

# The AQUARIST AND PONDKEEPER

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Attractive and unusual trophy at this year's B.A.F. was this 18 in. tall carving of a telescope eye veiltail in false acacia wood, presented by Mr. and Mrs. C. Hammond of Doncaster, for the most outstanding effort by a goldfish breeder

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## Editorial

NEW and attractive shades of green begin to appear in ponds and streams—favourite resorts for live food hunters, and with sunny days to tempt us to the waters more frequently than usual, there comes another temptation. Why not, says the gremlin responsible for so much aquarium trouble, why not take just a few of those beautiful plants home to try in the tank?

Somehow or other the mental reservation which the tempted plant collector makes as he gathers his prizes—that he will of course disinfect and quarantine the plants for a period—is forgotten on the way home. There are too many other jobs to do at the time, so in go the plants after the most perfunctory of examinations or after an inadequate rinse in water. It is unwise to be dogmatic about the next stage of the process, for sometimes the worst that happens is only an untidy crop of *Hydra* all over the tank, but commonly after a week or so in which all has appeared to go so well, the folly of it all is brought out by an outbreak of going so badly.

All manner of things which have no proper place in a well-ordered tank begin to appear; strange holes and ragged stems may suddenly be noticed in water plants which once seemed so expensive purchased from a dealer but which at least have been healthy up to now. Queer worm-like animals slide all over the tank glass, and what is most infuriating, the fishes refuse to eat them. In fact, they may even appear to cast accusing glances at their owner. If he has brought home fish from the wild as well as plants their glances may be those of a murderer's victims before death, for the troubles which this practice can engender in ponds and aquaria are legion and serious.

This is not to suggest that you deny yourselves the undoubted pleasures of collecting from natural waters, but please do quarantine all collected stock in special tanks for a fortnight or so before fully accepting it. The healthy aquarium is so easily upset. Material from the wild can be so richly upsetting.

# Inheritance in the Guppy

Simple Mendelian Inheritance of Albinism, Gold and other colorations

by Dr. MYRON GORDON

(Geneticist, New York Aquarium)

IT would be an easy matter to say that the golden recessive mutant of the guppy has its counterpart in many aquarium fishes, and then to go on to more complicated hereditary processes. Treating the simple recessive gene, *golden, g*, in this way would be most superficial. The study of inheritance of golden in each species, though basically the same, reveals new methods of the hereditary control of colour patterns in fishes. This is demonstrated in the careful and beautifully executed studies of the inheritance of not only the golden, but the blonde and the cream-colour variations in guppies described in 1944 by Professor H. B. Goodrich and his graduate student associates at Wesleyan University in Connecticut.

## The Wild Type of Guppy

For the purposes of comparison, Dr. Goodrich considered the coloration of the wild grey female guppy as the standard type. The skin of the grey female guppy, when observed under a microscope, is covered by hundreds of small black pigment cells, or melanophores. Since we will have to use the word "melanophore" repeatedly as we go along, we might take a moment to define it as a melanin, or black particle-carrying cell. There are several types of melanin-carrying cells in fishes and in other animals, but the melanophore has certain special physiological properties. The melanin particles may be dispersed throughout the cells, or the pigment particles may be grouped together in a small area in the centre of the cell. Whether the particles are

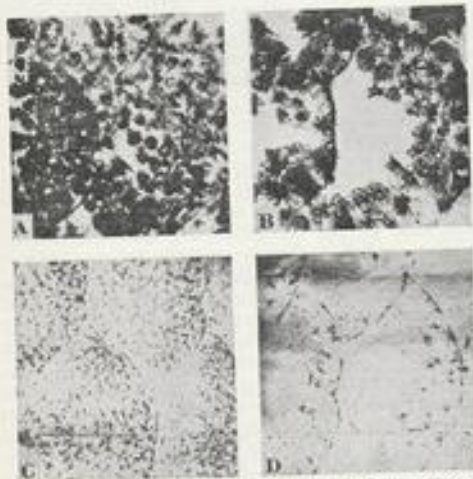
dispersed or concentrated depends upon the physiological state of the animal.

For example, if a fish hovers over a white sandy bottom, its body becomes pale and matches its background. In this case the pigment granules are concentrated in the centres of the melanophores. If the fish moves directly over dark rocks or black mud, its eyes act as a sensory pick-up and this initiates a chain reaction through a series of nerves that brings about a dispersal of melanin particles in the melanophores. As a consequence, the fish becomes dark coloured. We know that the eyes are vital in starting the reaction because, if blinded accidentally, or in the course of experimentation, the fishes cannot make the pigmentary readjustments to their background.

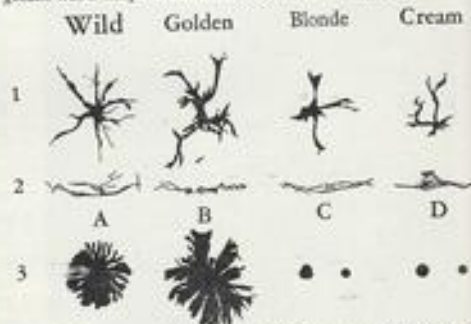
## The Golden Guppy

If by some chemical process one could remove the hundreds of tiny melanophores that are ordinarily present in a wild grey female guppy, or could reduce their numbers radically, one could produce a golden variety. We know of no chemical that will do this, and still maintain life in a guppy, but one chance hereditary mutant did the trick. The *golden, g*, mutant reduced the number of melanophores by about 50 per cent. This loss of black pigment cells uncovers and reveals the yellow pigment cells which are always present in the skin of every guppy. Curiously, the melanophores that the golden guppy retained are slightly larger than the usual type, but they were unable to cover the underlying yellow coloration.

When the Wesleyan University geneticists mated a wild type of guppy with a golden one, they obtained 257 first generation offspring all of which were grey coloured like their wild parent. When they mated two of the grey  $F_1$  guppies together, brother to sister, they obtained 230 grey to 74 golden guppies among the members of the second generation. The results convinced the experimenters that *golden* was a simple Mendelian recessive, and the reader will



(Figures reproduced by kind permission of Dr. H. B. Goodrich)

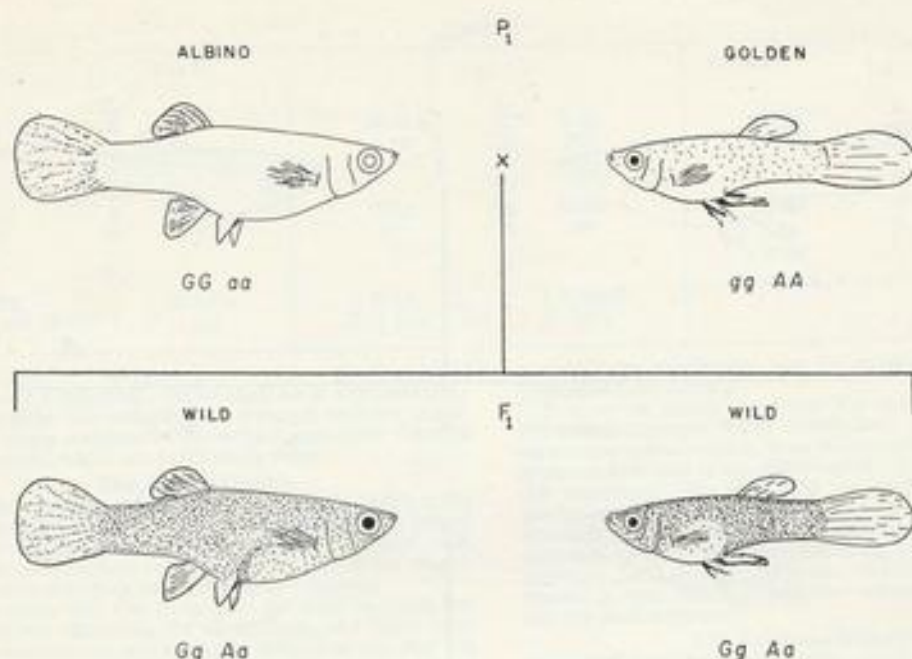


(Above) Four types of melanophores in four guppy color varieties: 1, dendritic melanophores on central part of scales; 2, dendritic melanophores at edge of scales; 3, "corolla" and "punctate" melanophores. Letters A, B, C, D, refer to typical pigment cells shown in corresponding photo-micrographs (left) of patterns produced by melanophores on the top mid-line of guppies, slightly in front of the dorsal fin. A: Wild-corolla type in the wild variety; B: Golden-corolla type in the golden recessive; C: Blonde-dendritic and punctate types in the blonde recessive; D: Cream-dendritic and punctate types in the double recessive variety.

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Black-  
1. W  
2. G  
3. B  
4. C



*Reversion of Fancy Types of Guppies to the Wild Colour:* When two fancy varieties, each recessive to the wild type, are mated together all their offspring have the wild ancestral coloration because each of the fancy varieties is recessive for only one hereditary factor. In the example illustrated the golden male guppy is recessive for the golden factor *gg* but is dominant with respect to the albino factor *AA*. Thus the golden male genetically is *gg AA*. The albino female is also recessive for one colour factor, albinism *aa*, and albino is dominant for the golden factor *GG*. The albino is prevented from showing its dominance as far as golden is concerned because the albino gene inhibits the production of melanin pigmentation. Thus the albino female guppy, genetically, is *GG aa*. When a golden (*gg AA*) is crossed with an albino (*GG aa*) all the offspring are wild grey (*Gg Aa*) because they have both dominant factors characteristic of the wild guppy.

agree with them if he makes a few calculations. This may be done by adding 230 greys and 74 goldens, which make a total number of 304. Assume that the ideal ratio of 3 to 1 should be attained in the second generation population. Then, on the basis of 304 individuals, there should have been 228 greys and 76 goldens. When compared with these theoretical numbers of greys and goldens expected, the actual results obtained are remarkably close.

#### The Blonde Guppy

Professor Goodrich had another and lighter strain of golden-like guppies which he called *blonde*. Placed under the microscope the blonde guppy's skin revealed just about as many melanophores as that of the wild grey guppy but the black pigment cells were extremely small and dot-like. Apparently the melanophores of the blonde are unable to disperse their melanin particles to the degree that normal pigment cells can. Thus the guppies that have this mutant appear golden in colour—indeed the blondes are much

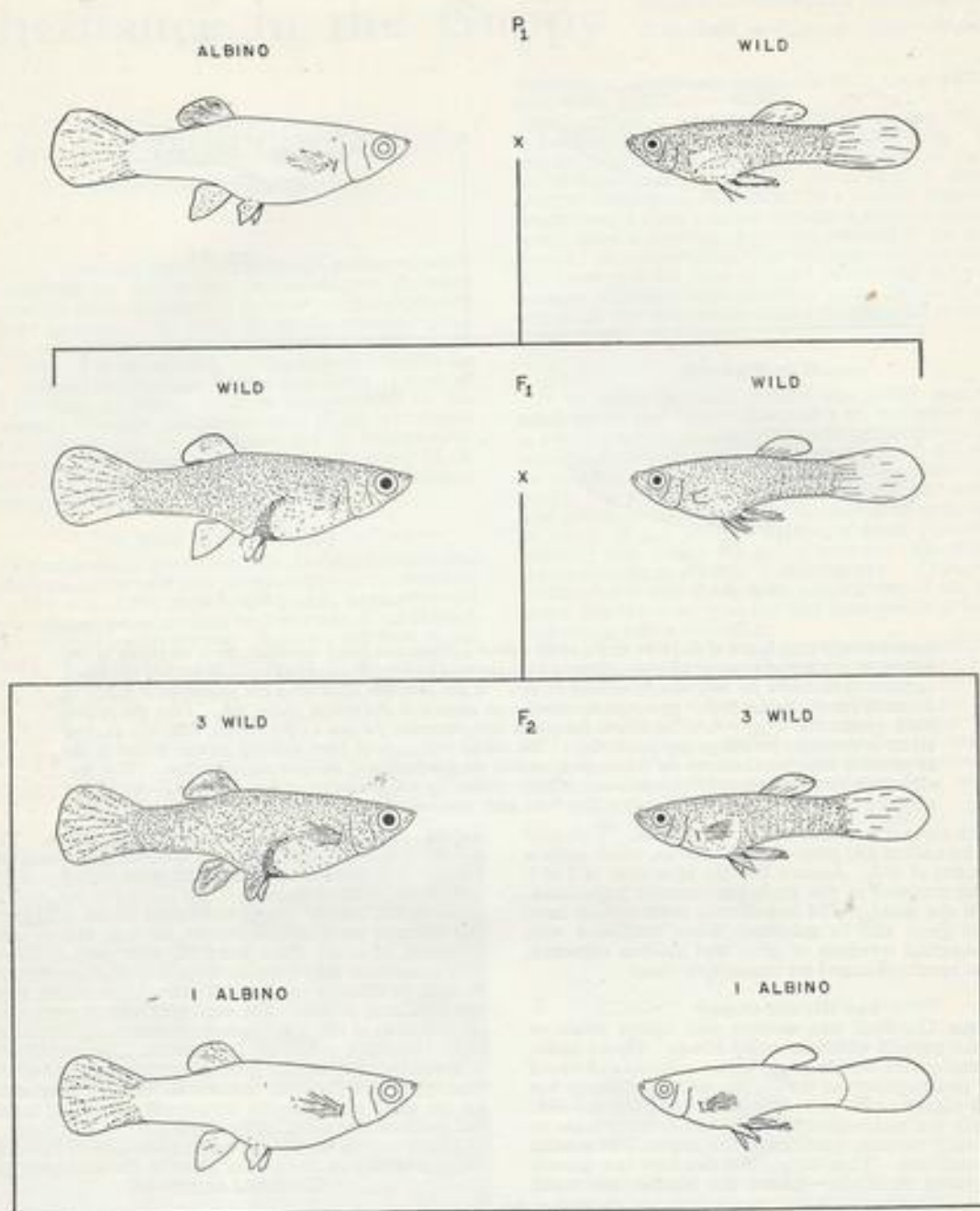
lighter and more translucent than golden guppies. This is a beautiful example of how two distinct mutations, one *g*, the other *b*, produce two different reactions, yet the final results are much the same.

When the blonde guppy was mated to the wild grey, in one series of experimental crosses, all their first generation offspring, of which there were 77, were grey. When the first generation grey guppies from this mating were mated brother to sister, a total of 285 second generation guppies was obtained, of which 224 were grey and 61 were blonde. On the basis of the 3 to 1 ratio expected in *F*<sub>2</sub>, there should have been 214 wilds to 71 blondes. Doctor Goodrich believed that the blonde guppies were not as strong as the wild type, and that this differential viability may account for the small discrepancies between the expected numbers and the numbers actually obtained.

This is very much like the result I obtained in *F*<sub>2</sub> from the original mating of the golden platy to the wild-grey platy. (Continued on page 49)

Table 1

Parents			Number of <i>F</i> <sub>1</sub>	Number of <i>F</i> <sub>2</sub>		<i>F</i> <sub>2</sub> Ratio		
Black-eyed	<i>P</i> <sub>1</sub>	..	Black-eyed	Black-eyed	Pink-eyed	Obtained	Expected	
1. Wild	x	..	Albino	291	272	7	54 : 1	3 : 1
2. Golden	X	..	"	161	404	6	69 : 1	3 : 1
3. Blonde	X	..	"	165	168	7	25 : 1	3 : 1
4. Cream	X	..	"	230	232	3	78 : 1	3 : 1



### Inheritance of Albinism in the Guppy

An albino guppy when mated with a wild type (P<sub>1</sub>) produced all wild type of offspring in the first generation (F<sub>1</sub>). From this mating, if two wild type members are bred brother to sister, they theoretically should produce in the second generation (F<sub>2</sub>) three times as many wild type offspring as albinos. This chart represents an ideal experiment. The actual results rarely produce a 3 to 1 ratio and the text explains why

Table 2

I			II			III		
Golden <i>gg</i>	P <sub>1</sub> X X	Wild <i>GG</i>	Blonde <i>bb</i>	P <sub>1</sub> X X	Wild <i>BB</i>	Albino <i>aa</i>	X X	Wild <i>AA</i>
	F <sub>1</sub>			F <sub>1</sub>			F <sub>1</sub>	
Wild <i>Gg</i>	X X	Wild <i>Gg</i>	Wild <i>Bb</i>	X X	Wild <i>Bb</i>	Wild <i>Aa</i>	X X	Wild <i>Aa</i>
	F <sub>2</sub>			F <sub>2</sub>				
3 Wild 3 (1 <i>GG</i> , 2 <i>Gg</i> )	:	1 Golden 1 ( <i>gg</i> )	3 Wild 3 (1 <i>BB</i> , 2 <i>Bb</i> )	:	1 Blonde 1 ( <i>bb</i> )	3 Wild 3 (1 <i>AA</i> , 2 <i>Aa</i> )	:	1 Albino 1 ( <i>aa</i> )

I, too, did not get as many golden platies in the second generation as I expected. As we shall see in a moment, the blonde guppies are considerably stronger and are represented in larger numbers in the second generation than the albino guppies, which are particularly weak.

#### The Albino Guppy

The albino guppy appeared during the early 1940's in the inbred stocks of the late Dr. Abbs of Ampere, New Jersey, whose avocation was breeding superior guppies. Dr. Abbs was good enough to let me have some of his magnificent fish that were both large and highly colourful.

The guppies that Dr. Abbs gave me were brilliant, but they were not albinistic, for all of them had black eyes. For our purposes an albino will be defined as one that has practically no melanin pigment on its body and none in its eyes. I was not making a genetic analysis of the guppies, for I had my hands full working with the platy and swordtail, but I maintained several aquaria of Abbs' guppies so that I could build up a supply for my friends. In this process I noticed that, every once in a while, an albino guppy appeared in the culture. I segregated a few albinos and, when I mated them together, they bred true to type. Then from another culture I mated an albino female with its brother of the wild type. This particular wild type of male must have been heterozygous for albinism, *Aa*. From the mating I obtained 138 wild to only 15 albinos. I had expected equal numbers. From these inclusive data I suspected, but by no means proved, that albinism is inherited through a simple recessive Mendelian factor. Much better proof was supplied by Drs. Caryl P. and Edna F. Haskins in 1948, when they published their results in the English journal *Heredity*.

The Haskins probably have the largest collection of genetic strains of guppies in the world. Some of them go back 25 years to the original stock from the Danish Carlsberg Laboratory of Johannes Schmidt and O. Winge. In their scientific paper the Haskins indicated that four types of guppies: *Wild*, *Golden*, *Blonde* and *Cream* (a special genetic compound of the two recessives *golden* and *blonde* genes, *gg*, *bb*) have one feature in common—all have black eyes. The albino, in contrast, has pink eyes. When in separate series of experiments they mated each of the black-eyed members with the albino, they obtained all black-eyed young in the first generation. Their data for the first and second generation populations are impressive (see Table 1).

These results reveal that the number of pink-eyed albino guppies in the second generation is far less than expected. The theoretical 3 : 1 ratio of wild to albinos seems not to have worked out. The Haskins attribute these wide discrepancies to the weakness of the albino—indeed, they call albinism a semi-lethal mutation. Nevertheless, they conclude that albinism may be referred to a single Mendelian factor, and I am inclined to agree unless new data may prove this view untenable. From the analysis of the inheritance of the *golden*, *g*, the *blonde*, *b*, and the *albino*

guppies, the conclusions may be summarised in genetic shorthand (see Table 2).

It must be remembered that the summaries represent theoretical concepts. The actual data, as I pointed out, sometimes deviate widely from the expected results. This is particularly true in the albino series, for albinism weakens the individual. We discussed the weakness of albinos, particularly the embryos, in our study of the inheritance of albinism in the swordtail where this phenomenon was first analysed, as far as aquarium fishes are concerned (see *The Aquarist*, April, 1953). Albinism, of course, is a common mutant in many kinds of animals—witness the white crow and the pink elephant.

#### The Zebhrinus Guppy

IN 1927, long before the *golden*, *blonde* and *albino* colour varieties of the guppy were discovered, 18 other inherited patterns in this small fish had already been described and worked out by O. Winge, Denmark's great plant and animal geneticist. For our present discussion we shall review the story behind only one of Winge's original 18 patterns in the guppy.

The *zebrinus* guppy, as the name implies, is a barred pattern of two to five vertical dark pigmented stripes on the caudal peduncle area of the body, that is, between the anal and tail fin. Like so many colour patterns in the guppy, *zebrinus* is expressed only in the males but, as we shall see, the females, although unable to express the pattern, nevertheless are able to transmit the hereditary factor for it to their sons. This may be the appropriate time to introduce a useful new term into our genetical discussion, a term that applies to the inheritance of traits like *zebrinus*, the gene for which may be carried by both sexes but expressed only in one. Such traits are *sex-limited*. Please note that I did not say *sex-linked*—that is something different and it definitely does not apply to *zebrinus*.

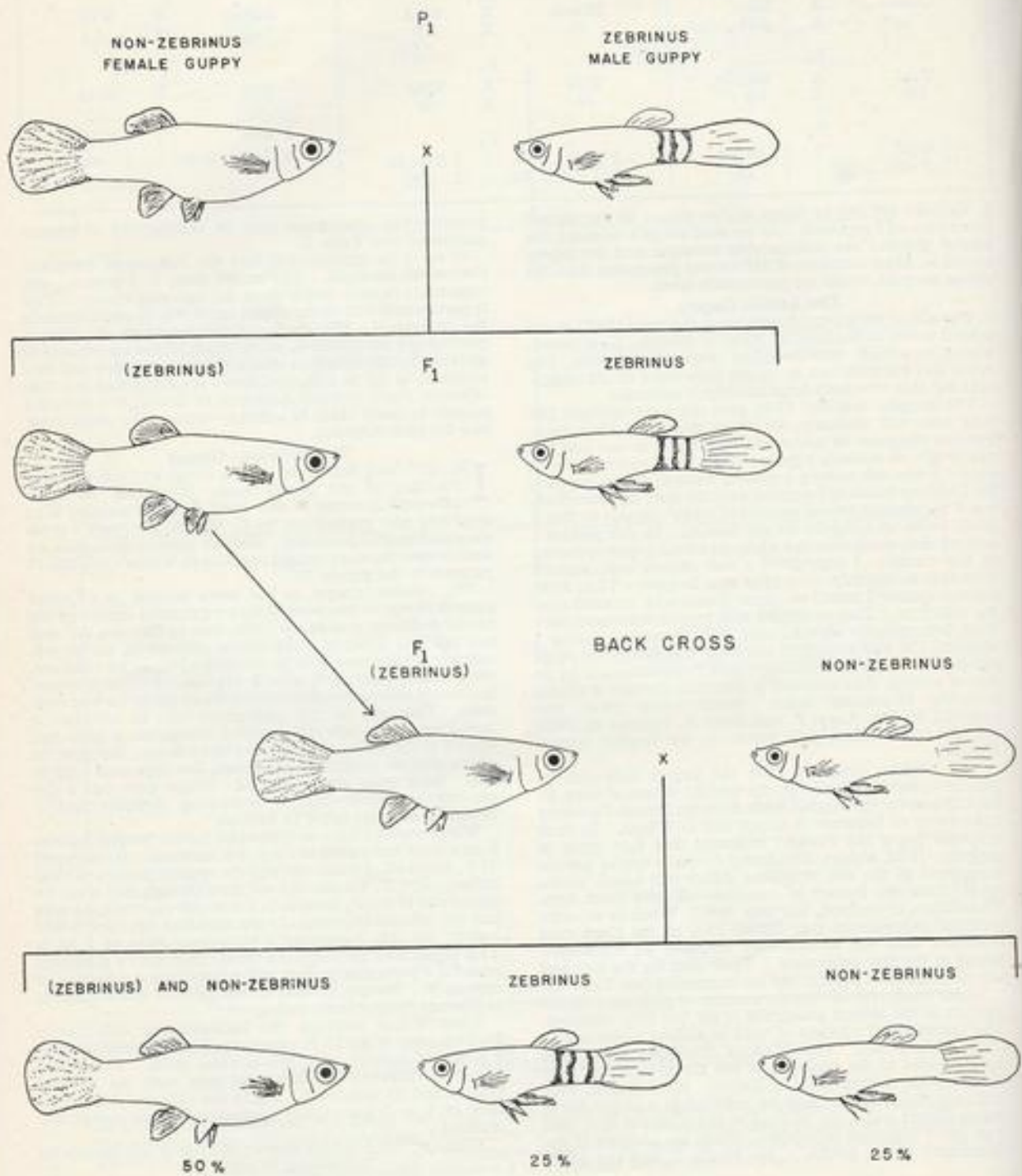
Winge mated a *zebrinus*-patterned male to several females from a stock known not to carry that marking. He obtained 37 F<sub>1</sub> males all of which showed the specific pattern of their father. The F<sub>1</sub> females did not show pattern, but when he mated one of the F<sub>1</sub> females to a non-*zebrinus* male, 24 sons had the *zebrinus* colouring, 25 did not; just what one would expect, for this represents a back-cross ratio of 1 to 1. This experiment proves that a female may carry a dominant gene for a particular pattern and yet she may not be able to express it. We say, therefore, that *zebrinus* is sex-limited; in this case limited to the males.

Then Winge reversed the back-crossing experiment. He took some of the 37 F<sub>1</sub> *zebrinus* males and mated them to a series of females of a non-*zebrinus* stock. From this series he obtained 29 back-cross sons with the *zebrinus* pattern and 35 without it. Again the expected back-cross ratio of 1 to 1 was closely approached if not completely attained.

Winge rounded out his genetic analysis of this pattern by  
(Continued on page 51)

# Zebrinus—an example of sex-limited inheritance

(see explanation of figure on opposite page)





# AQUARIST'S Notebook



by

RAYMOND YATES

**T**HE blind cave fish (*Anoptichthys jordani*) is worthy of a place in any aquarist's collection purely as a matter of biological interest. Small specimens about one inch long are probably the best as their interesting habits can be observed without the fish being too obvious in the tank.

The colour is a translucent pink and the fish looks somewhat nondescript. It is constantly on the move, up and down the tank at all levels. This ceaseless activity would seem to be a never-ending search for food and certainly this fish is always ready for whatever food its owner cares to give. Lack of eyesight is no hardship as it senses the proximity of other fish, plants and the sides of the tank.

When food is put into the aquarium this fish adopts a similar method to the shark, a fish with weak eyesight but an extraordinary sense of smell. Blind cave fish swim in circles or in a figure-of-eight until the food is found, usually in a matter of seconds. They are not quite so good when first introduced to a tank but find their bearings, as one might say, within an hour.

This fish can also sense danger from other fish, and on one occasion I noticed a large angel snap, in a bad tempered way, at a passing blind cave fish. Like lightning our blind friend was a yard away. One the other hand they appear to be attracted by the end of a siphoning tube and when a tank is being cleaned of muck it is essential to keep a sharp look out for suicidal tendencies on their part. All foods are equally acceptable and they are just as much at home going round the surface in search of dried *Daphnia* as on the bottom after *Tubifex*. All in all, a hardy fish with a wide temperature range. Like most characins this fish easily takes white spot.

**E**LECTRIC lamp bulbs in aquarium shades are either fixed sideways in the cover pointing lengthways (left and right) or they are fixed in the back of the cover pointing across the width directly towards the front glass. The latter method keeps the wiring outside the cover but suffers from one very big disadvantage. Every time the cover is raised the lamps are tilted to an angle of 45 to 60 degrees. Any condensation on the lamp immediately runs down into the lamp socket, with the result that breakages are frequent. To get over this difficulty it is necessary to raise the cover from the side (like the lid of a grand piano) or alternatively, to delay lifting the cover until the heat from the lamps has dried out any condensation.

**S**MALL earthworms up to three inches long are undoubtedly one of the best foods for aquarium fishes. Cichlids and swordtails make rapid progress on this food and the latter fill out and lose that flat-chested appearance so frequently seen. Angels grow very quickly on this diet and are always ready for a fresh helping. The average garden is soon exhausted of its supply of earthworms of a suitable size and the keen aquarist has to look elsewhere. He should bear in mind the fact that worms like damp situations and in such circumstances they will frequently be found under large stones.

Half-an-hour in the local countryside will often yield large numbers if the aquarist knows where to look. One of the best places is under old, dried and decayed sheep manure, and even horse manure gives good results at times. Cow manure is not so rewarding and is best avoided. Farm yard and garden manure heaps are excellent sources of supply. The loose, fallen stones in the vicinity of stone walls (dry walling) are also good. Worms will last about a week if kept in damp (not wet) moss and a cool atmosphere. An easy worm carrier is the ordinary maggot bait tin used

by anglers, and to this equipment should be added a builder's trowel—a useful tool for use in the more unpleasant places.

**T**HE hobbyist occasionally sees tropical tanks in which a coldwater variety is swimming about, apparently very much at home. It is true that some coldwater fish can be kept at higher temperatures but it is unwise for those who are inexperienced to experiment. Small shubunkins, some other goldfish varieties and the black banded sunfish are those most commonly seen, with the bitterling as a surprise "tropical." In all these cases the fish are small and the water temperature at the lower end of the tropical range.

It should be remembered that the day temperature in our English summer can occasionally prove too high for coldwater specimens in small tanks. A temperature above 60° F. is dangerous for most coldwater varieties and in particular for native fish. The trout and the perch fail very quickly, as also does the minnow. The carp and goldfish are probably the most hardy but they too have their limits. The carp and golden carp seen swimming about quite happily in the steaming waters of mill lodges come from a long line of fish all born and bred in those warm waters. When they are removed to other quarters where the water is normal (i.e. 60° F. or below) they soon fail.

I once managed to keep some large orfe for a week at a temperature of 78° F. and although they survived it was touch and go all the time. In much the same way a few enthusiasts have tried to keep certain tropicals, duly acclimatised, in coldwater tanks where the mean temperature averaged 55° to 60° F. It can be done with zebra danios, white clouds, paradise fish and the like but the result is not worth the trouble. The fish are not so active nor so brightly coloured at these lower temperatures, but what is worse, they look hopelessly out of place with coldwater fish and seem to know it.

**S**OME of our more enterprising dealers are now providing a separate tank for each different variety of fish which they have for sale. A school of fish of the same type certainly looks well and the absence of other varieties prevents distraction when selecting specimens. I noticed recently that one dealer had labelled each tank with the common name of the fish, the scientific name, the country in which the fish are found and the size to which they grow. This is helpful for the beginner, who is thus able to get to know many varieties of fish when looking round the shop, as well as giving an indication of the adult size of the species for those who are in doubt.

## Post-Mortem Examination of Fishes:

W. Harold Cotton, F.R.M.S., F.Z.S., 39, Brook Lane, King's Heath, Birmingham, 14. (Phone: Highbury 1603)

Specimens should be sent direct to Mr. Cotton with full particulars of circumstances, and a fee of 3s.

It is important that the following method of packing fish be adopted:—Wrap fish, very wet, and loosely in grease proof paper and then in wet cloth. Re-wrap in greaseproof or wax paper and pack around with cotton wool in tin box. Despatch as soon as possible after death, with brief history of aquarium or pond conditions.



## The Green Rivulus (*Rivulus cylindraceus*)

ORDER:—Microcyprini, from Greek *mikros*—small, and Greek *kyprinos*—a kind of carp.

FAMILY:—Cyprinodontidae, from Greek *kyprinos*—a kind of carp, and Greek *odontos*—tooth.

SPECIES:—*Rivulus cylindraceus*—from Latin *rivulus*—stream, Greek *kylindros*—cylinder, plus Anglicised Latin *axis*—tending to.

It is somewhat difficult to give an adequate word-picture of this little fish. It has not the brilliance of a neon tetra, nor the strongly contrasting patches of different colours which distinguish a male guppy. The female is always somewhat drab—a dingy olive-brown, with a hint of green in her fins. Her anal and dorsal fins are noticeably rounder and smaller than those of the male. In addition she shows a distinct dark spot ringed with yellow at the beginning of the upper rays of her caudal fin.

The male is much more pleasing. His back is dark brown, shading to olive. A dark brown line seems to divide his body into two almost equal halves. Below this horizontal line the body colour lightens and changes gradually to yellow or orange, being most intense in the throat region. The whole body is peppered with small green and red spots. The fins have a distinct yellowish tinge, with a touch of black in the caudal and a faint outline of white in the dorsal. The maximum size for both sexes is about two inches.

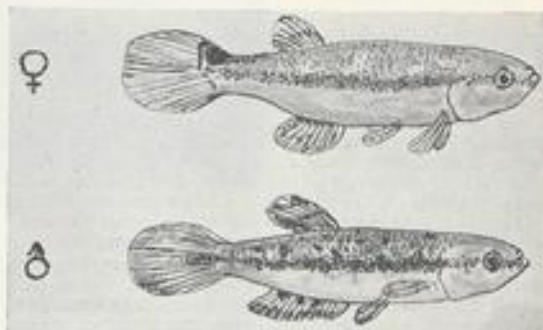
### Interesting Breeding Habits

*Rivulus* have never been one of the most popular aquarium fishes, but they are well worth keeping if only because of their interesting breeding habits. The male is an ardent suitor, constantly pursuing his mate, who is often forced to seek refuge among sheltering plants. At other times the female plays 'possum, sinking to the bottom of the tank and lying rigid, fading out what colour she possesses. This seems to be a hint to the male that she does not want any more to do with him for the time being, a hint which he usually takes.

Some aquarists recommend placing more than one female in the spawning tank to distract the attention of the male and give them all a respite periodically. There is another aspect to this method of procedure, however, which is worthy of consideration. *Rivulus* have a partiality for their own eggs, and unless extremely well fed, the "resting" females might well attempt to recruit their strength by feasting on the eggs already laid. I say "laid" deliberately, because the females have short ovipositors through which they pass the eggs singly, sticking them to the surface plants.

### Protection for Eggs

It is advisable to have a really thick layer (about one inch) of mixed *Riccia*, *Lemna* (duckweed), and *Utricularia* (bladderwort) to conceal the eggs, because when the fish start spawning they carry on for no less than a week at a time—a number of rather large eggs being laid each day. Temperature of the water should be from 72°-76° F. during this period, and in the weeks which follow, although normally the fishes are quite comfortable at 65° F.



Green rivulus (Female above, male below)

If it is desired to save all possible eggs, one of two methods can be adopted. The whole of the plants on the surface may be removed daily to another aquarium, and a fresh layer put in the spawning tank, or the breeding pair can be removed to a fresh aquarium every 24 hours. The first is to be preferred, although the fishes settle down and resume their courtship within a few hours of transfer. If the plants are taken out they should be put into a much larger aquarium, because the one-inch layer will become a seven-inch layer by the end of the spawning. The chances of the whole lot decomposing is then very great. If no large aquaria are available, a battery of smaller ones should be used.

Eggs are unusually slow to hatch, the first babies bursting the eggs about 11 days to a fortnight after they have been laid. This means that three weeks must be allowed from the start of spawning to ensure that all fertile eggs are hatched.

### Rearing Fry

Assuming that all the eggs have been left in the spawning tank, it will be necessary to observe a degree of caution in introducing Infusoria. Too much might easily cause pollution. The number of fry will be insufficient to consume it all, and what is not eaten will die of starvation and cause trouble. Little and often must be the principle observed. The sprinkling of dried food upon the surface of the water at the finish of the spawning will usually provide sufficient. Banish all snails from the breeding tank. These are avid egg eaters, and I am sure you would rather have fish fry than baby snails.

You will discover a marked difference in the size of the fish fry when you can examine them, and then is the time to remember that some are a week older than the others, and that the small ones are not necessarily runts. Feed them plenty of small live food and watch them grow.

*Rivulus* are not very active in the usual course of events. This is probably one of the reasons why they never seem to have established themselves as a firm favourite. But this attribute makes them ideal fishes for exhibition purposes. Both male and female, particularly if exhibited separately, will remain poised in midwater, all fins spread, and almost motionless for minutes at a time, giving judges and visitors ample chance to assess their good points.

*Rivulus* are great jumpers, and at all times care must be taken to see that cover glasses are well and truly covering the whole of the tops of their aquaria.

# "Running Water" Without a Pump

I HAVE always regarded this as my own "patent" though doubtless plenty of aquarists have thought of it for themselves. It is a method of keeping "running water" species healthy without using pumps.

All that is needed is a number of aquariums, jars or anything that will support fish, and an equal number of pieces of string (less one). Fill the jars and hang the string over the edges from one jar to the next. Now, so long as the string is longer on the right hand side than on the left and so long as it is in the water on the left hand side the water will flow from left to right until it is level throughout.

To keep the system working it is only necessary to empty the end right-hand jar and refill the left-hand one as need arises. One piece of string will give a very slow flow. It is, however, sufficient to keep alive many creatures that will not live in stagnant water. The flow can be speeded up quite easily by using extra pieces of string. In actual practice it will be found if several jars are used that they do not empty all at the same speed. The slow ones can be speeded up by using extra pieces of string to give extra outlet.

It is not necessary to use a large number of jars though three should be a minimum, as it is impracticable to keep stock in the last jar; and unwise to keep any in the first if it has to be refilled with tap-water. On the other hand one jar can be used in conjunction with an ordinary aquarium purely as a method of keeping the water fresh. The jar can be supported over or at the side of the aquarium or can even stand on a rock or other stand in the aquarium itself. It may be necessary to bale out occasionally but if the aquarium is large the loss through evaporation will often balance the inflow.

Over some years I found this method worked well, using only one string, with freshwater shrimps, which are almost impossible to keep alive in water that does not run. Shrimps are delightful creatures to keep by reason of their ability to swim in any position—upside down, sideways and even backwards. They breed in captivity and are useful scavengers—also ideal fish food for almost all fish if bred in a reserve tank.

Caddis-fly larva also thrive with this system and can be

watched constructing their interesting "houses" of small stones or pieces of reed. Pond "woodlice" and newt tadpoles do much better under this system, though both survive in still water. Among fishes the bull-head or miller's thumb will survive if the flow is speeded up and minnows and small fry survive much longer in indoor aquaria with its help.

The water flows by capillary attraction along the string and there is no lack of other materials to take its place or for experimental purposes. The only danger lies in colouring and other deleterious chemicals the material may contain. Cloth, paper and blotting paper cut in wide strips all give a fast flow. Wool and woollen cloth are very fast but the colours are not! Whatever material is used it should be soaked for 24 hours before use and care should be taken to see that it does not sag between one tank and the next otherwise the water will drip.

Bissett Lovelock

## The Coelacanth

THE South African Council for Scientific and Industrial Research, which gave support to Professor J. L. B. Smith, the ichthyologist, of Rhodes University, Grahamstown, in his successful effort to obtain a specimen of the coelacanth, the oldest of fishes, is now discussing plans to form a team of scientists to study various highly specialised aspects of this fish. Negotiations are being conducted with oversea interests and a panel of scientists will include men from abroad.

Professor Smith brought back from the Comoro Islands, near Madagascar, last Christmas a specimen of the coelacanth which was captured by fishermen; he is now reported to be making preparations for an expedition in Madagascan waters to secure further specimens. This expedition has been made possible through the response of Mr. W. P. Stuttard, of the Channel Islands, to an appeal by Professor Smith in an article in *The Times* of 2nd January last for someone to place a sea-going vessel at his disposal in the cause of science.—*The Times*.

## FRIENDS & FOES No. 15

### Cypris

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

CLASS:—Crustacea, from Latin *crustaceus*—having a shell.

MOST keepers and breeders of tropical and coldwater fishes will have seen cyprids running over the bottom of their tanks or climbing the plants. They are bean-shaped, and range in size from mere specks to nearly three-sixteenths of an inch. Their colouring varies, but one of the commonest is pale brownish-yellow, marbled with green patches.

The pair of eyes are fused into one near the hinge of the double shell. Movement is rapid and smooth. Sometimes a foot is extruded from the shell, as when the creature moves over sand



or mud. At other times, the first pair of antennae, equipped with swimming hairs, are used. Breeding, in heated tanks, seems to go on throughout the year. Drought-resisting eggs are laid, being attached to plant stems or stones.

## Ostracods

These are extremely small, and usually red or orange in colour.

Evidence has been accumulated which indicates that *Cypris* is guilty of egg-eating, although it normally acts as a scavenger, and does a good job of work in this direction. Most fishes find its shell too hard to crush, but angels and acaras make short work of any found in their aquaria. A tank from which all fishes have been removed, but in which a few cyprids are left, will soon be teeming with them. To avoid spreading them to other tanks, do not net them out to feed to your cichlids, but put the cichlids in the *Cypris* tank for their meal, returning them to their original quarters after they have finished feeding.

C. E. C. Cole

THE AQUARIST



*A page for  
the beginner  
contributed  
by*

A. BOARDER

ONCE goldfish fry are about 10 days old they must have something larger than Infusoria for food. This step is often a difficult one as few aquarists can get enough of the right size food. The ideal food now would be micro-worms. These are like a miniature white worm and form a grand food. If one is unable to obtain a large enough supply there is no need to despair. The earth or garden worm will do as well, but it must first be shredded so that it is brought to a pulp.

The pulp can be swept from the shredders with an old tooth brush and then the food can be sprayed into the water by drawing the thumb along the bristles. Any skin or large pieces should not be allowed to go into the fry tank. A net can be placed in the water so that large particles are strained out. Only a small amount of the food should be given at a time as it will hang about in suspension in the water, when it is readily eaten by the fry. After a time the uneaten food sinks to the bottom and the fry are not likely to feed there for a week or so. This uneaten food can pollute the water. Tiny fry are more likely to accept food which is slightly on the move, and an aerator working quietly does tend to keep the small bits of food moving.

If sufficient mashed worm or micro-worm can be given there is no need to use any fine dried foods as yet. The time to commence this type of feeding will depend on the rate of growth of the fish. In a fairly large container the fry will be able to obtain a good deal of vegetable food from the sides of the tank and from the water plants. Many tiny forms of animal life will also be found by them. Providing the temperature of the water is somewhere near 70° F., the fry will continue feeding almost all day long. You must therefore see that food is almost always available if you want the fry to grow at the maximum rate. Fine dried foods can be bought for fry and often if a packet of ordinary fish food is sifted through a silk stocking, the resultant dust-like food will be ideal for the youngsters. Only a small amount of this type of food should be given at a time as, of course, the remains of a meal will soon go foul. The fish will be able to take this food unsoaked once they are half-an-inch long over-all.

At this size it is imperative that the fish are not overcrowded. Unless they have plenty of space in which to develop, all the feeding in the world will not keep them growing healthily. A tank of the usual dimensions, 24 ins. by 12 ins. by 12 ins. will hold no more than two dozen fry of this size, and once they are about an inch long they must have twice the space. In warm weather or heated tanks the fry should make good headway, and as they grow new kinds of foods should be introduced. *Daphnia* can then be used, and it will be found that these will often encourage the fish to eat well—the action of the water fleas attracting the attention of fish very well. I do not believe in feeding *Daphnia* to young fish without some other form of food as a change. Some finely ground sifted Bemax can be added to the diet.

From now on you must watch the fry to make sure that a

few of them have not out-grown the others. If this does happen the larger fry can eat the smaller ones. Sort out any large fry and place them by themselves. If you are breeding any type of fancy goldfish, it is essential that the smaller ones are not neglected, as they often make the best fish. The very forward ones sometimes turn out to be coarse, useless fish, whilst some of the smaller ones may be show specimens one day. If the parent fish were spawned in a pond on water plants which had been in the pond for some time it is possible that many types of pests may be already hatched and living in the rearing tank.

To save any fear of this happening, it is well to remove all the fry from the hatching tank to another one containing clean pond water only; no plants need be in this tank for a time. It is difficult to catch fry so small, but they can be dipped out with a milk saucer. The surplus water can be drained off and the rest examined to make sure that there are no pests left to prey on the fry. The fact that there are no water plants in the fry tank often means that the water will develop plenty of algae as food for the tiny fish. When the fry are a month old will be soon enough to supply any water plants. These when added must be quite clean and free from pests as otherwise the original move will be of no avail.

Many pests such as the larvae of dragonflies and water beetles may be among the original plants and it is surprising how soon a few of these can put paid to a whole tank of fry.

Although it is noticeable that many fry can be kept in a tank together as long as they are under a fortnight old, they must be moved to larger quarters then, otherwise all kinds of troubles may beset them. Remember too that in very hot weather the fry may need some form of shelter. The strong sunshine on an unshaded tank can make it very uncomfortable for tiny fry, to say the least. A sprinkling of duckweed on the surface of the water will give the fry that little protection and shelter which they will appreciate.

I am often asked about the treatment of the parent fish once they have spawned. If they are in a pond, there is little that need be done, but if they are in tanks I consider that they should be fed once a day with some chopped garden worms, as this food will help to get them back into good condition after the trials of spawning. In the pond the parent fish will no doubt find plenty of food for themselves but an occasional worm will be readily taken by them.

At this time of the year many ponds go green. This is due to the excessive light and the general lack of other plant growth. Blanket weed may also become a nuisance. As much of this as possible should be pulled out of the pond, and when the water lilies and other plants grow up well their leaves will provide the shade which will tend to check the growth of the algae. There is one point I must make here and that is that so many pond-keepers grumble when the water in the pond keeps green, when much of the trouble has been caused or encouraged by the over-feeding of the fish. Algae appears to thrive in water where there is an excess of carbon dioxide, and this state is often caused by the decaying uneaten food.



Above: A busy scene around the information stand of the F.N.A.S., where stewards provided answers to general queries and Mr. Raymond Yates answered fish-keeping enquiries

**E**NTRIES in this year's B.A.F. held at Manchester last month formed a new record number and the area of floor space in the Exhibition Hall devoted to the show was also the largest yet utilised. Attendance of visitors on the first three days of the five-day show was somewhat below normal figures, but on Saturday and Sunday the Hall was crowded all the time.

In general appearance and lay-out all were agreed that the show was better

Below: "The Aquarist" stand with its display of the trophies and publications, seen before show opening. Here Mr. A. Boarder gave advice to over 300 fish-keepers during the show

than the two preceding Festivals. Floral decorations and bunting added much to the gay display. In all, 800 tanks were needed for the entries, nearly 200 being used for the small egg-laying fishes section alone. The impressive array of trophies on view at *The Aquarist's* stand throughout the show had added to it several new ones this year:—the W. R. Smith Coronation Furnished Aquaria Trophy; the John East Memorial Trophy for F.N.A.S.

## British Aquarist



Above: F.N.A.S. members at the Sunday meeting of the Federation, when trophies were distributed and a lecture by Mr. Harry Loder, followed by a film show, were presented

affiliated society gaining highest points at the B.A.F., the Hammond Challenge Trophy for most outstanding breeder's effort with goldfish; and the Harrogate Challenge Cup for the most outstanding guppy. (Judging results and awards are listed on page 58.)



# s' Festival 1953



Below: Several attractive water gardens formed a feature of this year's B.A.F. and part of one lay-out in the coldwater section of the Exhibition Hall is pictured

A high standard was set by furnished aquaria entries, and it was noticeable that winning tanks showed matching gravel and rocks—other entrants had failed in this respect. Tropical fishes in wide variety were outstanding, some specimens of very good size being



June, 1953



Above: Business was brisk for traders who had display stands at the B.A.F. and a very comprehensive show of apparatus and accessories was made on the stand of Mr. Walter Smith

exhibited; breeders' entries gave excellent living examples of what can be done in a short time in rearing young fishes when proper feeding and conditions are provided. The coldwater display was a greatly improved one for the B.A.F., and goldfish varieties of standards equal to others shown anywhere else in Britain were among the winners.

In the centre of the Hall was a magnificent collection of reptiles loaned by Mr. Robert Jackson, and the always

Below: Unusual exhibit was the "radar fish," two species of mormyrids being used to give audible evidence of the impulses they generate by means of electrical amplifying apparatus

pleasing stand of the Manchester Microscopical Society had plenty to interest aquarists. Several attractive water gardens in the coldwater section had pondside plants identified by labels for gardeners.

Unusual attractions were provided by a life-size five feet long model of the coelacanth prepared by the Sheffield and District Aquarists' Society, and the "radar fish" display by Messrs. H. L. Ollier and H. G. Kimber.





B.A.F.



1953



## JUDGING RESULTS AND AWARDS

### Section A.—Furnished Aquaria

Class 1. Club Tropical Aquaria: 1st—Hendon and District Aquatic Society; 2nd—Preston Scientific Society; 3rd—Newcastle-upon-Tyne and District Aquarium Society.

Class 2. Club Coldwater Aquaria: 1st—Blackpool and Fylde Aquatic Society; 2nd—Northenden Aquarist Club; 3rd—Rochdale and District Aquarist Society.

Class 3. Individual Furnished Aquaria (Tropical): 1st—Mrs. B. Robersshaw; 2nd—V. Sharpe; 3rd—H. Charles.

Class 4. Individual Furnished Aquaria (Coldwater): 1st—A. Sutton; 2nd—H. Penhall; 3rd—D. Cannon.

Class 5. Junior Tropical Furnished Aquaria: 1st—E. Conroy (awarded Hands Trophy); 2nd—I. Downhill; 3rd—Penelope Huddart.

Best Furnished Aquarium in Section A: Hendon and District Aquatic Society's entry; awarded Cussons Trophy. Aquarium contained lemon and *sepias* tetras.

Best Furnished Aquarium from F.N.A.S. affiliated club member: Class 3 entry from V. Sharpe (Blackpool and Fylde Aquatic Society); awarded Challenge Shield.

### Section B.—Coldwater Fishes

Class 6. Common and Comet Goldfish: 1st—J. Dodsworth; 2nd—R. Wilshaw; 3rd—F. Horrocks.

Class 7. Shubunkins: 1st—J. Dodsworth; 2nd—A. R. Thompson; 3rd—A. Sutton.

Class 8. Fantail Goldfish: 1st—W. C.



Mrs. M. Hemming shows her Bland Trophy for best fighting fish to her son Roger.

Webley; 2nd—W. C. Webley; 3rd—W. C. Webley.

Class 9. Moors: 1st—H. North; 2nd—H. North; 3rd—W. L. Mandeville.

Class 10. Veiltail Goldfish: 1st—W. L.

Mandeville; 2nd—H. North; 3rd—J. A. Cullum.

Class 11. A.O.V. Fancy Goldfish: 1st—Lionhead (H. North). No other awards.

Class 12. A.O.V. Coldwater Fish (foreign): 1st—Sunfish (J. Bully); 2nd—Sunfish (Messrs. Ryan and Womersley); 3rd—Catfish (M. Dodd). Best Fish in Section B: Fantail Goldfish (W. C. Webley awarded Belle Vue Ltd. Silver Challenge Cup).

Best Common Goldfish: J. Dodsworth, awarded Leeds and District Aquatic Society Challenge Trophy.

Best Veiltail Goldfish: W. L. Mandeville awarded Goldfish Society of Great Britain Challenge Trophy.

Best Shubunkin: J. Dodsworth awarded N.W. Section of Goldfish Society of Great Britain Silver Challenge Cup.

### Section C.—Guppies

Classes 13, 14, 15. Guppy (male): 1st—A. J. Holloway (cofertail); 2nd—D. Bradley (cofertail); 3rd—A. J. Holloway (cofertail).

Class 16. Guppy (male) Bottomsword: 1st—F. W. Humptidge; 2nd—J. A. Manwaring; 3rd—J. A. Manwaring.

Class 17. Guppy (male) Doublesword: 1st—only—R. Rawlinson.

Class 18. Guppy (male) Scarftail: 1st—P. Whitecross; 2nd—F. N. Ghadially; 3rd—J. A. Johnstone.

Class 19, 20. Guppy (male) Veiltail, Gold: 1st—R. Rawlinson (veiltail); 2nd—N. Hadley (veiltail); J. A. Johnstone (veiltail).

Class 21. Guppy (female) Gold: 1st—A. J. Holloway (goldfaced); 2nd—A. J. Holloway (gold); 3rd—Mrs. M. Thompson (gold).

Classes 22, 23. Grey Robson and coloured: 1st—A. L. Judge (coloured female); 2nd—



Mr. N. Park (left) and Mr. J. Livingstone with the East Lancs. A. S. Trophy awarded for their flame fish

R. C. Lowry (coloured female); 3rd—N. Bell (coloured female).

Most outstanding Guppy: R. Rawlinson awarded Harrogate Aquarist Society Challenge Cup.

**Section D.—Livebearers other than Guppies**

Class 24. A.V. Mollies: 1st—A. N. and K. Rycroft (*M. varifera*); 2nd—E. Bagmall (*M. latipinna*); 3rd—D. Ince (*M. varifera*).

Class 25. A.V. Platys (*Xiphophorus*): 1st—A. N. and K. Rycroft (*X. variatus*); 2nd—J. J. Harris (*X. maculatus*); 3rd—C. N. Linford (*X. maculatus wagtail*).

Class 26. A.V. Swordtail (*Xiphophorus*): 1st—R. Rawlinson (red-eyed red); 2nd—R. Rawlinson (red-eyed red); 3rd—R. R. Hrough (black-eyed red).

Class 27. A.O.V. Livebearer: 1st—W. Dann (*Heterandria formosa*).

Best Pair of Livebearers: Fraser-Brunner Silver Challenge Cup awarded to Messrs. A. N. and K. Rycroft.

**Section E.—Small Egglayers**

Class 28. A. V. *Hypostelonyx*: 1st—Park and Livingstone (flame fish); 2nd—W. Hutchinson (*H. serpa*); 3rd—R. H. Puller (neon fish).

Class 29. A.V. *Hemigrammus*: 1st—V. E. Scoffin (*H. pulcher*); 2nd—Mrs. Hemming



Mr. F. Taylor was awarded the F.N.A.S. Trophy for best exhibit in the breeders' livebearer class

(*H. stellatus*); 3rd—W. Hutchinson (*H. ocellifer*).

Class 30. A.O.V. Characin: 1st—J. R. Shaw (*Metynnis achromulter*); 2nd—J. R. Shaw (black widow); 3rd—J. R. Shaw (*Metynnis roseus*).

Class 31. *Barbus nigrofasciatus*, *B. tetrazona* and *B. nico*: 1st—C. N. Linford (*B. nigrofasciatus*); 2nd—W. L. Mandeville (*B. tetrazona*); 3rd—W. Sharp (*B. tetrazona*).

Class 32. A.O.V. *Barbus*: 1st—C. E. Cotton (*B. lateristriga*); 2nd—G. Dillon (*B. nitaya*); 3rd—L. Wardle (*B. nigolepis*).

Class 33. A.V. *Rasbora*: 1st—E. Scoffin (*R. heteromorpha*); 2nd—R. Skipper (*R. heteromorpha*); 3rd—J. Peck (*R. trilineata*).

Class 34. White Cloud Minnows and A.V. Zebra fish: 1st—N. Bell (*Brachydanio albolineatus*); 2nd—A. E. Stevens (white cloud minnows); 3rd—P. Holden (*B. zebra*).

Class 35. A.V. Tropical Catfish or Loach: 1st—Mrs. M. Hemming (*Corydoras aeneus*); 2nd—J. Woodcock (*C. paludosa*); 3rd—R. Skipper (*C. aeneus*).

Class 36. A.V. *Panchax*, *Reticular* or *Aphyonemion*: 1st—F. Bates (*Epiplatys macrotrigona*); 2nd—G. W. Cooke (*Aplochelichthys lineatus*); 3rd—R. Gill (*Aplochelichthys lineatus*).

Class 37. A.O.V. Small Egglayer: 1st—J. R. Shaw (black-banded sunfish); 2nd—L. Wardle (chameleon fish); 3rd—D. and H. Loder (chameleon fish).



Mr. F. Bates with his three trophies—the Aquarist Cup for best egglayers, St. Martin's Aquaria Trophy for best tropical breeder's exhibit and F.N.A.S. Trophy for best exhibit in the breeders' tropical egg-laying fish class

Most outstanding pair of egglayers: F. Bates awarded *The Aquarist* Silver Challenge Cup.

Best pair of *Hypostelonyx* spp.: Messrs. Park and Livingstone awarded East Lancashire Aquarists' Society Challenge Trophy.

**Section F.—Labyrinth Fishes**

Class 38. Fighting Fish: 1st—Mrs. M. Hemming; 2nd—H. G. Rundle; 3rd—H. G. Rundle.

Class 39. A.O.V. Labyrinth Fish: 1st—C. N. Linford (pearl gourami); 2nd—G. J. Doerian (blue gourami); 3rd—D. Collingswood (gourami).

Best Labyrinth Fish: C. N. Linford awarded F.N.A.S. Open Challenge Trophy.

Best Fighting Fish: Mrs. M. Hemming awarded Bland Challenge Trophy.

**Section G.—Cichlids**

Class 40. Angel Fish: 1st—A. G. Cormack; 2nd—R. Harper; 3rd—A. N. and K. Rycroft.

Class 41. Dwarf Cichlids: 1st—H. Charles (*Astatotilapia rotundifrons*); 2nd—E. Hemmingway (*A. agassizi*); 3rd—S. R. Riches (*A. rotundifrons*).

Class 42. A.O.V. Large Cichlid: 1st—D. Cannon (*Astronotus ocellatus*), Best Fish in



Mr. R. Rawlinson's guppy exhibit won for him the Harrogate A.S. Cup

Show Award; 2nd—S. Davies (*Cichlasoma severum*); 3rd—F. E. Woodall (*Cichlasoma maki*).

Best Cichlid: D. Cannon awarded N.A.S. Challenge Trophy and also *Daily Dispatch* Trophy for Best Fish in the Show.

Best Angel Fish: A. G. Cormack awarded Whitwell & Smykals Silver Challenge Cup.

**Section H.—Breeders' Classes**

(Teams of six fishes)

Class 43. Livebearers (*Xiphophorus* spp.): 1st—H. Hall (green tuxedo swordtail, bred 17th October, 1952); 2nd—P. N. Ghadially (red-eyed swordtail); 3rd—A. N. and K. Rycroft (*X. variatus*, bred 1st January, 1953).

Class 44. Livebearers (*Mollies*): 1st—F. Taylor (*M. platyops*, bred 20th December, 1952); 2nd—F. Taylor (*M. varifera*, bred 28th February, 1953); 3rd—W. Dann (black mollie, bred 20th November, 1952).

Class 45. A.O.V. Livebearer: 1st—A. W. Engelke (guppy, bred 8th September, 1952), only award.

Class 46. A.V. Tropical Barb: 1st—J. Woodcock (cherry barb, bred 2nd February, 1953); 2nd—C. A. Blake (*Barbus*, bred 10th January, 1953); 3rd—F. N. Ghadially (tiger barb, bred 7th February, 1952).

Class 47. A.V. Characin: 1st—N. Bell (glow-light tetras, bred 31st January, 1953); 2nd—



Mr. A. N. Rycroft (left) and Mr. K. Rycroft with the Fraser-Brunner Trophy awarded to them for the best pair of livebearers

G. W. Cooke (glowlight tetras, bred 21st October, 1951); 3rd—N. Bell (*Nannostomus anomala*, bred 28th December, 1952).

Class 48. A.V. Anabantid: 1st—F. Taylor (pearl gourami, bred 12th October, 1952); 2nd—S. R. Riches (dwarf gourami, bred 7th January, 1953); 3rd—A. Briggs (pearl gourami, bred 31st August, 1952).

Class 49. A.O.V. Tropical Egglayer: 1st—F. Bates (*Aphyocormium coruscum*, bred 3rd October, 1952); 2nd—F. Bates (*Rivulus irritans*, bred 23rd November, 1952); 3rd—W. Hutchinson (chameleon fish, bred 20th September, 1952).

Class 50. Fancy Goldfish: 1st—W. C. Webley (fantail goldfish, bred 1st May, 1952); 2nd—J. H. Hood (shubunkins, bred 31st August, 1952); 3rd—M. Welch (veiltail goldfish, bred 15th June, 1952).

Most outstanding breeder and best egglayer exhibit: F. Bates awarded St. Martin's Aquaria Challenge Trophy and F.N.A.S. Challenge Trophy.

Best Livebearer exhibit: F. Taylor awarded F.N.A.S. Challenge Trophy.

Most outstanding breeder of A.V. Goldfish:

W. C. Webley awarded the Hammond Challenge Trophy.

#### Section J.—Plants

Class 51. *Vallisneria* and *Sagittaria*: 1st—F. N. Ghadially (only award).

Class 51a. *Cryptocoryne* spp.: 1st—E. W. Aubrooke (*C. griffithii*); 2nd—C. R. Perry (*C. cordata*); 3rd—E. W. Aubrooke (*C. cordata*).

Class 51b. *Apogonon*, *Echinodorus*, spatterdock: 1st—C. R. Perry (spatterdock); 2nd—G. D. and J. Grimshaw (Amazon sword); 3rd—N. Hadley (*Apogonon*).

Class 51c. A.O.V. water plant: 1st—F. N. Ghadially (*Cobomba*); 2nd—P. Holden (*Bacopa*); 3rd—C. Cooper.

Best water plant exhibit: E. W. Aubrooke awarded *The Aquarist* Silver Challenge Cup.

#### Points Trophy

The John East Memorial Trophy awarded to the F.N.A.S. affiliated society gaining the highest number of points for entries at the B.A.F. was won by Newcastle-on-Tyne and District Aquarists' Society (also the donors of the Trophy).

#### Special Acknowledgments

DR. J. F. WILKINSON, President of the F.N.A.S., paid special tribute to the organising committee's work when he spoke to the 550 assembled members of affiliated societies before trophies were presented by the Editor of *The Aquarist* on the last day of the B.A.F. The organising committee was formed by Messrs. H. Ashbrooke, F. Bentley (chief steward), J. Batty, G. W. Cooke (show secretary), C. Chapman, N. Gott, Mrs. P. D. Hammond, Messrs. T. R. Lee, H. Loder and J. R. Shaw. Mr. H. Hall was festival organiser. Judges at the B.A.F. were Messrs. J. Carnell (London), C. W. Creed (London), G. T. Iles (Manchester), R. G. Mealand (London), A. Boarder and W. H. White (London).



## Well Done, Hendon!



Mrs. R. Skipper holds the Cussons Trophy awarded to Hendon A.S. for their furnished aquarium exhibit, and Hendon member Mr. D. Cannon looks pleased with his Daily Dispatch Trophy for best fish at the B.A.F. and N.A.S. Trophy for best cichlid



DESPITE the weight of the opposition and in the face of competition from northern entries of very high quality, the only society from the London area showing at the B.A.F. achieved most impressive prominence in the results lists. When it is said that this society's members took their entries to Manchester by road in a van flying the society pennant, and that they took back with them the Cussons Trophy for the best furnished aquarium, veteran showgoers will guess their identity. Hendon is the place—the happy fellowship of skilled aquarists with such excellent showing records makes the society—the Hendon and District Aquatic Society.

The Cussons Trophy and the *Daily Dispatch* Trophy are, perhaps, the two most coveted B.A.F. awards. Hendon's members took them both, and with them, the National Aquarists' Society's Challenge Trophy for the best cichlid. They took first in both individual and club furnished aquaria, first in A.O.V. coldwater fish and, to trim a long story of successes, they gained more points at the B.A.F. than any other society. There was no special trophy to collect for this however, as the John East Memorial Trophy is given only to the F.N.A.S. affiliated society awarded the

highest number of points among Federation exhibitors.

Hendon's achievement was, of course, the result of a lot of effort, not the least of which were two arduous double road journeys in successive week-ends. But when the Hendon party left Manchester there were tired but only smiling faces to be seen, and other London and southern societies are probably going to be frequently reminded of the new rungs of the ladder Hendon has climbed when their B.A.F. trophies are proudly displayed "first time down south."

The enthusiasm of the party can be instanced by describing how they made an evening trip to Derbyshire to collect special stone (and *matching* gravel, please note!) whilst they were up north; and stone collecting by Hendon members is no haphazard undertaking. Dozens of pieces are sorted and rejected during the selection of stones which to practical eyes have that special something for a furnished tank.

Mr. D. Cannon's *Astronotus ocellatus* (best fish in the show and best cichlid) was a beauty. Over six inches in length, its general demeanour made it appear to be jealously and proudly upholding Hendon's good name; as one onlooker

said, "A fish with character, that there." Mrs. R. Skipper told us why she thought Hendon's furnished aquarium had been chosen by the judges; special care had been taken to blend harmoniously the shades of green in the water plants used, and the Loch Lomond stone was matched with natural gravel from the same natural site. The fish in the tank—just two species (*lemon* and *serpae* tetras)—were mature specimens.

Hendon is sometimes said to be a "rich" society. Well, all finances are raised by the joined activities of members at weekly meetings and special events; "subs." are only 10 shillings a year for each member. There is always something fresh at the meetings—members at the one held during the B.A.F. week heard a tape recording made when show results were 'phoned from Manchester by Mrs. B. Robertshaw immediately after judging.

The society's future activities are always well-planned. Their August show for this year has been staged in plan form for months already, and at the close of the B.A.F. one member said, "Next time we must have a special lorry for London water—this year we carried barely enough for our 60 entries." See the spirit? Hendon needs watching!



## OUR EXPERTS' ANSWERS TO READERS' QUERIES

I have a large aquarium populated with about 60 fishes such as guppies, zebra fish, rosy barbs, gouramies and the like. Every now and again I find one or more of the smaller fishes dead on the bottom yet they never show any external signs of disease. Can you tell me what is killing them?

As it is only the smaller species which you find dead on the bottom, we are inclined to think that some of the larger fishes are worrying them to death. Full-grown rosy barbs, gouramies and even angel fish will often keep smaller species away from food, and generally make life so miserable for them that they just die of under-nourishment and exhaustion. We advise you to keep a careful watch on your aquarium, and, if you notice too much bullying going on, remove the offender to another tank.

I have two aquariums. One measures 24 ins. by 12 ins. by 12 ins.; the other 18 ins. by 10 ins. by 10 ins. Can I use one thermostat to control the temperature of both of them; and does it matter if the heaters are of different wattage?

If you place the thermostat and heater with the lowest wattage in the 18 ins. by 10 ins. by 10 ins. tank, the larger one should keep at the temperature previously decided on. We suggest a 60-watt heater in the small aquarium, and one of about 75 to 100 watts for the larger one.

I have a tank containing an assortment of tropical fishes including mollies, fighters, guppies, white cloud mountain minnows and wagtail platys. I should now like to breed some of them. How should I go about it?

As you have only one aquarium, we do not think you stand a very good chance of raising any fry in it. Big fishes prey on little fishes, you know. With plenty of plants matting the surface, you may be lucky enough to raise some livebearer fry. But we think your best plan would be to set up another aquarium, well planted and filled with boiled or matured water, and introduce a pair of easy-to-breed egg-layers into it. White cloud mountain minnows are quite easy to breed; and so, too, are fighting fish.

I have more than 100 fishes in my community tank, but every now and again I lose some of them. They go very thin, become listless and die. I have tried various remedies but nothing I have used seems to improve matters. Can you help, please?

You did not tell us the size of your aquarium. Your trouble may be due to overcrowding. On the other hand, the fish might have died of old age. If you buy large fish, you can never be sure of their age—unless, of course, you buy them from the actual breeder. We suppose you have checked up on such things as drippings from exposed metal which may be poisoning the water. Fishes which are in water in contact with zinc, copper, or brass seldom live very long.

The books tell me that zebra fish are easy to breed, but try as I may, I cannot get mine to spawn. I have placed them in a tank with glass bars on the bottom; I have tried them over a bed of pea-sized gravel; I have fed them with all the live food I can get for them; but still they refuse to spawn. I have almost given up hope. Can you suggest anything?

Generally speaking, zebra fish are easy to breed, but like all our aquarium fishes, some specimens are not so prolific as others. Separating the sexes for a fortnight or so often helps to create the necessary urge; but other things have to be considered. The aquarium should contain shallow, matured water; temperature slightly above normal. The addition of a large cupful of ordinary tap-water overnight often results in egg-laying early next morning. Besides glass bars or rounded pebbles on the bottom, it is a good idea to throw in some bunches of feathery-leaved plants to protect the eggs as they fall through the water, and to make the fish feel more at home.

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*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.*

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I have two aquariums. One has several pairs of full-grown livebearers; the other houses some young mountain minnows, cherry barbs and one catfish. The other day, I noticed a large female platy was about to give birth, so I placed her in the tank containing the young fishes. The platy delivered her young, and now I feel worried about their safety. Will the other fishes eat them?

The best thing you can do is to carpet the surface of the water with floating vegetation, and see that plenty of plant life extends down the side of the glass facing the light. Most species are cannibals, but young fish usually get on well together. Like human beings, it is not until they grow older that they start to covet certain territory for themselves, or all the food, or some other fish's mate. Of the species in your aquarium, the ones to watch are the cherry barbs, which are often guilty of bullying; and the mountain minnows, though these fish will only chase after the tiniest of fry, and even then may not harm them. Make sure, however, that your baby livebearers get plenty of dust-fine dried food, or small live food.

I have been told that acriflavine can be used to tint aquarium water green and yet not cause any harm to the fish. Is this true?

Quite true. A tablet of 0.46 grains of acriflavine dissolved in 80 drops of water will make a stock solution. Keep the bottle of made-up solution in a dark, cool place. A drop to every gallon of water in the aquarium will produce an attractive greenish-yellow hue. In cases of fungus or tail-rot, you can add as much as five drops to every gallon without killing the fish.

The water in my aquarium is green. I have painted the back and one side, but the green still persists. The aquarium is under bright electric light for at least nine hours every day.

Most newcomers to the aquarium-keeping hobby worry too much about green water. As a rule, green water will die down of its own accord; that is, in time. But if some of the green water is emptied away, and fresh water is added, the greenness will last for a very long time, perhaps for months on end. You may be burning too bright a light over your aquarium. Try cutting down some of the light, or mat the surface with plenty of floating plants or rooted plants with floating foliage. In fact, if you have plenty of strong growing plants in your aquarium, you will notice that the water will gradually turn yellowish, then clear.

Can you please give me some information about the breeding habits of the Egyptian mouthbreeder? My fish spawned, so I removed the male and left the female alone in the aquarium. Eleven days have passed, yet I have not seen any baby fish. Do you think the female has eaten them? Until the ninth day, I could see the dark shapes of the babies in her mouth.

A female Egyptian mouthbreeder carrying babies in her mouth is very secretive, and sometimes it is not easy to ascertain whether they have been eaten or not. We suppose you know that after the fry have hatched out, they stay inside their mother's mouth for several days before they venture out into the aquarium. It is not unlikely that the baby fish are still alive and well inside the female fish's mouth. Introduce a little live food into the aquarium every now and again, and disturb the fish as little as possible. It is a good idea to cover the aquarium with a sheet of white paper with a peephole cut in it so that you can observe the

mother fish without her being aware of it. This trick is a useful one to play on any other secretive or nervy fishes.

Although I often draw a piece of paper across the top of the water, the surface of it quickly becomes coated with a sort of greasy scum. How can I stop this, please?

Scum may be caused by excessive dust in the atmosphere, by burning oil, by fumes from a cooking stove, or even oil working out of aquarium cement. Remove the scum with paper, and see that the aquarium is kept tightly covered with glass. We might add that pollution of the compost by decaying roots of the plants, or disintegrating foliage will cause a scum to form on the water. Check up on the plant life, and condition of the compost.

Some months ago I started a community aquarium. In it I placed mollies, platys, guppies and one large female zebra fish. Later on, I introduced a small male zebra fish. This poor fish never got a moment's peace from the female; she chased him about every moment of the day, and would not even let him take food. A few days ago he died. Should I risk introducing another male into the aquarium?

It is a habit of zebra fish to chase each other about the water. But next time you buy a male fish, choose one nearer to the size of the female, and introduce it into the aquarium overnight.

About three weeks ago, one of my female fighting fish had its tail-fin bitten to shreds by another fighter. Two or three days later, the injured fish became very moopy, so I transferred her to a jar of water containing sea salt. Though I have managed to keep her alive, she still seems very ill, and a patch of fungus appears to be spreading down her back. What can I do to save this fish?

We think that your fish must have sustained a greater injury than that affecting her caudal fin. Probably the other fish nipped her gills, or dealt her a sharp blow on the side. Frankly, we doubt whether you will save the fish now. Keeping her in salt water for so long may have removed the mucous covering from the body. Once this happens, fungus quickly takes control, and death results in a matter of a few days. Once a fish becomes covered with fungus, it is kinder to destroy it.

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

I am setting up a cold water tank, 36 ins. by 15 ins. by 15 ins. and have a cover for it with two lamp holders. What wattage do you advise for each lamp and shall I need a glass cover as well? How many plants shall I need?

If you are placing your tank in the usual position, end on to a window, I suggest a 40-watt lamp near the window end, and a 60-watt lamp for the other end. Use the lighting according to the light from the window; on dull days keep the lamps on longer. I think it is well to have a cover glass, but see that it is about an inch shorter than the inside measurement of the tank. If you fit a strong wire hook on the back frame the glass can rest in this and then on the top of the front frame. This will give the glass a slight slope so that any condensation can run back into the water. With no glass cover dust can enter and the lamp fittings may be affected by moisture.

The number of plants you require will depend on their size. If they are the usual single stem cuttings that are sold for the purpose you may need 100. On the other hand, if the plants are nice clumps of a kind, it would be possible to use six clumps of about six species of water plants. At this time of the year the plants will soon grow and fill up the vacant spots.

I am buying a fish house and wish to heat it. As I live in a Council house I am not allowed to run an electric cable to the fish-house. Can I heat with Calor gas or paraffin?

I think that it will be better to use paraffin for heating. An aquarist friend of mine used to heat all his tanks with a small home-made oil lamp underneath each tank. The tiny flame played on to an asbestos base and he managed to keep up the necessary warmth without trouble. You could also use a heater of the type sold for greenhouse heating. I use one myself and find it quite satisfactory. There is little or no smell if the wicks are kept clean. There are many types of heaters; some have hot air pipes over them and others water pipes. The latter are the best as they hold the heat longer.

There are two main types of burners, white flame and blue flame. I consider that for your purpose the white flame type is better as this type can have the wick turned down quite low during the day, and if there are water pipes over, the small light will keep the water fairly warm all day. The blue flame cannot be turned down, as it will not function properly if this is done. Use the best paraffin and after lighting the lamp see that it is visited very soon in case the flame has burnt up too high.

Can you tell me why my ramshorn snail eats my plants,

particularly spatterdock? It has only done this since the weather has turned warmer.

The snail is eating more now that the temperature of the water is higher, and the fish will do the same. This type of snail is not as a rule very harmful to plants which are healthy and growing, but usually confines its appetite to the decaying leaves. It must always be realised that snails must eat as well as the fish and so if you must keep them don't begrudge them a bit of food. A small bit of lettuce leaf will perhaps keep the snail from the best plants.

I have been trying to breed bitterling carp, but although I have seen the carp apparently laying their eggs in a mussel, no fry have been seen. There are other fish in the tank and shingle on the bottom of the tank. The mussel seems reluctant to move. What do you advise to ensure success?

In the first place I do not think it a wise policy to have goldfish, shubunkins and catfish in the same tank where you are trying to breed the bitterling. Give them a tank to themselves. Also you should not have shingle at the base. Mussels cannot move about and get their food in such stuff, they prefer a good thick mulm such as is found in a well-established tank. If the mussel is not in good health you cannot expect it to prove a good foster parent. I should have two mussels at least and then try again without the other fishes in the tank.

I have read that goldfish can be artificially spawned. How is this done?

I do not recommend novices to attempt to strip their fish. I have done this with success but there are several points which must be remembered before one can be successful. It is not quite as easy as some people make out. In the first place it is absolutely imperative that the fish must be ready and the best time is when they are starting to spawn of their own accord. If you try to force eggs from a female which is not exactly ready you may do more harm than good. When fish are actually spawning the eggs and milt are easily extracted.

Hold the male in the left hand, belly up and head towards the wrist. With the thumb and forefinger of the other hand gently stroke the belly towards the vent. The milt appears as a milky fluid and only a little should be expressed into the water. Then quickly repeat the stroking with a female, when the eggs will be seen to stream out of her into the water. Wash the water around a bit with the tail of the fish and after about 15 minutes the water can be emptied away and fresh water added. The eggs will stick to the sides of the container.

# Journal of a MARINE AQUARIUM

by L. R. BRIGHTWELL

THE sooner some of our coastal aquarist societies form sea-water sections the better, for this business of the marine aquarium is like opium: it rouses the wildest ambitions, and then the snags . . .

If white spot appears amongst your goldfish, or something quite unprecedented occurs in the breeding of your angels, there will be 20 brother aquarists at your elbow ready to discuss the trouble until temperatures reach danger limit. But the marine aquarist still largely fights a lone battle. The unprecedented occurs almost daily, and one cannot spend one's life delving amongst the too scanty literature, or corresponding with the few experts who, often as not, confess that they are as nonplussed as yourself.

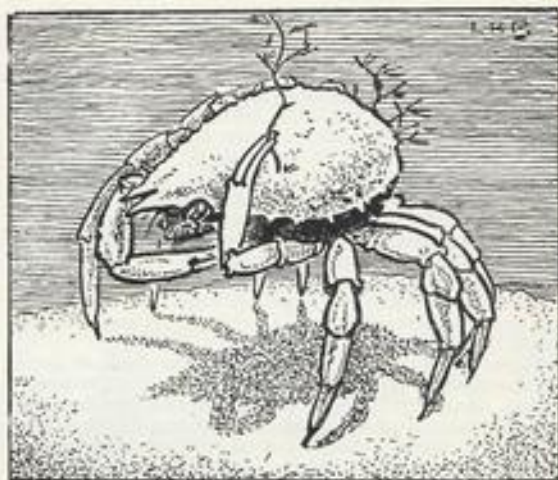
Two years ago I started with a 15-inch tank. Marvellous . . . my dearest wish achieved. Now I have three 18-inch tanks and they seem terribly cramped. When I look at the Channel just outside they seem like three teaspoonsful—pitiable. Nothing ever goes according to the books.

I like to see animals, whether dogs or *Daphnia*, well fed. Two years ago I put a three-quarter-inch edible crab, together with two small blennies, three winkle-shelled hermits, some common anemones and a few winkles in my first 18-inch tank. All went well for some months, and then the edible crab changed its shell. It swelled to a surprising extent and was that much ahead of the other people.

Some time ago I said in this journal that the edible crab was less destructive than the shore-crab. I withdraw that statement and apologise to any who may have acted on my well-intentioned guidance. It not only pulled two fairly big hermits out of their shells and ate their soft abdomens, but actually waylaid a blenny. However, it only got away with part of the tail fin. My two blennies, now 18 months in residence, spend every warm night side by side on a rock-ledge, an inch above water line. On cold nights they cuddle down side by side in a rock-crevice.



Plumed sea slug (*Eolis*) laying eggs, and at the right, eating an anemone. X—egg capsule with embryos—magnified.



Thornback spider crab (*Maia*) "dressing up"

Provided you live by the sea and embark on this marine tank business, there is a fearful temptation to take all kinds of beasts home and install them, just to enjoy a close-up. It is, of course, the only way to learn, but the results can be startling. In spring (I write this in late March) many of our nudibranchs, as fantastic as any of their coral-reef cousins, come inshore to lay their eggs. Lately I installed a two-inch-long *Eolis papillosa*. After a week's residence it attached to the back wall a salmon-pink, spirally-twisted egg-skein, measuring five and a half feet.

This increase in the birth-rate naturally demanded some recuperation, about a fortnight, at the expense of the anemones. The slug then produced another six feet chain. After a desperate struggle with simple arithmetic—at which I am very bad—the two efforts totted up to some 50,000 lively embryos . . . at the very lowest estimate. To-day this flower-like slug is gliding round the tank and biting off the tentacles of anemones as a man might enjoy celery or asparagus.

Mussels are undoubtedly good water-cleaners. Being filter-feeders and needing lime to enlarge their shells, they can work wonders in a cloudy tank. But the mussel can also be a great wanderer. It will anchor itself to the glass by some 30 amazingly strong silken threads, and in a night tire of the situation, slip the cables, and attach itself to a crab that has settled down to digest one of its usual overdone meals. Aboard my favourite trawler, I found recently, a big thornback spider-crab (*Maia squinado*) so encumbered with mussels that walking must have been difficult. It would have to hobble about thus until the next period of ecdysis.

The shore is sufficiently brimming with delightful problems in all conscience but if, like myself, the marine aquarist makes a habit of sailing with local trawlers, the temptation to strain limited tank resources to the utmost is aggravated a hundredfold. Here is just one example. Some months ago, there came aboard amongst enough rubbish to keep a hundred students busy for a month, a lump of ship's clinker about the size of my two fists.

It was full of holes, cracks and crannies, altogether as dead and uninspiring a lump of mineral as one could hope

(Continued at foot of next page)

# In the Water Garden

by Dr. W. E. SHEWELL-COOPER

THERE are, of course, formal pools and informal pools, and in the former case it is usual to have flagged paving around, but in the latter it is quite convenient to use rockwork. One always thinks of the rock garden as something huge, and, of course, it can be. But it is possible to make very effective small rock gardens providing certain facts are borne in mind. The first thing is that it is better to use stones with a massive appearance, even if there are only comparatively few of them, rather than a large number of smaller ones. This means that for the little rock garden at the back of the pool, the two main stones will weigh about five hundredweight each, and any other rocks used will weigh, say, one hundredweight each. The plea, then, is to use rocks rather than stones.

Never try and make a rock garden in the shade of a tree, for the alpenes will just wither and die. There is a very serious danger from the drip-drips of moisture from the branches, as well as the plant food robbing which will be done by the roots. Make a mound with varying contours, say to the south side of the pool, and have, perhaps, a path skirting its irregularly shaped outline. Try and use the stone from the county in which you live. A good sandstone, say, in Surrey or Sussex, the Kentish rag in Kent, the limestone in Somerset, Derbyshire or Cumberland, and so on. Local stone is always cheaper and it may look more natural.

Try and choose stones that have been weathered, and show the original geological outlines. Do not use rocks that have had to be quarried and so look brand new. If there is one side of the rock that looks more natural than the other, then you can always expose this and bury the rest. Remember that the maker of a good rock garden invariably buries three-quarters of the bulk of each rock. The more skilled the builders of the rock garden, the more natural will the rocks look when they are in position. Try and study the small outcrops seen on the hill sides. It is from this natural out-cropping that you understand the meaning of the word strata. See that you show some lines of stratification—say a primary line and then a secondary line or two if this is really necessary.

Start at the lowest part of the rock garden, bed in these rocks in their right strata, or as we might say at their right angle, and always slope the rocks slightly backwards, because this helps the rain to get down to the roots of the plants. Then go on with placing the other rocks in position, watching the general "tilt" so that the look of the strata will be right. Sometimes the rocks themselves will have

markings on them, which will give you an idea how they are to be placed to look right. Examine the graining or the weather markings, or even the colouring, and you will learn much. Choose for the top of the garden the more rounded stones and for the base the more angular, solid, harder rocks. As the stones go into position see that suitable soil is placed around them and behind them and ram them tightly into position. Then the planting areas, or pockets as they are called, will appear quite naturally. They may be large or small, but they will be available for planting out.

Do not, whatever you do, just put down a mound of soil and then stick into it a number of stones and pretend that this is a rock garden. It may look like a Christmas pudding with almonds sticking out of it. You might perhaps call it a rockery, but whatever you call it, it is just as hideous. Never use old bits of marble, brickbats, old pieces of cement, and then allow them to stick out of the soil in a higgledy-piggledy fashion. Readers will forgive my stressing this but again and again I have been taken into gardens and asked to admire such atrocities!

Once the little rock garden has been made the planting can be done, and if you are prepared to buy plants in pots you can usually find a good alpine nurseryman who has specimens to offer you even at this time of the year. It is by no means ideal to do all your planting in June, but you can certainly make a wonderful start. Anyway, delay the planting until the soil has time to settle. Most people like to get the rock garden planted in the spring but this is very near the flowering time for some of the plants. It is just as good to plant in the late summer when many of the more rampant varieties have been cut back and divided. However, as I have said, you should buy the plants in pots and they will be well rooted and healthy, and it is quite safe to plant them now, even if they are in full flower.

Something has been said about soil but very little about which is the best type of soil to use. Undoubtedly the ideal would be good fibrous loam cut up into small pieces about the size of a hen's egg and mixed with the ordinary garden soil, on a 25 per cent. basis. Add in addition another 25 per cent. of sedge peat and 10 per cent. of really coarse silver sand. If you are going to grow plants that hate lime then you must be careful to use lime-free loam and never to cover the soil with limestone chippings. It is better to have one or two pockets that are acid for the plants that are lime haters.

There is no reason why the beginner should start with difficult plants. There are many alpenes that will be very happy in rather poor soil and under conditions that are not ideal. I would suggest some of the veronicas, one or two of the saxifrages, some sedums, several armerias, three or four subretias, (say a pink, a mauve and a blue) and an orange and yellow *Geum*, a mauve and pink phlox, of course, alpine, and several varieties of *Primula juliae*.

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## Journal of a Marine Aquarium

(Continued from preceding page)

to find. But I placed it in the middle of a tank, and what a centre-piece it forms. Within half-an-hour of being installed, it was transformed into a sub-tropic garden. From every sizeable hole there now sprouted multi-coloured discs of a daisy anemone (*Sagartia*), the largest well over an inch in diameter. Minor crevices bloomed with the scarlet plumes of *Serpula*, and other worms not yet identified.

A cluster of the dainty semi-goose barnacle (*Scalpellum*) constantly rakes the water with feathery nets looking as though made of spun glass, and now at night a dozen unsuspected lodgers scuttle forth to dispute meals with the tank's normal complement of resident hermit-crabs. Amongst these night-raiders are long-horned porcelain-

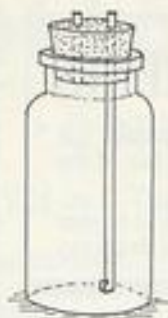
crabs, two hairy crabs (*Pilumnus hirtellus*) and a bandy-legged spider-crab (*Pisa tetraodon*) that solemnly cuts little nosegays from a nearby colony of *Sertularia*, and plants them on its twisted limbs and knobby carapace. When first it revealed itself, this shallot-sized crustacean was relatively clean; to-day it presents the appearance of a walking bush.

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### Correction

In the article on marine aquaria which appeared on page 4 of the April issue the third sentence under the sub-heading "Coastal Temperatures" should have read "Animals which live near the low-tide limits are subjected to rapid variations of temperature for only a very short time each day, while those from near the high-tide limit are subjected to rapid variations of temperature for most of the time, and often experience extreme variations."

# A Simple Measure for Dried Fish Food



THIS little appliance should appeal to all fishkeepers—whether they keep tropical fish or coldwater fish in tanks or outdoor ponds. It will save time, labour, patience, and ensure a measured quantity of food being given at each meal, whether given by the fishkeeper or some other person. The same quantity of food passes through the feed tube every time the jar is inverted.

It is quite simple to make and the material will be at hand in most homes. A small pickle jar, or a small bottle with a very large mouth, fitted with a cork stopper will do for the container. A straight length of three-eighths-inch brass tubing, as this has a smooth bore, half an inch longer than the height of the jar, will do for the feed tube. A cross cut is made half way through, three-eighths of an inch from one end, and then one wall cut lengthwise to meet the centre of the cross cut. The two flaps are then turned out at a suitable angle to catch the food. Two holes are made in the cork stopper with the butt end of a file: one to receive the feed tube, and the other large enough to receive the spout of a small funnel for filling and refilling. This latter hole is closed with a stopper after filling.

The feed tube should be inserted into the cork stopper with its feed trap at its lower end facing the filling hole, and the jar inverted each time with the trap facing the palm of the hand. With most dry foods the quantity that will pass through this tube each time the jar is inverted is sufficient to feed daily a dozen fish of guppy size; where a smaller quantity is required, the cross cut should be a quarter of an inch from the end, but not less. A smaller tube cannot be used, for it is liable to choke. Where a larger quantity is needed, the cut may be made half an inch, but not more, or a tube with a larger bore used.

W. H. Macey

## September Lecture Tour

A LARGE number of enquiries was received in response to our preliminary announcement of the September tour of illustrated lectures on selective breeding of tropical fishes to be given by Dr. Myron Gordon, geneticist to the New York Aquarium, which is being arranged by *The Aquarist*. As the time Dr. Gordon can allow for his British tour is strictly limited only six centres for his lectures have been selected, but it is hoped that the situation of these will give the greatest number of aquarists the chance to attend.

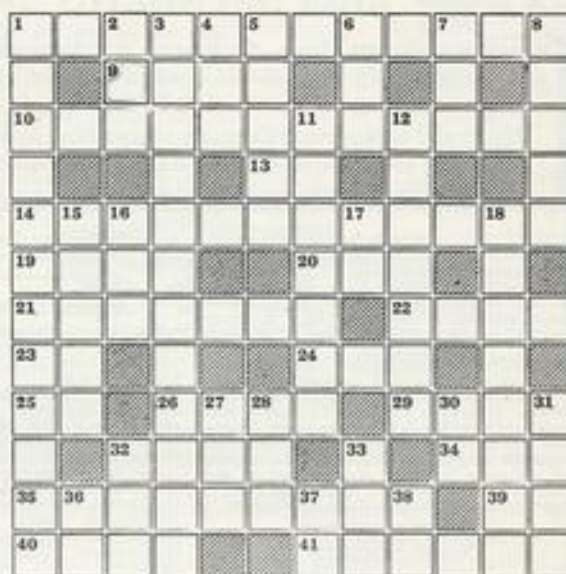
The chosen centres are:—Glasgow (Tuesday, 8th September); Manchester, Newcastle (Thursday, 10th September); Sheffield (Friday, 11th September); Birmingham (Saturday, 12th September); London (Tuesday, 15th September). These dates are provisional ones and the lectures halls and times (most of the lectures will take place in the evenings) are to be announced in coming issues of *The Aquarist*.

All aquarists are invited to make a note of the dates, and it is hoped that many parties formed by societies in the areas of the lecture towns will attend. Admission to the lectures will be by ticket only, and tickets must be purchased in advance—1s. 6d. each person—from "Lecture Bookings," *The Aquarist*, 24, Wood Lane, Isleworth, Middlesex. No reduction in price can be made for parties. Money should not be sent until it is announced that the tickets are available, but early application for reservation of stated numbers of tickets by society secretaries is recommended.

June, 1953

## The AQUARIST Crossword

Compiled by J. LAUGHLAND



### CLUES ACROSS

- |  |   |
|--|---|
| 1 Bronze striped barb (6, 6)   | 24 Bring forth young (3)  |
| 9 Put out (4)  | 25 Look to loach for this (2)   |
| 10 Heat measurers (12)   | 26 Sheet of water (4)   |
| 13 Mother of mackerel! (2)   | 29 The fan who 41 across his fisher may make these of them. Idolatry! (4) |
| 14 <i>Hemicorax bimaculatus</i> (7, 5)   | 32 Mica (4)   |
| 19 Gift or favour (4)  | 34 Short sleep (3)  |
| 20 These national safety measures compare with the fishes' dive from bird attack (1, 1, 1) | 35 Opposite of inbred (9)   |
| 21 The flattering word for a <i>Rasbora</i> (7)  | 39 Thanks for half tail (2)   |
| 22 One of the fins (4)   | 40 Look for him in a mossy tank (4)                                       |
| 23 Chinese mile (2)  | 41 Worship (6)  |

### CLUES DOWN

- |  |  |
|--|--|
| 1 Fighting fish variety (5, 7)   | 16 Confused one (3)                      |
| 2 Fish eggs (3)  | 17 Junior reduced (2)                    |
| 3 This magnifying glass sounds as if it might be used for a flame fish tank (7, 5) | 18 Without a tail (8)                    |
| 4 Leathernecks (1, 1, 1)   | 27 Belonging to Albert (3)               |
| 5 Breathing holes in the bodies of articulates (3)                                 | 28 Noble Order (1, 1, 1)                 |
| 6 Devonshire river (3)   | 30 Not off (2)                           |
| 7 Hard water! (3)  | 31 Salt baths, perhaps (4)               |
| 8 Form of hemp (5)   | 32 Aho (3)                               |
| 11 Dugong or sea-cow (7)   | 33 Don't follow herrings of this hue (3) |
| 12 Bêche-de-mer or sea slug (7)  | 36 British equivalent of 4 down (1, 1)   |
| 15 Leaf, but not aquatic! (5)  | 37 The Gunners (1, 1)                    |
|  | 38 Half dory for action (2)              |

### PICK YOUR ANSWER

- A common goldfish with a veil-tail is called by the Japanese: (a) Demekin, (b) Maruko, (c) Ryukin, (d) Watsonai.
- Fairmount Park Aquarium is in: (a) Chicago, (b) New York, (c) Philadelphia, (d) San Francisco.
- The famous water lily, *Victoria regia*, was discovered in: (a) Bolivia, (b) Chile, (c) Ecuador, (d) Peru.
- The popular name of *Gephyrocharax atracaudatus* is: (a) Bronze tetra, (b) Glass tetra, (c) Platinum tetra, (d) Silver tetra.
- The family Goodeidae is native to: (a) Guatemala, (b) Mexico, (c) Nicaragua, (d) Panama.
- The optimum temperature for *Bacopa* is: (a) 64 degrees, (b) 68 degrees, (c) 72 degrees, (d) 76 degrees.

G. F. H.

(Solutions on page 66)

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# News from AQUARISTS' SOCIETIES

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

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

**PUBLICATION** of an information pamphlet each month is the latest venture of the **Hampstead Aquatic Society**, and the first one is on keeping and breeding tiger barbs. The pamphlet can be obtained (price 3d.) from the secretary, whose address is listed under "Secretary Changes" below.

**SCHEDULE** announcing this year's Nottingham Show and Exhibition has just been issued by the **Nottingham and District Aquarists' Society**. The show will be at The Albert Hall Institute, Derby Road, Nottingham, and is open from 3rd-12th September. There are open classes for societies to exhibit in both tropical and coldwater furnished aquaria sections and details will be supplied on request to Mr. W. J. Christian, 36, Bridlesmith Gate, Nottingham.

## New Society

**Worthing and District Aquarists' Society.** Secretary: V. R. N. Ryan, Angola House, Angola Road, Worthing, Sussex. Meeting: Every second and fourth Tuesday, 8 p.m., at the Norfolk Hotel, Worthing.

## Secretary Changes

**CHANGES** of secretaries and addresses have been reported from the following societies: **Canford Aquarium, Reptile and Pond-keepers' Society** (Mr. V. L. A. Hutchins, 28, Trewhary Road, Sydenham, London, S.E.26); **Hampstead Aquatic Society** (Mr. K. J. A. Pye, 35, Steele's Road, London, N.W.3); **Kettering and District Aquarists' Society** (Mr. J. Sharp, 70, Queen Street, Kettering, Northants); **Richmond and Twickenham Aquarium Society** (Mr. J. Hemens, 34, Queen's Road, Richmond, Surrey); **Sheppy**

**Aquarist Society** (Mr. S. W. Ball, 27, Wheat-sheaf Gardens, Sheerness, Kent).

## Aquarist's Calendar

**4th June: Friends' Aquarist Society.** Coronation table show (evening) for tropical and coldwater fishes at St. Jude's Hall, Herne Hill, London, S.E.24.

**6th-7th June: Chelmsford and District Aquarist Society.** Open aquaria show in conjunction with Chelmsford Coronation celebrations. Details from Mr. R. A. Gray, 2, Norfolk Drive, Chelmsford, Essex.

**9th June: Aquatic Traders Association** open meeting for all traders; 7.15 p.m. at Coach and Horses, Marlborough Street, London, W.1.

**11th-13th June: National Aquarists' Society National Aquarium Exhibition** at Royal Horticultural Hall, Westminster, London, S.W.1.

**19th-20th June: Haslingden Aquarium Society.** Open show of tropical and coldwater fishes and furnished aquaria (details from secretary, Mr. W. Taylor, 11, Salisbury Street, Haslingden, Rossendale).

**20th-27th June: Gainsborough and District Aquarists' Society** exhibition of tropical and coldwater fishes at The Old Hall, Gainsborough.

**22nd June: British Herpetological Society (London Group)** meeting "Reptiles and amphibians in art and literature," 7 p.m., at the Linnaean Society's rooms, Burlington House, Piccadilly, London, W.1.

**27th-28th June: Burnley Aquarists' Society** second annual Roses Show (Lancashire v. Yorkshire) with furnished aquaria and individual fish classes. Show secretary: Mr. F. Taylor, 21, Hogarth Avenue, Rosehill, Burnley, Lancs.

**2nd-4th July: Wembley and District Aquarium and Pool Association** third annual open show at St. John's Hall, Crawford Avenue, Wembley. Show schedules from show secretary, Mr. A. Williams, 16, Weston Drive, Stanmore, Middlesex.

**2nd-4th July: Coventry Pool and Aquarium Society** show and exhibition of tropical and coldwater fishes at Swan Lane Garage, Ford Street, Coventry.

**9th-11th July: Burton-on-Trent and District Aquarists Society** annual show, 10 a.m.-9 p.m. at R.A.F. Association Club Room, Market Hotel, High Street, Burton-on-Trent.

**18th July: Frimley, Camberley and District Aquarists' Society** show in conjunction with Camberley Agricultural Show. Details from secretary, Mr. J. A. Willis, 9, Sherwin Crescent, Farnborough, Hants.

**21st-25th July: Shelf and District Aquarist Society** open show of furnished aquaria, tropical and coldwater fishes at Shelf Church School, Shelf, nr. Halifax. Show schedules and entry forms from Mr. L. P. Nash, 28, Rothersey Terrace, Great Horton Road, Bradford, Yorks. Closing date 25th June.

**23rd-25th July: Bath Aquarists' Society** open show at the Pump Room, Bath.

**28th July-1st August: Bournemouth Aquarists' Club** annual show and exhibition at Princes Hall, Grand Hotel, Bournemouth. Schedules and entry forms from Mrs. Penon, c/o Haskins Bros. Nurseries, Coy Pond Road, Westbourne, Bournemouth.

**3rd-8th August: Hendon and District Aquatic Society** annual open show of fishes and aquaria. Schedules available from Mr. B. Calrow, 6, Axholme Avenue, Edgware.

**6th-8th August: Portsmouth Aquarists' Club** annual show at R. E. Drill Hall, Portsmouth. Schedules and information from Mr. G. F. Elverston, 24, Bertie Road, Milton, Portsmouth.

**20th-22nd August: Romford Aquarist Society** annual show at The Lambourne Hall, Western Road, Romford, Essex. Schedules and information from Mr. A. E. Falkus, 37a, Wallenger Avenue, Gidea Park, Romford, Essex.

**2nd-5th September: Kingston and District Aquarist Society** annual show at the Y.M.C.A. Hall, Eden Street, Kingston, Surrey. Show secretary, Mr. A. Beckett, 13, Plough Road, West Iwell, Surrey.

**3rd-5th September: Southampton and District Aquarists' Society** annual open show. Show secretary: Mr. E. C. Goleworthy, Westways, Romsey Road, Nursling, Southampton.

Early notification of dates of coming aquarists' events for free insertion under the above heading is requested to ensure inclusion in good time.



Coldwater, tropical and marine aquaria were exhibited by the Swindon and District Aquarist Society at the first display of the Society in Swindon, as part of the town's Coronation year attractions. This picture shows the coldwater section with one of the seven feet aquaria used for shubunkins

## Crossword Solution

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

PICK YOUR ANSWER (Solution)

1 (d). 2 (c). 3 (a). 4 (c). 5 (b). 6 (b).

