it is only possible to see a portion of it instead of the whole. This may be disappointing, but there are sound reasons why it should be so. I will attempt to explain them in good time. In the meantime use only the lowest power—the 2 in.—and get used to focusing quickly and accurately, by means of the coarse adjustment only.

### Passport to Wonderland with the "Aqualung"

(Continued from preceding page)

"can take it," but that it is not the sport for them. That may be the case. But it is as well to point out that it is not difficult, and even those who cannot swim are not on this account excluded from taking part. Nor is it dangerous if the necessary simple precautions are taken. Even taking these matters into consideration, the aquarist may say, "It is not my line. It sounds very interesting but what use is it to me if I do not do it myself?" But it may still be of practical interest to him because it offers new scope for collecting. The marine aquarist should be the first to benefit. Unless he has a boat and special tackle, or buys his specimens, his aquaria will only have inter-tidal animals. But with the aqualung, or from an aqualung diver, he can get material from 10 fathoms or more. If a sufficient number of marine aquarists were interested, it might be possible to build up a number of centres where diving is done and where there would be aquaria ready on the spot to take the animals collected by the divers. They could later be distributed to other aquarists throughout the country.

No doubt uses for the aqualung for collecting in fresh-water could be found, e.g. driving fish into nets. Something like a fyke net might be used to get small pike which would be suitable for the average sized aquarium; I have often asked anglers using spinners to get small pike but they only seem able to get large ones with them. Smaller nets might be used to catch demersal fry, and spawn could be collected

by hand.

Finally, we may ask, what use is the aqualung likely to be to the tropical aquarist? It is rather too early to speculate on this at present, though I would suggest that some useful observations on breeding under natural conditions might be made. But if the problem of transport of marine fish were solved, the aqualung might well give a new slant on tropical aquaria. I was fortunate enough to pay a visit to the Institut Oceanographique at Monaco and to be shown round by one of the senior members of the staff. It was, to say the least, a revelation to me; what surprised me most of all was the comparatively small size of the tanks and yet the large variety of fish kept. Perhaps there is a much bigger future for the marine aquarium—an aquarium stocked with the gay colours and bizarre forms of a tropical sea.

I have tried to show very briefly in this article that underwater swimming offers attractive possibilities to all those who are interested in water life, whether they are biologists, naturalists or aquarists. It is a new sport in this country, and has been made a practical proposition by the development of rubber suits to protect the body against the cold. But its spread has been remarkable. Already the British Sub-Aqua Club alone has over 1,100 members, and interesting work has been done examining wrecks and collecting geological material. So far water life has not received its fair share of attention. It does not require experts, but enthusiasts with initiative and perseverance.

My thanks are due to Mr. Barry Blair of the British Sub-Aqua Club for his kind permission to use his photographs.

## OUR EXPERTS' ANSWERS TO READERS' QUERIES

Will drops of water falling back into the aquarium from an asbestos cover prove harmful to the fish?

So long as pure asbestos sheeting is used for a cover, no harm should come to the fish. But it might be a good idea to give the asbestos cover two or three thin coats of aluminium paint, and, after allowing it to become thoroughly dry, wash over with plenty of tepid water.

Could you please tell me how to set about breeding tiger barbs?

Tiger barbs are not among the easiest of the barbs to breed in the tropical aquarium. The best thing you can do is to separate the male from the female for a short period, say, a week to a fortnight. During this time, feed the fish very well on live food or scraped red meat, washed liver, or heart. The tank intended for spawning should be prepared as follows. Fill to a depth of about eight inches with clear, old water. Place clumps of feathery-foliaged plants at each end, and in the middle. Introduce the two fish late at night. They may spawn next morning. If they do not spawn then, raise the temperature slightly and note their behaviour. If they do not seem interested in raising a family, separate them, and repeat the procedure after a short interval.



Photo:

Female tiger barb

Lawrence E. Perkins

I have bred some black swordtails, but to my dismay most of these youngsters have developed fin- and tail-rot. I have been told that this is due to the black pigment not being strong enough to hold the membranes together. Is this true?

We are afraid you have been misinformed. The pigment in the fins does not hold them together. Your fish may be suffering from the after-effects of a chill, poor diet, or unhygienic conditions such as polluted water caused by too much uneaten food or decaying plant life being allowed to collect on the bottom. We suggest that you keep the bottom of the aquarium well siphoned, make sure that the fish are receiving a nourishing diet, and maintain the temperature on the high side, say, about 78° F. with little or no variation for at least a fortnight.

I keep the back and two ends of my aquarium thickly planted with *Vallisneria spiralis*, but I should like to fill up most of the foreground with dwarf plants. Can you please tell me the names of a few plants which grow only a few inches tall, and which should do well in the normally lit tropical aquarium?

*Sagittaria natans* and *S. subulata* stay dwarfed if grown under a good top light. Then there is the dwarf Amazon chain sword plant, which soon carpets the sand with a forest of grass-green foliage. Another dwarf-growing species worth obtaining is *Cryptocoryne beckettii*, which seldom grows more than four inches tall, and if left undisturbed will soon grow into a tight clump of elongated, lance-shaped leaves.

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.

While on a visit to a large public aquarium, I was most impressed by the appearance of the rockwork, which was covered by what looked like a dark green moss. An aquarist friend has told me that this "moss" is an underwater growth known as algae. Please can you tell me how to encourage this vegetable growth on the rockwork in my own aquarium?

The mossy types of algae may be encouraged to grow on rockwork by making sure that the light immediately over it is a bright one. Some aquarists speed up the process of growing algae on rockwork by placing it in a bucket of water stood outdoors in a position where it will get plenty of sunlight. In a week or two the surface of the rockwork will become tinged with green, and directly this colour-change is noted, the rockwork can be removed from the bucket and placed in the aquarium.

Early in the summer, I shall be taking a fortnight's holiday by the sea. But I feel rather worried about this because I have no one to care for my fishes while I am away. Do you think they will survive the fortnight without any food?

In our own experience, it is wiser to leave fish unfed for a fortnight rather than ask a non-aquarist friend or relation to look after them. An aquarium can be polluted in a few hours if too much food is emptied into it, and most people unused to fishkeeping tend to overfeed rather than underfeed their charges. We advise you to feed the occupants of the aquarium on plenty of meaty food or live food for a week or two prior to your leaving home for your holiday. In your absence, some of the fishes will nibble at the water plants when they feel hungry; the carnivorous ones may be provided for by introducing a dozen or so water snails into the tank. Before you actually set forth on your holiday, it would be a good idea to empty about a cupful of live *Daphnia* into the aquarium.

I have read somewhere that "Soft, acid water kills Infusoria." If this is correct, how can the aquarist feed baby fish hatched out in acid water, for surely such water would be devoid of microscopic live food?

Acid water is not devoid of small live food. But acid conditions are less likely to encourage the development of certain bacteria and excess Infusoria than alkaline water. Then again, Infusoria fed to the fry through a drip-tube having its origin in a jar placed above the aquarium will be eaten almost the moment it falls, as drops, into the water. A few days of such feeding, and most fry should be large enough to take micro worms, brine shrimps, screened *Daphnia* and the like. Too much Infusoria introduced into a tank of fry is dangerous at any time, for the organisms often multiply so quickly that they upset the balance of the water and so deprive the fry of oxygen. With experience, the aquarist soon learns how much Infusoria to feed to baby fish at a time.

I am thinking of setting up a tropical aquarium, but before I do so, I should like to read a few reliable books on the subject. Can you recommend a few titles for me to look for in my local library?

We suggest that you try and obtain the undermentioned books from your public library: *Exotic Aquarium Fishes*, by William T. Innes; *Freshwater Tropical Aquarium Fishes*, by Hervey and Hems; *Aquariums*, by Anthony Evans; and *A Home Aquarium on a Small Income*, by A. Fraser-Brunner.

## COLDWATER FISHKEEPING QUERIES *answered by A. BOARDER*

I have a new spring water-garden pond and the outlet serves a neighbour's greenhouse. Can you suggest a grid or cover to prevent baby fish from going down the pipe?

Any form of grid which you use will have to be frequently examined. I know of nothing which could be fitted and forgotten. There would almost sure to be particles of water plants, etc., which would in time clog up any type of grid. The safest method to adopt would be to use two grids—one fairly coarse and then another inside that at an interval of a few inches. The outer coarse one would collect much of the material and the smaller one would then keep free to act as a strainer for the fish. The inner grid could be a piece from the bottom of a large tea strainer. Do not use copper as this can be dangerous. If the outer screen is examined every few days it should work quite well.

I have heard that London water is very hard. Would it be harmful to top up tanks with natural pond water? I have heard that distilled water is suitable for topping up; how do you distil water?

I use London water and get by all right. When topping up so little water is needed as a rule that I do not think the small amount of lime does much harm. I do not advise using distilled water. This is only water which has been heated to steam and then condensed back again. This leaves behind the impurities but it can also remove anything which may be helpful or even essential for the health of the fishes. Pond water can contain pests.

I have recently purchased a house, and have "inherited" a pond in the garden. This is 7 ft. by 5 ft., and 1 ft. deep. I also intend to buy an aquarium 24 ins. by 12 ins. by 12 ins. The problem is can I keep golden tench in either the pond or the tank, and can I breed from them? What size should they be for breeding and how much should they cost?

Your pond is a small one and would not be very safe in the winter for golden tench, or many other fishes for that matter. The small amount of water can lose heat or gain it so quickly that the fishes are subjected to varying degrees of temperature at such a fast rate that it is not good for them. Golden tench will live all right in an outdoor pond and in an aquarium when they are small. Any of these fishes over four inches long over all would be better in the pond than in a tank. As to breeding them, it is first essential that you should be able to keep such fish in perfect health before the prospect of breeding can be considered. I do not hold out much hope of breeding them in your pond although it might be possible if you had no other fishes there. I have bred from ordinary tench in my pond, which although not a large one is nearly twice as large as yours and much deeper. As for the size of them, I have bred from ordinary tench when they were only two years old and not more than five inches long. Tench breed in a manner similar to that of goldfish. The males chase the females through the weeds and the eggs are like those of goldfish, slightly smaller, and adhere to water plants in the same way. Tench fry are thinner and longer than goldfish fry. The cost varies with size; you might buy small tench for a few shillings but large ones could cost one pound each or more. You are not likely to be able to breed these fish in an indoor tank the size of yours. Normally, tench are late spawners, in nature as late as July in some seasons.

I am constructing an outdoor pond, roughly triangular in shape. I propose to have a light beneath the water in each corner. I have made enquiries as to an underwater lamp and all I can get information of is one which would cost 12 guineas. Can you make any suggestions? I thought of using three 60 watt lamps.

I do not see that the method of illuminating your pond presents insurmountable difficulties. The only difficulty is the insulating of the lamp connections from the water.

When you realise that most tropical tanks have heaters insulated in a safe manner it can be seen that a similar method could be used in your case. You could use the 60 watt lamps and they could be housed in a large glass jar. You could use polythene insulated cable for your leads and this could run through a sealed rubber or similar bung. As long as the top of the jar is sealed with a waterproof I do not see why this method should not work. It would even be possible to dispense with the jar as long as the connecting lead to the lamp holder was coated with a good waterproofing agent and covered with wax and insulating tape. You would have to be able to withdraw the lamps from the pond for cleaning occasionally as they would be sure to get overgrown with algae and mulm.



Photo:

Laurence E. Perkins

Mr. A. Boarder sorting his fantail fry (see query below)

When should fancy goldfish be sorted, before they change colour, or after?

The final sorting will have to be left until the youngsters have changed colour but this does not mean that no sorting should be done before this. Fry should be sorted as soon as possible so that food and space are not wasted by rearing a lot of runts. Fish that should have a divided tail, such as veiltails, fantails, moors, celestials, lionheads, orandas and bubble-eyes, can be sorted when they are no more than two weeks old. Another grading at a month will find many fish which may not be worth rearing. If the fry are placed in a white bowl and examined from above the tails which are divided will show up quite clearly. Further sortings when the fish are in glass sided tanks will show all those with incorrect dorsal fins and badly shaped bodies.

I have a 70-gallons galvanised tank which I painted with red lead paint. Would this do for rearing live foods for my fishes or would the paint harm them? I grew some water plants in it last year and also it appeared to be full of Infusoria.

The fact that plants grew and Infusoria formed in the tank proves that the red lead paint could not have been very harmful. You should be able to breed such things as mosquito larvae or water fleas in it.

# Biology—Career or Hobby?

by

Dr. J. L. CLOUDSLEY-THOMPSON

**I**N an issue of *The Aquarist* about a year ago (Vol. XVIII, p.219) the Editor commented that opportunities for making a career in zoology are somewhat limited, and he recalled that some years ago a colleague of his was advised not to try. As another professional zoologist, I am often asked much the same question: "What chance do I (or my child) stand of making a living in biology?" This is more easily asked than answered however, because there are so many points to consider. But in the long run I believe that everything really depends upon the determination, initiative and intelligence of the person concerned.

I sometimes wonder too, if zoology is not more of a disease than a career: you go in for it because you cannot prevent yourself! Anyone who could be equally happy in some other job would no doubt be well advised to avoid making biology his career. And even for those truly infected with the disease, a formidable amount of hard work lies ahead. I well remember my dismay as a school-boy when I began to discover the number of names and facts that had to be learned, and I soon realised that it was much less fun and very much harder work than one would ever have imagined possible. Indeed biology is no soft option to physics and chemistry!

More than ever before a university degree in zoology or botany is essential to the professional biologist. Thirty or forty years ago thousands of boys left public or grammar schools who did not want further education, or whose parents could not afford it, and some of these became successful biologists. To-day, however, most of the clever boys and girls (as well as many who are not so bright) are awarded scholarships to the university from their local authorities. It is still possible for someone with considerable determination and skill to earn a living as an independent writer and broadcaster upon biological matters, but such a course is extremely hazardous; and although books that appeal to the amateur naturalist may command large sales it is necessary for the author to have acquired a considerable reputation before a regular income can be produced in this

way. Most established biologists naturally prefer merely to supplement an income derived from a more reliable source.

So far we have been considering the more academic posts. Of course a degree is not required for a technician's or an assistant's job, and university departments and research laboratories are always anxious to recruit keen and reliable youngsters as "lab. boys" who may later become fully-fledged laboratory technicians. Unfortunately, there is at present no generally recognised scheme of training for biologists of a standard below that of a degree, and no biological equivalent of, for example, the National Certificate in Chemistry, although the matter is under consideration by the Institute of Biology. Thus, I presume that a credit in biology in the School Certificate, Matric. or General Certificate of Education exams must inevitably become the minimum requirement for technician's posts in biological laboratories, river-pollution boards and the like.

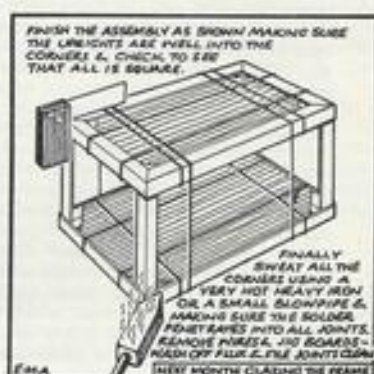
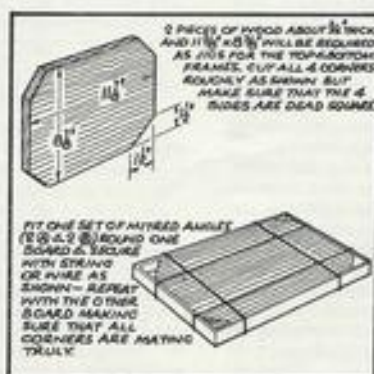
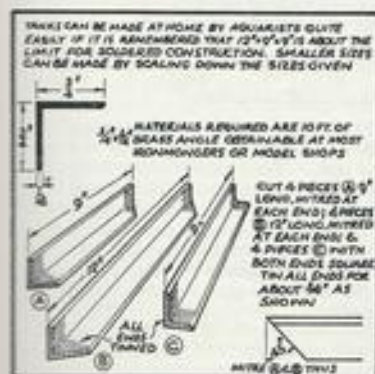
## Opportunities

Many embryo zoologists (and I was one of them) begin as keen aquarists, although their interests may afterwards lead them into other fields such as entomology, physiology or biochemistry in which there is wider scope for employment. At the same time there are a number of posts in the United Kingdom directly connected with hydrobiology and fisheries. The principal organisation concerned with life in lakes and rivers is the Freshwater Biological Association, which has its headquarters at Lake Windermere, but freshwater biologists are also employed by the larger water-supply undertakings, especially the Water Examination Department of the Metropolitan Water Board. Institutes concerned with life in the sea include the Plymouth Laboratory of the Marine Biological Association, the marine biology laboratories at Millport in Scotland, Port Erin in the Isle of Man and the Ministry of Agriculture and Fisheries laboratory at Lowestoft. The Discovery Committee organises research in the oceans rather than in the home waters. Apart from the last two, the institutions mentioned are privately sponsored, although they may derive considerable support from governmental funds. Other government research stations include the freshwater Brown Trout Research Laboratory at Pitlochry, the marine station at Aberdeen and shellfish research stations at Conway and Burnham-on-Crouch.

(Continued overpage)

## THE PRACTICAL AQUARIST

## Making Small Aquaria



In all, probably about a hundred scientists are employed in hydrobiological work in Britain in eight major research stations and eight research vessels. This number is infinitesimal however, when it is compared with the total population of the country, so it is not surprising to find that vacancies are quickly filled and competition is severe. Furthermore, since many of this hundred are young men who were recruited just after the war, openings at present are relatively few and are likely to remain so for a number of years. Another aspect of biology in which there are openings for a few talented individuals is systematic research in the museums. The British Museum (Natural History) at South Kensington is one of the principal employers of biologists whose interests are primarily taxonomic, but again numbers are strictly limited.

Most primary schools have courses in nature study or hygiene, and some secondary and modern schools provide good biological teaching, but in others it is deplorably lacking. We have heard much recently of the shortage of science teachers in schools, and for this there are a number of good reasons, not the least being the poor salaries offered. First-rate teachers have a natural gift that cannot be artificially stimulated in others and they will devote themselves to the cause however much they are exploited. But they alone are not enough and other scientists who are less interested in teaching will have to be attracted to the schools. Until it is generally realised that education and science are profitable investments for the nation, the salaries of school teachers are unlikely to compare with the wages of industry. Another very important point which has not, I think, so far been mentioned is that research to most scientists is the chief object of life. If the schools wish to attract good scientists they must be prepared to provide both the time and the facilities for research.

Last, but not least, we come to biology in the universities. Now the functions of a university include both the maintenance and the extension of knowledge and consequently its academic staff are expected to undertake research as well as teaching. The amount of time allotted to each varies

considerably in different departments and universities, but they form an ideal combination. The mental stimulation and enthusiasm required for inspired teaching are provided by the research and at the same time the necessity for wide reading in the preparation of lectures not only engenders a breadth of vision in the approach to fundamental problems, but helps to counteract any tendency toward over-specialisation. In addition, the university lecturer is free to select any subject for research that he chooses and he enjoys a liberty that is unequalled in any other profession. At present, however, the universities absorb only a small proportion of their own output of graduates in biology. After obtaining a first or second class degree, a biologist intending to follow an academic career will normally have to undertake two or three years' research before being appointed to the staff of a university. In addition it is advisable for him to obtain a higher degree, although ultimately appointment depends upon a reputation acquired for critical scholarship and original research.

#### The Amateur Naturalist

This brief survey may have indicated some of the points to consider before deciding to make a career in biology and especially aquatic biology. Perhaps the best advice to most people is still to enter some more profitable even if humdrum business so that aquatic and zoological interests may be followed and enjoyed in leisure time. Such a course is not without its rewards and the debt that biological knowledge owes to the amateur naturalist cannot be over-estimated. On the other hand, if anyone is still determined to become a professional biologist he or she will delight in a career in which hobby and work are entwined and which, however badly paid, provides its own rewards.

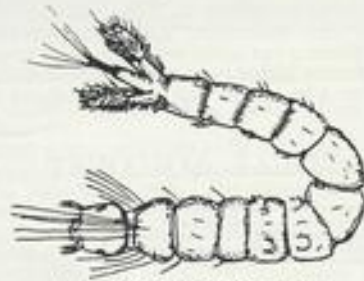
For full details about the opportunities and requirements for a career in biology, reference should be made to an excellent and informative booklet entitled *Biology as a Career*, published in November, 1954, by the Institute of Biology, Tavistock House South, Tavistock Square, London, W.C.1 (price 2s. 6d.).

## FRIENDS & FOES No. 35

## Midges

### DIXINAE

**D***XINAE* is actually a sub-family with thirteen British members, all belonging to one genus—the genus *Dixa*. The larvae of the *Dixa* midges cannot be confused with any others, for they rest in a U-shape at the surface of the water, briskly whisking their mouth brushes to and fro to bring microscopic particles of food (usually vegetable) near enough to eat. A full-grown specimen is only about a quarter of an inch in length, so that sharp eyes are necessary to spot them, particularly as they frequent ponds where there are numbers of floating leaves and a deal of submerged vegetation. If found they well repay close examination. Their heads are well-developed and, viewed from above, appear to have a number of long whiskers underneath. Turning the creature over, however, we can see that these are actually from the anterior end of the first thoracic segment. There are two pairs of false legs, one on the first abdominal segment and another on the second, both ending in a comb-like fringe of hairs. There are three further combs of hairs lower down the body. Very long hairs again appear at the extremity of the abdomen, which is usually above the water surface. The pupa, too, when resting at the water surface, is of a pronounced U-shape, but



Magnified larva of *Dixa* midge

easily distinguished from *Culex* and anophelene pupa by the difference in the breathing horns and the extremity of the pupa case. The imagines have long slender antennae, which are not plumed. Fishes will eat *Dixa* at all stages of development, and it might well be that many of the larvae and pupae are actually fed without being noticed in catches of other live food. Their favourite position being at (almost on) the water surface, the eyes do not observe them when looking into a pool.

C. E. C. Cole



## In the Water Garden in APRIL *by Astilbes*



Photo:

Laurence E. Perkins

Pond fishes appreciate the shade provided by lily pads

**T**HIS month is the time when water lilies may be planted in the garden pond. Some of the more tender plants can wait until May, but most of the types in common use will be quite safe as long as the work is not done in a very cold spell (and even in April this can happen!) The planting of the lilies will depend a great deal on the type and size of the pond. Where the pond is a natural kind with a soil bottom the planting is far more easy but the subsequent treatment can be more difficult than when dealing with a concrete pond. The lilies will prefer the natural bottom, and will soon send down numerous roots to get well established. Should the plants get very large it will be found a difficult task successfully to restrict the rate of growth. Where a plant has been introduced into the pond in a large pot or other container the whole can be removed from the pond for pruning and division with little trouble.

In the natural-based pond even though pots may be used when planting it does not follow that the roots will not leave the pot and still become deeply embedded in the base soil. As a rule those ponds with a natural soil base are larger than the usual garden pond, and so the rampant growth of the plants will be less harmful than it would be in a small pond. For planting lilies in the soil-based pond it is only necessary to lower the plant into position and anchor it well so that it cannot rise to the surface before the roots can get a firm hold. The anchoring can be done by loosely wrapping the roots of the lily in a piece of coarse sacking and tying a weight inside—a large stone will do. The roots will soon grow through the sacking as it rots.

When planting lilies and other water plants in concrete ponds it is essential that much more care is taken. The soil is very important, as most lilies are gross feeders and until a pond is well established with fish there is not likely to be enough food for healthy growth. Once the pond is well balanced there will usually be plenty of waste matter from the fishes and from dust, etc., falling into the pond, so that it is only in a newly constructed pond that the need for rich soil is so essential. I know of nothing safer than good loam for the purpose. Loam is the top spit of soil, with turf, from an old established meadow, which has been stacked for a few months, grass down, to rot slightly. A good loam is quite sufficient to start growth in water lilies

and the addition of manures and fertilisers can be dispensed with. I know that some growers advise a little well rotted cow manure to be incorporated in the planting medium, but I consider that most water lilies are such rampant growers when in a pond with fish that there is no need whatever to add to the nourishment found in the loam. If you feel that you must use some form of fertiliser I think a little crushed bone would be the safest to use; but only a little in case the action of the decomposing material harms the occupants of the pond.

It has always been my experience that it is not the encouragement to flourish which is the worry with water lily growing, but the need for restriction of growth, in most cases after a year or so. The plants will always have plenty of moisture and with a little warmth they soon make rapid growth. Therefore, I consider that just sufficient nourishment is needed to start off the growth and then the roots will be sure to find plenty of food which forms in a fish-occupied pond. If one intends to try to grow water lilies in a pond which will not contain fish then it is imperative to give more nourishment when setting the plants. For planting in concrete ponds large special pots can be obtained. These have holes round the sides of the pot so that the roots can leave if needed. Also these pots are easily removed from the pond at cleaning time or if any attention is needed by the plant.

There are many kinds of water lily to choose from and it is always best to ask your dealer to recommend which to grow after you have given the size and depth of the pond and the colours you prefer. Some types will grow in a few inches of water, whilst others require up to two feet or more in depth. What must be realised is that even a large-growing kind will not do well in a restricted area or in shallow water. The size of the flower is also governed to a great extent by the conditions of growth. I have known water lilies to produce flowers only an inch-and-a-half across when in poor conditions yet when transplanted into ideal sites the same plants have produced flowers over twice as large.

For small and fairly shallow ponds the following will be found useful:—*Nymphaea aurea* (yellow-red) (Marliac), *N. brakleyi candida* (white) (Asian), *N. chrysantha* (reddish yellow) (Marliac), *N. delicata* (white) (Henkel), *N. laydekeri fulgens* (crimson) (Marliac), *N. odorata minor* (white) (North American) and *N. Princess Elizabeth punctata* (peach) (Hybrid).

For ponds about 12 to 18 inches deep the following may be used:—*N. Andreana* (red) (Marliac), *N. caroliniana nivea* (white) (Marliac), *N. comancha* (rose) (Marliac), *N. eburnea* (white-pink) (Marliac), *N. eucharist* (rose pink) (Marliac), *N. fire crest* (deep pink) (American origin), *N. froebeli* (red) (Froebeli), *N. graziella* (red-yellow), (Marliac), *N. laydekeri purpurata* (rose-crimson) (Hybrid), *N. Livingstone* (red) (Marliac).

Some stronger growing types for ponds from 18 to 24 inches deep are:—*N. Arc-en-ciel* (salmon) (Marliac), *N. atropurpurea* (dark crimson) (Marliac), *N. brakleyi rosea* (rose-pink), *N. darwin* (red) (Marliac), *N. fabiola* (pink) (Marliac), *N. gloriosa* (red) (Marliac), *N. indiana* (orange-red) (Marliac), *N. James Hudson* (purple crimson) (Marliac) and *N. lucida* (rose) (Marliac).

The following are more suitable for large ponds and lakes:—*N. alba*, *N. colossae* (pale pink) (Marliac), *N. gladstoniana* (white) (Richardson), *N. goliath* (rose-pink) (Marliac), *N. leviathan* (pink) (Marliac), *N. marliacca albida* (white) (Marliac), *N. odorata gigantea* (white) (Hoptacong), *N. picciola* (crimson) (Marliac) and *N. Vera Louise* (pink) (Hybrid).

## 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.

### Light and Algae

THE usual advice given in text books on tropical fish-keeping for the cure of green water, is to reduce the amount of light shining on or entering into the tank. However, after repeated experiments, I find the contrary to be true. In other words, if one is troubled with green water or algae, the best way to eliminate this is to keep the top light on for about 16 hours a day for about three to four days, and, hey presto, the tank is crystal clear.

In my opinion, the plants in an ill-lit or dark tank will give off a great deal of carbon dioxide, which is a stimulant for the growth of algae and green water. If the carbon dioxide is reduced, as it must be by the prolonged lighting of the tank, then the microscopic plant life perishes. Strangely enough, the main plants in the tank flourish, their leaves being crisp and clean. I find a parallel in my garden. On the north side (where the sun never penetrates owing to the shadow of the house) the ground and path has large patches of moss and plants will not grow, whilst on the south side, which is exposed to the sun and strong light, there is vigorous plant life but no moss.

I should be most interested if other of your readers experimented on the lines of curing green water by giving more and not less light to their tanks, and then publishing their results in your columns.

G. H. DANIEL,  
Wirral, Cheshire.

### Hard or Beautiful?

THE letter from "Pisces," published in your March issue, is easily answered. So far as I know there is nothing in Von Linné to support *kallos*, but equally there is nothing to support *callus*. It follows, therefore, that a case for *callus* can be made out. I have never said otherwise. What I have said, and still say, is that *Callichthys* can only be transcribed as beautiful fish, and to transcribe it as hard-skinned fish is virtually accusing Von Linné of being ignorant of Latin and Greek. I for one am not prepared to go to this length in face of the fact that he lived at a time when Latin and Greek were the languages of educated men.

T. S. Palmer is merely stating a general principle. It is not very impressive. Dr. Leach, for example, named a group of parasitic crustaceans by constructing anagrams on his wife's name, and at least one worker has been known to draw names out of a hat. Dr. George Myers is a first-class ichthyologist, but he is hardly an authority on the classics. What appears to be the truth is that, as it is hard to believe that anyone would describe the South American catfishes as beautiful, a case has been made out for hard-skinned, and this has been accepted by aquarists because it has appeared in a popular American book.

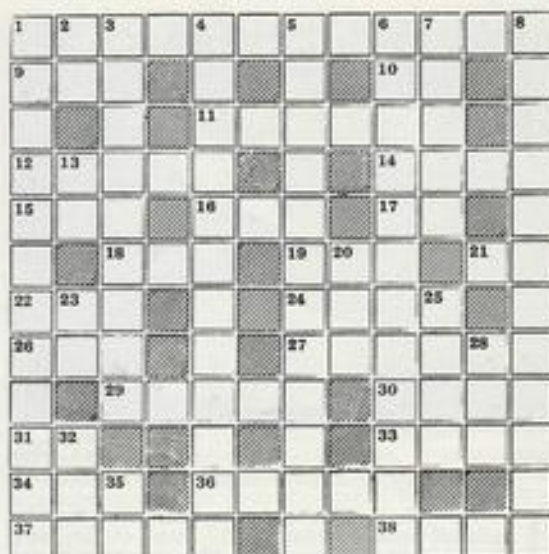
GEORGE F. HERVEY,  
London, N.W.5.

### PICK YOUR ANSWER

- The missing word in the quotation, "It's no fish ye're buying, it's men's . . .", is: (a) blood, (b) brains, (c) lives, (d) souls.
- Which is the largest of the following species: (a) *Barbus callipterus*, (b) *Barbus lineomaculatus*, (c) *Barbus isambardus*, (d) *Barbus wernerii*.

## The AQUARIST Crossword

Compiled by J. LAUGHLAND



### CLUES ACROSS

- Instrument necessary to ensure that tanks are maintained at correct temperatures (12)
- There is good material in reptiles (3)
- Out of out of *Tubifex* (2)
- Mollusc which ejects septa when alarmed (6)
- Nose returns after Dad for this material (5)
- Every one within reach (4)
- If your fish seem this it may be partly illusion (3)
- Unit by which electrical resistance is measured (3)
- Little holy one; not a parasite fish (2)
- Part of the circumference (3)
- Whale or grampus (3)
- When half *Hyphessobrycon isseni* is off, it is on (2)
- Its eggs were once popular fish food (3)
- To turn up with the snout (4)
- To deposit eggs (3)
- These musicians may give you the pip at first (6)
- Sally goes formal (5)
- Cardinal point of the *Asterias* (4)
- Tail of the *Gadus* (2)
- The Spanish Maureen Connolly for a saint (4)
- Hardest worker in your society, probably (abbrev.) (3)
- Unpleasant (5)
- Rinularia* . . . (5)
- See a confusion for relaxation (4)

### CLUES DOWN

- I chip last for (anagram) (8, 4)
- Male (2)
- This *clasper* is the barred *panchax* (9)
- The toothed carps (12)
- Change in form, as from tadpole to frog, for instance (12)
- Nelson's blind one? No, fancy goldfish (9-3)
- Formal leave begins with a moorland river (5)
- Fish louse is one (12)
- Mr. Capone to you (2)
- King, in case you have forgotten your French (3)
- North Africa (1, 1)
- Water fowl is late in a way (4)
- Warrant Officer, Class I (1, 1, 1)
- Seal loses tail but finds his home (3)
- You deserve a little credit for getting this one (2)

- Acanthophractus leucurus* (the leopard eel) was named by: (a) Bloch and Schneider, (b) Cuvier and Valenciennes, (c) Müller and Troschel, (d) Weber and de Beaufort.
- The sleepy trout is the popular name of: (a) *Dormitator maculatus*, (b) *Hypselotris cyprinoides*, (c) *Megarrhinus megarhinus*, (d) *Oxyeleotris marmoratus*.
- Pallinuria* is represented by: (a) 5 species, (b) 10 species, (c) 15 species, (d) 20 species.
- Wolffia arbuscula* is popularly known as: (a) Greater duckweed, (b) Lesser duckweed, (c) Rootless duckweed, (d) Thick duckweed.

(Solutions on page 19)

G.P.H.

LAST summer season the Dublin Society of Aquarists extended an invitation to aquarists on holiday in Ireland to visit their meetings, and another welcome is offered this year by secretary Mrs. E. Spurling Jewell (99, Walkinstown Road, Crumlin, Dublin). Meetings are held on the third Friday of each month, and the secretary is at home to all "fish people" every Monday evening.

HUSBAND and wife, popular Yorkshire aquarists Mr. and Mrs. H. Loder were elected chairman and secretary respectively at the Burnley Aquarist Society annual general meeting. The society is hoping to attract many new members with some well-known speakers at meetings planned this year.

OFFICIALS of the Pontefract and District Aquarist Society were all re-elected at the annual general meeting last month. Highest number of points for thirteen table shows held during last season was secured by secretary Mr. R. W. Rhodes, gaining him the Morton Cup. Mr. H. Cranwick was second and won the Stewart Cup award.

MEMBERS of the West Middlesex Aquarists' Society now meet at their original headquarters in the Town Hall, Ealing, on the third Tuesday of each month at 7.30 p.m.

IT is announced that the Workington and District Aquarist Society has been disbanded owing to lack of support.

### Sunset Platy Standard

THE following additional colour standard for the sunset platy has been approved by the Federation of British Aquatic Societies for addition to the general standards for platys (except wagtail platys): *Colour:* The ground colour of the body a deep tangerine spreading into the dorsal and caudal fins. The belly straw-coloured, this colour spreading upwards but becoming less intense as it approaches the dorsal area. The sides overlaid with black leaving a margin which is greater above the middle line than below. The black should be more intense below this line than above it, where it shades into iridescent green as it approaches the region of the base of the dorsal fin; it should not spread into the snout or show in the fins. The iris of the eye black.

### Hendon "At Home"

AN "at home" to which London society members and friends are invited is being held by the Hendon and District Aquatic Society at the London Aquarium, South Bank, 7.30 p.m. on 14th April. As well as the display of fishes to be seen there, three talks are to be given by Hendon members on "Aquarium Management" (Mr. F. Riddle); "Breeding the Characins" (Mrs. B. Robertshaw); "Ladiges' Fishes in der Landschaft" (Mr. R. Calrow).

### Midland Show

SCHEDULE for the classes to be staged at the Midland Aquarium and Pool Society Midland Show (25th-27th August) shows 25 classes for tropicals disposed as at last year's show. The coldwater classes are 20 in number, covering common goldfish, two breeders' classes (one for twin-tails, one for single-tails); calico shubunkins—six classes; orandas and lionheads—one class; moors—one class; fantails—one class; a.o.v. aquarium fishes—one class.

### New Societies

Herts and Essex Aquarists' Society. Secretary: Mr. J. McCarthy, 99, The Chantry, Mark Hall, Harlow, Essex. Meetings: Second and fourth Friday evenings each month at Cooks Spinney Junior School, Harlow. Llandudno and District Aquarist Society.



## 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.

Secretary: Mr. C. H. Jones, 46, Pengarth, Conway, Caernarvonshire. Meetings: First Thursday each month at Balmoral Hotel, Trinity Square, Llandudno.

### Secretary Changes

CHANGES of secretaries and addresses have been reported from the following societies: **Hanbury and District Aquaria Society** (Mr. A. Sergeant, 28, Cromwell Road, Banbury, Oxon.); **Bolton and District Aquarist, Pond and Marine Society** (Mr. G. Birchall, 11, Louisa Street, Bolton, Lancs.); **Bristol Aquarists' Society** (Mrs. G. Grimston, 10, Queens Road, Knowle, Bristol, 4); **Gallagher Ltd. Recreation Club Aquarists' Section** (Mr. G. E. Crisp, Gallagher Ltd., 138, York Street, Belfast); **Hertford and District Aquarists' Society** (Mr. B. M. Waller, 3, New Road, Ware, Herts.); **Liverpool District Section of Federation of Puppy Breeders** (Mr. B. B. Thurlow, 4, Coniston Avenue, Wallasey, Cheshire); **Macclesfield Aquarium Society** (Mr. A. Lunt, 53, Stapleton Road, Macclesfield, Cheshire); **Midland Association of Aquarists' Societies** (Mr. J. Druce, 174, Shenley Fields Road, Hill, Birmingham); **North Staffs Aquarists' Society** (Mr. L. J. Perks, 6, Radford Road, Cliffe Vale, Stoke-on-Trent, Staffs.); **Preston and District Aquatic Society** (Mr. D. A. Varley, 261, North Road, Preston); **Romford Aquarists' Society** (Mr. L. A. Elliott, 45, Grovener Drive, Romford, Essex); **Southport and District Aquarium Society** (Mr. G. Cahill, 21, Somerset Road, Blundellwands, Liverpool, 23); **Tottenham and District Aquatic Society** (Mr. J. Lewis, 192, Langham Road, Tottenham, London, N.15); **Ulster Aquarium Society** (Mr. G. E. Crisp, 31, Lismore Park, Belfast).

### Aquarist's Calendar

4th-16th April—**Southport Aquarist Society** second annual show in Gaumont Cinema foyer, Lord Street, Southport.  
14th-16th April—**Todmorden and District Aquarists' Society** open show at York Street Sunday School, Halifax Road, Todmorden. Schedules and entry forms available from Mr. J. Holroyd, The Cottage, Railway Street, Todmorden.  
2nd-7th May—**Oxford Aquaria Society** exhibition of fishes. Details from secretary, Mr. V. H. Lewin, 21, Halliday Hill, Oxford.  
20-22nd May—**Rochdale and District Aquarist Society** fourth annual open show at the Fire Station Hall, Rochdale. Show schedules and information from show secretary, Mr. J. Dodsworth, 251, Koolley Moor Road, Rochdale, Lancs. Closing date 25th April.  
23rd-28th May—**Blackpool and Fylde Aquatic Society** fifth annual open show at Trinity Schoolroom and Lecture Hall, Coronation Street, Blackpool. Schedules and entry forms available from Mr. J. Peck, 82, Barburst Avenue, Blackpool.  
9th-11th June—**National Aquarium Exhibition** at Royal Horticultural Hall, London, S.W.1.  
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.  
28th-30th July—**Portsmouth Aquarists' Club** annual open show at Royal Engineers' Drill Hall, Portsmouth. Entry forms from show secretary, Mr. G. Ilverson, 24, Bertie Road, Southsea.



### The Aquarist's Badge

PRODUCED in response to numerous requests from readers, this attractive silver, red and blue substantial metal emblem for the aquarist can now be obtained at cost price by all readers of *The Aquarist*. The design is pictured above (actual size). Two forms of the badge, one fitting the lapel button-hole and the other having a brooch-type fastening, are available.

To obtain your badge send a postal order for 1s. 9d. together with the Aquarist's Badge Token cut from page xii, to Aquarist's Badge, *The Aquarist*, The Butts, Half Acre, Brentford, Middlesex, and please specify which type of fitting you require.

### Crossword Solution

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

PICK YOUR ANSWER (Solutions)  
1 (c), 2 (a), 3 (b), 4 (c), 5 (a), 6 (c).



*Essential To All Breeders*  
**Hobby Fish Foods**



See page xi

## ARTHUR DERHAM

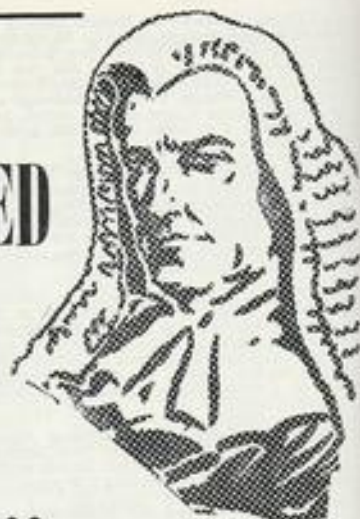
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