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and Pondkeeper

NOVEMBER 1966



MONTHLY
Vol. XXXI No. 8

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The Editor accepts no responsibility for views expressed by contributors.

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VOL XXXI No. 8

1966

Cichlasoma festivum

by JACK HEMS

THIS species, commonly called the festive or flag cichlid, is native to Guyana and northern Brazil and attains about 5in. in captivity against about 6in. in the wild. It is a strikingly handsome fish, brassy-green to clayey-yellow on the back, shading to pale ivory, interspersed, at times, with some shadowy bars, on the sides, and silvery white on the belly. A black band extends from the side of the mouth, through the red-and-gold rimmed eye, to the posterior rays, produced to a point (long drawn-out in adult fish) of the dorsal fin. The anal fin is shorter based than the dorsal fin, but is similarly pointed. The ventral fins terminate in needle-like extensions. All the fins are yellowish, the paired ones plain, the unpaired ones marked with brown, sometimes white, spots. A blackish blotch in a cream to gold field adorns the upper root of the tail. The gill-covers reflect a shifting metallic green sheen. It is difficult to tell the sexes apart, except at pairing time, when the colours of the male outrival those of the female and the sides of the female become swollen with spaw. Occasionally, but only occasionally, a large male will wear enhanced colours all the year round.

The flag cichlid is dignified in its movements and spends a lot of time nosing about near or at the surface, the body tilted slightly upwards. It is a shy and easily frightened fish and thickets of tall-growing plants, among which it can glide and hide, are necessary for its peace of mind. Of equal importance, too, is soft water giving a slightly acid reaction. A temperature range of 73°F (23°C) to 78°F (26°C) is advised because in cooler water the fish is inclined to lose colour and go off its food. 68°F (20°C) should be regarded as the minimum.

Continued on page 176

Fish fry for millionaires

by RÉMY and TINY GANTÉ

£800 in a bath-tub

THERE are about £800 worth of fish at the bottom of this odd bath-tub."

We looked up respectfully at the bearded owner of this small fortune: there were two other similar bath-tubs in the shed not counting numberless buckets, basins and aquariums, all alive with minute fish that looked as if they came from a jeweller's shop-window.

"Of course, I am not speaking of the price at which I sell them myself, but of the prices they fetch when they get to Europe."

We were at Hamburi, a few miles north of Mombasa on the Kenya coast, in a cottage on a vast white beach shaded by coconut palms. A Frenchman, Jacques Allard and his wife Andrea settled there three years ago and have been earning their living in a rather unusual way: they capture coral fish and send them to Europe.

"What gave you the idea of coming here and doing this?" we asked.

Jacques Allard replied with a wry smile: "After a rather disastrous experience in the ex-Belgian Congo, we came here to relax and forget. We had lost almost everything. It all started with a little *Pterois radiata* we picked up in a pool at low tide. It was without much hope that we sent it to Europe. We hardly knew anything about the methods at the time and it was a miracle it arrived in Frankfurt alive. We were paid 5 dollars for it and started receiving requests for other specimens. And this is how, gradually, we built up our "transit camp" for fishes."

Europe is a nightmare

"Is it an agreeable and money-earning job? A job, in other words, that a father could recommend to his son?"

"At the present time it allows us to live comfortably and so more. Furthermore, you must realise that the notion of comfort in a country like this, comes down to very little: a good refrigerator, fresh drinks, a car, a boat, a cool house... all the rest is meaningless. As to the question of such a life being agreeable, of course it is if you like the sea, the sunshine, the open air and can do without theatres, premieres, art galleries, fashion shows and sophisticated cocktail parties... My brother Ray, here, was chief of bureau of an airline agency in Rome seven months ago. He came here on a holiday to see us and has dropped everything to stay. His years in Europe now seem to him like a faraway nightmare!"

"You certainly must need a good deal of knowledge..."



Ray Allard gazes into a bathtub that contains over £800 worth of coral fish

"Of course! When you receive an order for a *Glaucostygia* *hawaii* you must know what it is you are being asked for. But there are several good books to guide you. You must also know how to prepare and pack the fish for the journey because only the ones that arrive alive and healthy are profitable. But if these questions interest you, we can look into them later. Now we must make the best of the low tide and capture a few specimens on the reef. Would you like to accompany us?"

THE AQUARIUM

A Submarine Butterfly Hunt

Jacques and Ray led us to the beach and, in their wake, we waded up to their Zodiac Mark III pneumatic boat anchored amid the African fishing-boats.

"This pneumatic thing is ideal for our job", they explained, "however heavily loaded it floats comfortably over the reef with the coral just a few inches beneath the surface; it never runs over, is childish to repair, easy to fold and carry about by car or plane and, for what we do, our solid little 10 h.p. Evinrude outboard engine is amply sufficient."

The Zodiac was crammed with buckets, basins, nets and such-like among which we finally managed to find room for ourselves, and soon, with the engine purring contentedly, we were off for the reef. There we threw the anchor and the Allards started dumping their equipment overboard: two nets per person and a strange device of their own invention composed of a plastic bucket full of small holes and surrounded by the tube of a tyre to prevent it from sinking; this they drag behind them at the end of a rope, and into it go the fish they catch.

With our masks on our noses and our snorkels between our teeth, we slid overboard into the warm sea to attend to what looked like an underwater butterfly hunt. Certain species that think themselves safe amid the tentacles of a sea-anemone or hidden behind a piece of sea-weed are easy to catch; puffer-fish will almost let you tickle them with your fingers. But others are much slyer and disappear under the sand into caves and crevices; the hunter has to dive deep if he wants to get at them and often returns with nothing but scratches and a torn net.

The Allards, however, so as to preserve the fauna of their reef, operate with the greatest discretion. Indiscriminate netting of coral fish can ruin an area and turn it very quickly into a submarine desert. The Allards advise that only "abundant" fish should be captured if possible, for the very young ones are difficult to adapt to aquarium life and the mature specimens should be left for reproduction. So as soon as the Allards had fulfilled their needs, we returned to the house where the fish were poured into a basin.

How the Fish Travel

"These little newcomers will not leave at once. It takes at least two days for them to get used to their new surroundings, and then they have to go on diet for three days to prevent them from polluting their water with excrement during the journey. But here are some that are leaving today and that we shall now proceed to pack up. The packings are paid by the buyer who also pays for the plane fare. The packings we composed first of all of these transparent plastic bags. I take one and quarter fill it with this specially filtered and aerated sea-water. Then I put the fish in. After which I squeeze all the air out and replace it with medical oxygen out of this cylinder. I then close the bag hermetically with a tight knot. One third of water, two thirds of oxygen and



Ray Allard returns to the boat after a satisfactory hunt.



Jacques and Andrea Allard fill a bag full of fish with oxygen.

here are my fish all set and ready for a thirty hours trip. All I have to do now is fill the other bags and place them in that cardboard box."

The Fish die of Cold and Fright

"What is the percentage of losses during the journey?"
"You can consider yourself very lucky when 90% of the fish arrive alive. They rarely die from want of oxygen unless the package gets mislaid. They leave Mombasa in the late afternoon by the East African Airways plane and arrive in Rome, Paris and London next morning. But as my principal clients are German or Scandinavian, most of my fish have to change planes somewhere in Europe and it takes them about twenty-four hours to get to their destination. If the oxygen is still sufficient, the temperature, very often, has dropped. The water has had time to grow cold and the fish suffer from it. The losses are much higher in winter than in summer. And it is always the rarest and most expensive specimens that die: their fragility is probably the reason for their rareness. But there are also psychological causes for these losses. Some species are so emotive that if they are not handled with care, they are liable to die of fright. Such accidents often occur when the fish are unpacked. Species such as the *Zanclus* and the *Aspidurus inaequalis*, for instance, have been seen to arrive in perfect condition and then die of sheer terror when placed in an aquarium. The transfer of fish from their plastic bags into an aquarium must always be done very, very carefully, at night preferably, or in any case in the darkness. After having spent twenty-four hours in a closed box, the fact of being suddenly thrown into a brightly lighted unknown world can be fatal to them: light must come back gradually, like day breaking over a landscape."

A Fish Fry that costs over £200 per lb.

"Tell us a bit about the price of these fishes: £800 per bath-tub sounds fabulous!"
"The most expensive aquarium fish is a trigger-fish, the *Balistes conspicuus* (1). It grows to the size of about 15 in.

I get 50 dollars for it. In Europe it fetches over £200. At the other end of the fish hierarchy are the sturdy and common little *Aspisprius* species for which I am paid 15 U.S. cents and which are sold to the European aquarists for between £1 and £5. In between is the smart little chap you pay between £15 and £25 for."

"Considering the size of these microbes, how much do you think a pound of them would cost in Europe?"

Allard scratched his beard.

"It depends which ones. Something between £50 and £250 I should say. Caviar, when compared with it, loses a lot of its prestige!"

Coral Fish on the Market

"What, in your opinion, determines the price of these fishes? Their rarity, their beauty, their vivacity? . . ."

"A little of everything. A rare fish with no looks to it has no value. Take the curious case of the *Mastur niger*, that lovely little black and white fellow wriggling so gracefully round the aquarium over there. It is a very rare species. I get 25 dollars for a young specimen and it must be sold for around £100 or £150 in Europe. The adult grows to quite a large size, over two feet, but changes completely in aspect and becomes as dull and uninteresting as a herring. It is still quite as rare, if not more, but has lost all value apart from what you could get by selling it to a fishmonger. There is also, for the European seller, the question of the price of transportation. From here the plane fare for a carton of fish is about 15 dollars and one can send an average of 20 fish per carton. But it is not always the case. For instance, certain species such as the trunkfishes let out poisons when frightened and have to be packed separately. And if 20 fish can travel in 4 litres of water, one fish alone needs half a litre, so that the transportation price, instead of being spread out over 20 fish is only spread out over 8, sometimes less! When the fish come from more remote places than Kenya, the transportation prices go up and less fish can be sent per carton."

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Jacques and Roy Allard prepare their equipment before diving overboard onto the coral reef

Around the aquariums

by MIKE SHEEDY

AT least 1,000 fish, of 100 different species, perished in a blaze which recently reduced to ashes Mr. Frank Grosvenor's do-it-yourself aquarium in the garden of his home at Eyre Street, Creswell, near Worksop.

Four years' work in building up a valuable collection of tropical and sub-tropical fish lay in ruins. Said Mr. Grosvenor, head timekeeper at Whitwell Colliery: "It's not so much the cash value—it's the fact that four years' painstaking work has been ruined".

Mr. Grosvenor, a member of Worksop Aquarist and Zoological Society, and his neighbour Mr. John Young, were beaten back by smoke as they tried to put out the fire with a garden hose. Only two of Mr. Grosvenor's 30 fish tanks escaped the fire. The aquarium was heated by pipes leading from the greenhouse boiler. It is thought the fire may have started at a point where the pipes led into the shed.

★ ★ ★

Storm clouds hung over Bristol on Midsummer Day. It was the latest chapter in a sequence of unsettled weather. It proved too much for Goliath, the Bristol Zoo's Giant Tortoise. The continued lack of sunshine and the cool temperatures put him off his diet of lettuce. The sequel? Goliath was moved from his normal outdoor summer quarters back into the warmth of the heated Reptile House. Now Goliath is happily munching lettuce again and viewing the doubtful weather from the comfort of central heating.

★ ★ ★

The London Zoo has purchased an Electric Eel from a Slough firm, after a short absence of this species from the Aquarium. It is on view in the Sea-water Hall, where special equipment is installed to convert the electric impulses into "clicks" which are amplified so that visitors may hear them.

The eel, which comes from north-eastern South America and the middle and lower regions of the Amazon, measures about four feet in length, but they can grow to six and a half. The large electric organs are modified muscles and they occupy over half of the body. The electric pulses are not only used for attack and defence, but less powerful pulses are used in direction-finding as, although the young eels have functional eyes, these become clouded as the animal grows. It can produce a discharge of from 200-300 volts and has few enemies, other than man, as a result.

★ ★ ★

Calling to see my old friend, John Hutchinson, who runs

the Walk-Around Pet Stores, at the Wicker, Sheffield, recently, I was surprised to find he has now opened a mini zoo over his shop. The top floors have now a rather large collection of animals and birds on show, while at the back of the ground floor the largest collection of tropical fish in or around Sheffield are on display.

Well over 100 species are on view and John seems to be doing good sales with them for the place is always crowded and while I was there I saw several customers purchasing different species of fish. John also has in stock some of the rare fishes as well as all the well-known species and prices range from 3/6d. to £10.

I was most impressed by the way the tanks were displayed and each one of them was well planted and stocked. John also supplies the goldfish to fair grounds and other places and delivers as far as fifty miles radius of Sheffield. In charge of the tropical fish department is Mr. Paul Cooke, who has a very wide experience in this field and is always ready to give advice to people purchasing fish, especially beginners. Talking to John Hutchinson about the different departments in his shop and each department having an experienced person in charge he said: "Today so many people buy pets from a puppy to a monkey and from the goldfish upwards to the very expensive tropical fish, yet they know so little about them. So in each department will be found a person who has a good knowledge of the species in question and customers can seek advice on how to keep the pet they are interested in and when they know how to look after their purchase they are satisfied and the store keeps a good name, for no livestock leave the store unless they are in perfect condition", to me that is a good policy and the customers are happy. I may add that John also stocks *The Aquarist* and it is surprising the number of copies that are sold and the people who come in looking for back numbers.

★ ★ ★

There was trouble recently between the West Berlin Aquarium and the neighbouring Zoo when a queen bee escaped from the glass lives of the former and with her followers invaded the latter, making straight for the lion's cage and causing great disturbance and fear among the kings of the animal world.

The Berlin Fire Service, as general-purpose savers of situations, were called, but were powerless to help. A solution was finally reached when Dr. Werner Schroeder, Director of the Aquarium, entered the lion's cage armed with only a matchbox which was empty, and after some

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Breeding types of goldfish

by A. BOARDER

Growing on and sorting

WHEN the youngsters are about two months old it is possible to sort them out so that the better ones can have extra space and attention. This will ensure that they grow at their maximum and remain in good health. The object of the breeder from now on should be to increase the size of food as the fishes grow. It is imperative to give food as often as is necessary but at the same time to make sure that no over-feeding is done. As long as the water temperature is about 60°F., it is probable that the fishes can be fed two or three times a day. The important point to watch is that the water must contain plenty of oxygen, but if it gets too warm it is possible for it to lose much of the oxygen.

Although fishes will feed and digest the food at the maximum when the water is warm, once it becomes a little foul it loses some of the oxygen and contains too much foul gas. The fishes then go off their food and if more is given the state of the water goes from bad to worse and the fishes would soon be in trouble. It is surprising how soon the water can be upset and it is possible to have a tank of youngsters feeding and moving well one day but if too much food is given that day the water may become foul and if the weather is very warm, there can be dead fishes the next day.

If a little food is given on the top of the water, the fishes should be up after it within a minute but if no signs of feeding take place then no more food should be given for at least a day. If all artificial feeding is stopped for a day once a week it will benefit the fishes. If they are healthy they will continue feeding on the soft Algae and vegetation in the tank. This will do them good and assist them in feeding better the next day. Still try to give a little live food as often as possible but a varied diet will ensure that the fishes continue to thrive.

If a number of youngsters have been raised it will be an excellent idea to start to sort them out. The common goldfish will be rather difficult to sort as they can be very much alike when very young. They should be placed in a glass tank for sorting so that their finnage can be inspected. It may be found that they do not vary much, as it will be among the fancy types when differences will appear. However, some of these youngsters may have a badly shaped dorsal fin or their tails may not be correct. The common goldfish should have a sturdy body with well shaped, but not over large finnage. The unfortunate part about sorting these is that they may not change colour at a very early age. They will all be dark bronze for a start and the time taken to change to gold or red will depend on several factors.

The strain can be a deciding factor as if fishes are used for

breeding which have taken years to change colour it is probable that their youngsters will also take a long time to change. Most goldfish should change colour during their second year and those which do not do so should not be used for breeding in the future.

The comet goldfish can be sorted at an earlier date as their main characteristic is the long and flowing tail or caudal fin. Although the tail will not show its full development at an early age it is still possible to sort out those which have a short, thick tail and discard them. Many comets are silver and gold in colour and it is probable that these will change colour earlier than the all gold ones. A stream-lined body is also desired in this variety and this should be apparent when the fishes are over three months old, providing they have been well fed and grown on well.

Fansail goldfish can be sorted out at a much earlier age and although it may not be possible to find all those which could be winners it is possible to find all those which will never make the grade. As these fishes should have double tails they should have a first sorting in a white bowl. It will then be possible to see all those which have a double tail. This may not show the divide but the tail may appear spade-shaped. The single tailed ones will be very pro-



Celestials: Postpone fry-sorting until eyes have migrated to uplooking position.

THE AQUARIST



Lionhead. Main feature is the hood which is rarely seen properly developed.

smooth and can be discarded at an early age. It is even possible to see these when only ten days old.

Do not discard any youngsters which appear to have a double tail but a joined one, as it is often found that the gans hold together so much that at this early stage it is not possible to be certain. These varieties should also have paired anal fins, but this will not be evident until the fishes develop more. Now the pick of the youngsters can be placed in a glass tank so that they can be viewed from the side. Inspect the dorsal fin which must be normal and not pointed and thin. The body can also be examined to see that it has sufficient depth. The mature fish should have an oval shaped body and any which are apparently thin in body should be discarded. It has often been said that the depth of the body can be improved by the type of feeding given, but I do not agree with this, as unless the shape of body is there no feeding will improve it.

As for the colour change in these fishes it depends on whether they are scaled or shubunkin types. The scaled fishes may not colour for a year or more but the shubunkin types will soon show their colours and can be sorted accordingly. I would prefer all fantails to be scaled as I am sure that many shubunkin type fantails are just throwouts from veiltails. A scaled fantail can never be bred as a throwout from any other variety.

The sorting of veiltails follows the pattern of the fantails and the same procedure can be adopted. The body should be deeper than that of the fantail and approach that of a sparrow. The dorsal fin must be well developed and the tail *very long*. It may take some time to develop properly but at an early stage the experienced breeder can tell which youngsters are likely to make good fishes. They should also have paired anal fins and these may be seen when the fishes are about three months old. Most veiltails are shubunkin types, and in my opinion the scaled type should never have been acknowledged. It is not natural to find the lovely soft, flowing finnage in scaled fishes. These shubunkin or scaleless types will show their proper colours much earlier than the scaled types and so it may be possible to sort the coloured ones likely to make the best fishes when quite young.

The ordinary shubunkins are found in two types: the London which is shaped as for the common goldfish, and the Bristol which is stream-lined and with larger finnage. The sorting can be accomplished when these are three months of age and any badly shaped ones can be discarded. When sorting for colour do not discard any fishes which are darkly coloured when young as it will often be found that these darker coloured ones develop into that grand blue colour so desired as a ground colour for all shubunkins. Those which are very quickly coloured and pale may not be of any value as they may never get the colours which they should have. The true colour of a good shubunkin should be a blue ground with red, brown, yellow and violet in patches with a smattering of black all over the fish and fins. This black can be in spots or small patches.

The orandas present more difficulty when sorting as the hood which is the particular feature of this fish does not develop at an early age. It can be two or three years before this hood develops. However the fry must be sorted as for the veiltail as apart from the hood this fish is shaped as for the veiltail.

The lionhead is a fish shaped like the fantail but with the hood of the oranda. Therefore the same sorting procedure as for the fantail must be adopted but one has to wait a year or two to see if the hood grows as required. The hood should cover the head and gill plates but many fishes are seen today with an insufficiently developed hood.

The sorting of the celestials must also wait until the fishes grow older as the eyes gradually move to their above position, and will not be in position when the fishes are young. The same applies to bubble eyes and pearl scales. The pearl scales can appear in any type of scaled goldfish and in my opinion should never be classed as a distinct variety.



Oranda. Lionhead's hood and veiltail's finnage

OUR EXPERTS' ANSWERS TO TROPICAL FISH-KEEPING QUERIES

Is it true that one can overstock a tank with plants? In short, do less of plants in a tank rob the fish of oxygen?

Not if the light is sufficiently bright to keep all the plants in a healthy condition. But if the plants have to struggle for light to survive then a lot of foliage decay is bound to occur with disastrous results for the fish.

My three-foot tank is situated on the opposite side of a smallish room with a window facing due south. A 60 watt lamp is kept switched on for about 5 hours every night, yet I cannot get the plants to grow. Please give me the benefit of your advice.

In all probability you are trying to grow just those plants that need a really bright top light. If you gradually change over to such plants as *Cryptocoryne* spp., fine-leaved willow moss, Java moss or *Sagittaria subulata* we feel certain you will find a marked improvement in the appearance of your tank.

I should be pleased to know the country of origin, breeding habits, temperature requirements, and maximum length of *Barbus stoliczkae*. I can find no trace of this fish in my books.

This fish is native to Burma and, although it is not often on the market, was first introduced to hobbyists about 40 years ago. It reaches a length of about 3 in. and spawns (quite freely) in typical *Barbus* fashion. It will accept any live or dried foods, and flourishes well at the usual range of temperature.

I have just placed a pair of speckled mollies in my community tank. Will they breed faster and remain healthier if I introduce salt into their tank every now and again?

The last thing you should do is to introduce salt into the aquarium every now and again; for if you did this you would soon be heading for trouble. Mollies can stand quite a lot of salt in the water, but very few plants or other fishes can stand more than slightly brackish water. If you introduce one level teaspoonful of evaporated sea salt or ordinary block cooking salt to every gallon of water in the aquarium you can hardly go wrong. Once this salt has been added, do not introduce any more.

I have been told that the so-called blind cave fish known as *Ampelisca jordanii* is not a distinct species at all but is really a freak form of the banded or striped aphyanax (*A. fauvelii*). Is this correct?

Scientists believe that the blind cave fish (*A. jordanii*) is descended from a Mexican race of *Aphyanax fauvelii*. The theory is that some of these aphyanax became imprisoned in subterranean waters and so through the course of centuries lost the use of their eyes.

Do ants' eggs make a good food for tropicals?

Ants' eggs (actually they are not the eggs of ants but the pupae of ants) given direct from the nest make quite a good food for the larger tropicals.

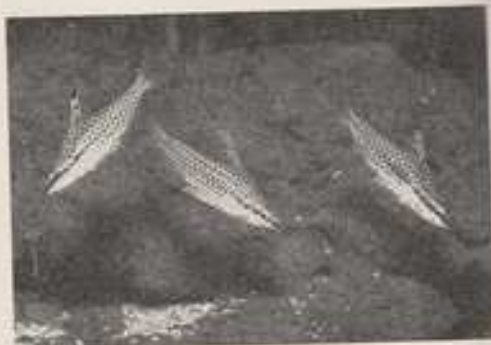
Can you tell me the name of the aquarist who first bred the guppy in captivity?

It is generally believed that the late John Paul Arnold of Hamburg, Germany, was the first person to breed the guppy in captivity. He is said to have done this in 1909.

I have read somewhere that the spores of *Saprolegnia* (Fungus) are present in every aquarium. If this is so, what prevents the spores of this disease from attacking every fish in a tank?

The body of a healthy fish is covered with a protective coating of mucus. If anything removes or penetrates this mucus down to the skin, then the way is open for the spores of fungus to take hold. All the same, fungus is less likely to appear on a fish attacked by another fish or skin-boring parasites if it is kept in a scrupulously clean tank.

Many queries from readers of "The Aquarist" are answered by post each month, all aspects of the fancy 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.



Headstanders (*Chilodus punctatus*)

What conditions and food are needed for the headstander (*Chilodus punctatus*)?

This interesting fish is a species that needs plenty of swimming space in a large tank filled with soft, acid water maintained in the middle to upper seventies (°F). It has a small mouth and therefore cannot manage large food. Although it will accept dried food, it is essential to include live *Daphnia*, tiny worms and various larvae in its diet.

Recently I was told that some water plants have a detrimental effect on the growth of other species introduced into the same tank. Is this true?

Most probably it is; for several plants that grow on land have root secretions inimical to the growth of all or certain other plants.

Do fishes need as much light as plants?

It is reasonable to assume that those fishes which haunt the surface, in open water or among floating plants, need plenty of bright top light to keep them in good health. But we are unable to say whether the species which frequent the lower levels derive much, if any, benefit from light at all. Again, quite a number of species are found in the natural state in streams and pools so overhung with trees and bushes that their entire lives are lived out in perpetual shade.

I have been told that the pH of a balanced aquarium does not remain constant over 24 hours. If this is true then surely all the fuss some aquarists go to to obtain a certain pH reading in their tanks is sheer waste of time. I would be grateful for your comments.

Lots of decaying plant life and nitrogenous faecal matter from fishes fed heavily on live food, meat and meaty dried food will result, after dark, in a rise in the carbon dioxide content of the water. Carbon dioxide creates acid conditions. It follows therefore that there is a temporary decrease in the pH value of the water. In a well cared for aquarium, however, the change in pH in every 24 hours is negligible.

THE AQUARIST

COLDWATER FISH-KEEPING QUERIES answered by A. BOARDER

I have hatched out some fry which I believe are Rosch. How should they be reared?

The same procedure can be adopted as for rearing goldfish fry. Infusoria or liquid fry food first and increase the size of food as the fry grow on. Daphnia can be given when the fry are large enough to take them.

I have been unsuccessful in breeding gold coloured goldfish. Last year's fry are still uncoloured. How can I improve matters?

If goldfish are used for breeding which took a long time to change from bronze to gold, then their youngster will also take a long time to change. This however is not the whole story as even with fishes bred from a quick changing strain the way they are reared can make a lot of difference as to when the change takes place. For instance, well fed and quickly grown fishes can change earlier than those which have been starved. The warmth of the water also makes a great deal of difference. The warmer the water within reason the quicker would the fishes change colour. This is the reason why we see small coloured goldfish which have been imported from warm climates.

Is there a time of the year when fish should be introduced to a pond?

It is unwise to introduce fishes to a pond in the winter but from late March to October would be quite safe. Test the temperature of the water first and as long as there is not more than five degrees F. difference either way, it will be more safe. If the water temperature varies more than this heat the fishes in a bowl or other container in the pond before letting them swim in.

I have just discovered two of my shubunkins with blisters on their tails and fins. What is this?

It sounds like a form of embolism and can be caused by too much oxygen in the water. This can come from forcing fresh water into the pond from a strong jet. It can sometimes happen when there are too many water plants in the pond and weather conditions change rapidly, such as when a thunderstorm occurs. Stop feeding and the fishes will probably recover after a day or two.

My water lilies are in a corner of my pond where they have not much room. Should I prune them or move them into the centre of the pond?

The easiest way would be to move the lilies but if they are really too large then they can be pruned. You will find that there are some shoots from the roots which could be removed with a sharp knife. The whole piece can be cut off and this should not spoil the look of the main plant.

I am thinking of setting up a tank 48 in. by 12 in. by 12 in. and would like to keep some river fish. Which kinds can I keep and how large will they grow?

They will grow to about 14 oz., and be about a foot long; silver orfe can grow to 18 in. long and weigh a couple of pounds; golden and silver rudd can grow to about a foot long and reach 3 pounds, but you would not expect them to do so in a tank. You could keep small specimens of all the fishes for a few years but you would have to watch the growth of the orfe and remove them if they got too large. Minnow and bitterling carp would also be suitable.

I have made a lined pond in the garden and last night I put some golden orfe in the pond. Later in the evening I found that two of them had jumped out. I was able to save them but would like to know if this is an unusual happening.

Orfe are great jumpers, but it is not possible to say with certainty why they jumped out of your pond. It is probable that the water was not to their liking.

I have a natural pond in which I put some goldfish some years ago. They have bred well but now I see a number of the young

ones which are dark bronze in colour. What is the reason for this and how can I get back to the original red ones?

Goldfish were originally bronze in colour and it has been from mutations or types which turn red that the present goldfish have been developed. If left to themselves to breed in a pond without sorting, it is probable that some will fail to change colour and remain bronze. If these are not removed from the pond the tendency will be for more of this type to be bred every year. Efforts should be made to catch the uncoloured ones before they breed.

I have a number of goldfish in my pond and one of them seems to collect blanket weed on its gills. What is the reason for this and how can I get rid of it?

I suspect that this is not blanket weed on the gills of your fish but fungus. In a pond which has a quantity of green algae in it it is possible for this green substance to cling to the fungus, which is white, and make it look green. Give the fish a salt bath as recommended in previous answers.

I have a fish which has suddenly developed some black patches on the body. It recently had an attack of fungus. What is the cause?

The fungus may have damaged some of the flesh of the fish and after a cure the damaged portion will grow again. New growth on goldfish is usually black but this will change to the usual red in time. There is nothing you can do about it but wait.

Can you please tell me if it is possible to breed goldfish in a garden pond? At what does one determine the age of a goldfish in respect of its length? How can I determine the sex of a goldfish and what is the recommended food for them?

My book "Coldwater Fishkeeping," from *The Aquarist*, will give you all the information you require as it describes not only the methods to adopt for keeping fishes but also as to breeding them and treating diseases. However, the points you especially require are:—Yes! goldfish can be bred with little trouble in a garden pond. You just have to prevent the parent fishes from eating the eggs or fry. There is no means of telling the age of a goldfish by its length. It will depend on how the fish has been reared. With plenty of space, warmth and food the fish can grow space but one with insufficient of either of these could be half or even a third as long as the former fish at the same age. A well looked after goldfish should be three inches long at least at a year old. Female goldfish when near spawning time will have a fatter body than the male and this fish will usually show small white raised pimples on the gill plates and sometimes on the front of the pectoral fins. For the question on foods, consult my book.

What methods are there for stocking white worms and blood worms. I believe some form of mud is used for forcing up worms from a lawn, would this make them dangerous to fishes?

White worms are easily kept and bred in a box of damp peat. A piece of damp bread is used as food for them and if a few worms are introduced they will soon breed. A piece of glass should lie on the peat and all must be covered to exclude the light. Keep in a fairly cool, dark place. To collect any, just press a small piece of cheese or rind into the peat. After a couple of days this will be surrounded by thousands of worms ready for collection. Blood worms are collected from natural waters and I don't think you could breed these easily. Worms can be got by pushing a garden fork into the damp ground and wriggling it back and forth. The worms will come from the ground with such disturbance. Any procured by using chemicals would have to be washed and well cleansed before feeding them to fishes.



The fish hunter often has to dive into underwater caves and crevices to get some shy species of fish

The Unknown

"During your explorations on the coral reefs, have you ever discovered any unknown species?"

"Yes. In fact quite recently we captured a strange little pink monster 5 ins. long. Here is its photo. Impossible to identify it: it isn't in any of our books. Considering its behaviour, we think it must be a member of the *Tetraodon* family. We sent it to the Frankfurt Troparium to see what they think of it. One of the fascinating things about the sea is that we still know so little about it and that even in shallow waters there still remain unknown creatures to be discovered."

(1)—Impressive as they are, scientific names seem to be as unreliable as common ones. Dr. Bruce W. Halstead calls the same fish *Balitoris niger*, Dr. Herbert R. Axelrod and William Vanderwalker call it *Balitoris spilargenteus*. The latter also writes that in the U.S.A. this fish is bought from the hunters at \$250 whether it arrives dead or alive.

The Siamese

by JOE

LONG before I became a keen aquarist I had heard of the Siamese Fighting Fish. In Thailand natives sometimes still match males of the species as our forebears had done with cocks and bears. The outcome of these contests was always certain death to the vanquished and more than probable death to the victor also.

The fish which is available to the aquarist bears little resemblance to the one found in its native environment. Careful and selective breeding has evolved graceful and flowing fins out of ragged and torn ones. The nondescript colours are now breathtaking hues of red, blue, green and in some cases black and cream. Only one characteristic remains common to both fish—their deadly attitude towards members of their own sex.

The Siamese Fighting Fish is an ideal member of the community tank. Not only is it indifferent towards other species but its slow and regal movements combined with its sheer beauty, excite comment and admiration from all.

Brooding these fish presents no real difficulty. The male and female should be carefully chosen, separated and fed well mainly on white worms and grated raw liver. No brooding should be attempted until the female is swollen with eggs.

A tank of 24 ins. by 24 ins. or larger should be chosen and filled to a depth of 6 ins. to 8 ins. with matured water heated to 74°. No compost is needed to cover the bottom of the tank but floating greenery is essential. Introduce the male into the breeding tank and slowly raise the temperature of the water to 78°-80° during the period of two days. During this time both fish should still be fed primarily on live food. Soon it will be observed that the male is gulping air from one part of the surface and blowing bubbles into a concentrated area of between two and three inches in diameter. When the "bubble nest" is about half an inch deep the female should be introduced to the tank. This is the time to watch "*Betta splendens*" for two good reasons. Firstly, very few people would be able to put into words the sheer beauty of the male as he begins his courtship procedure. All his fins are erected and spread taut as he swims excitedly by the side of his prospective mate. Secondly, if the female is not quite ready to breed, the male will chase her viciously round the tank and will probably cause either damage or death. Here again, dense floating vegetation will give her protection. It is advisable not to remove the female when such skirmishing begins as it is

Aphyosemion, top of the pops

by JACK HEMS

Photo by Nilmar Hansen

Aphyosemion
zealandicum



FISHES of the genus *Aphyosemion* are members of the family Cyprinodontidae. At one time it was believed that aphyosemions were found in the natural state nowhere save tropical West Africa, but of recent years species of this genus have been collected east of the Congo.

The waters in which aphyosemions dwell in the wild are invariably soft and acid or acid-brackish (in coastal areas). They are also shallow and relatively cool (owing to the fact that they are usually overhung by bushes and trees or covered by thick carpets of aquatic vegetation through which little or no sunlight enters).

During the dry season not a few of the ponds and ditches supporting aphyosemions dry up. But Nature in her wisdom has seen to it that the eggs laid during spawning time are deposited in places where they are least likely to be damaged by a temporary or protracted withdrawal of water and the period of incubation, which may be regarded as among the most delayed of any tropical species normally bred in captivity, appears to be determined (within reasonable limits) by prevailing climatic conditions.

According to Dr. George S. Myers, the American ichthyologist, it is not unlikely that a number of species of *Aphyosemion* are actually annual fishes, that is fishes that

complete their entire life cycle within the space of eight months to a year. But short-lived or not, almost all members of this genus have an attraction for the aquarist and are becoming increasingly sought after on account of their wonderful colours and finnage—in some species as splendid as any displayed by the most exalted fancy guppies. Furthermore, aphyosemions present a challenge to the enthusiastic and ambitious breeder for, although some species are often ready and easy to propagate in captivity, others are not.

The aphyosemions known to tropical aquarists are divided into two groups: those that deposit their eggs in the mud or among bits of vegetation lying on the bottom, and those that spawn in floating vegetation at or near the surface. But be all this as it may, fish which are normally regarded as bottom-spawners occasionally mate at the surface, and fish which are normally regarded as surface-spawners occasionally conduct their amours on the bottom. Why individual pairs should depart from the regular spawning procedure is not known. Ordinarily up to fifteen eggs, quite large and hard to the touch, are laid daily, or almost daily, over a period of several days to several weeks. The eggs of the surface-spawners incubate in

about a fortnight to three weeks; the eggs of the bottom-spawners in about two months or more.

An aquarium for aphyosemions need not be large but it must contain water that has stood for some time and is of a soft and acid nature. A small quantity of scalded peat scattered over a non-calcareous sandy floor is obviously appreciated by the fish (if glowing colours and a lively manner are anything to go by) and helps to maintain the acidity of the water. Plants that will flourish under acid conditions include *Najas flexilis*, *Vesicularia dubyana* and the fine-leaved form of *Fossinella antipyrretica*. The ascending stems of nitella are particularly valuable for filtering incoming light (a soft light is of supreme importance) and providing a cradle for the deposited eggs.

For breeding and normal maintenance the temperature of the water should be from about 72°F (22°C) to 78°F (26°C). As to the question of food for aphyosemions, green larvae, bloodworms, white worms, *Daphnia*, and the like, are an essential part of their diet. All the same, small foods are taken by a number of species.

It is not wise to introduce aphyosemions into a decorative community tank for apart from their special needs, the larger species will snap at and sometimes devour smaller companions. Besides, the males of most, if not all, species are quarrelsome among themselves. Because of the males' habit of fighting, it is advisable to keep aphyosemions in single pairs or trios. Also, and this is a point the aquarist must always bear in mind, aphyosemions are excellent jumpers, and the aquarium in which any of them are placed should not be left uncovered.

Over the last fifteen years or so nylon yarn—in dangling strands tied to a cork or feeding ring—has largely taken the place of plants in a tank set up for surface-spawners.

And for those species that spawn on the bottom, in mud, glass dishes (or non-toxic plastic dishes) filled with scalded peat moss have been used with great success. As the nylon mops (as the bunched and tied strands are called) and trays of moss are charged with eggs, they (or the eggs) are removed from the tank and hatched elsewhere (in containers filled with soft, acid water shielded from a bright light, of course. But here it may be mentioned that the eggs of some bottom-spawners are stored for a while in moist peat before water is run in over them).

Naturally, as the eggs of aphyosemions are deposited on different days, they do not all hatch out at the same time. Therefore, the aquarist intent on raising lots of youngsters must sort them periodically or else the larger fry (the first-born, so to speak) will plague the lives out of the smaller fry (except the clever few that keep out of harm's way). As a rule, the fry grow rapidly on a diet of cyclops, brine shrimps, micro worms, or anything else alive and small enough to be swallowed. If the eggs of aphyosemions are not removed to another container for hatching, some of the fry will certainly be swallowed by the parent fish, but in general members of this genus are not avid eaters of their own offspring, that is provided they are well fed. Another thing, parent fish will not go to much trouble to seek out fry covering in dense thickets of vegetation.

Sexing aphyosemions is not difficult (in fish past the young fry stage); for the coloration of the male is much brighter than that of the female and his fins are large and pointed, whereas those of the female are smaller and rounded. In some species the caudal fin of the male is trident-shaped, the centre and outer rays terminating in well-developed but somewhat rusty points.

Among the loveliest and most popular of these species



(Aphyosemion flammeum)
Photo by Hilmar Hansen

← *Aphyosemion
flammeum*

with a trident-shaped caudal appendage is *Aphyosemion coarctatum* (a bottom-spawner), which ranges in the natural state from the delta of the Niger to the Cameroons. This fish, commonly called the blue gularis, is variable in coloration, but whatever garb it chooses to wear it never fails to delight the eye.

The general colour of the male is reddish brown on the back, shading to pinkish yellow to yellowish green on the sides, and bluish white on the belly. There are red streaks and red dots and red bars (posteriorly) overlaying the basic tints. Intermingled with these red markings are oases of blue. Indeed, there are plenty of blue patches, and green patches, on and about the head. The dorsal fin is bluish green to yellow, dotted with red and red along the base; the anal fin is yellowish green marked with red and blue, with some blue to black along the conspicuously fringed lower margin. The other fins are yellow to deep orange-red. It is indeed an outstandingly handsome fish. It attains a length of nearly 5 in.

Less than half the size of *A. coarctatum*, but almost as spectacular in its array of colours is the male *A. australe* from Gabon. The back is dark brown, shading to pale green to bluish yellow on the lower sides and belly. Several rows of red dots extend from the head to the tail. Sometimes the hinder part of the body glows with a fiery hue. The dorsal and anal fins are well developed and yellowish adorned with bands of purple to violet melting into white tips. The pectoral and pelvic fins are yellow inclining to red. The lyre-shaped caudal fin is yellow with some red and some black along the upper and lower margins (white at the points) and greenish blue to deep lavender spotted red in the centre. German aquarists usually refer to this species as the Kap Lopez. It is popularly known among English-speaking aquarists as the lyre-

tail or cameronensis. It spawns in plant life growing in midwater or at the surface.

Among other gems contained in this genus so singularly rich in beautiful species is *A. biwatianum*. This fish has a reddish brown body, adorned here and there with touches of violet, and a whitish belly. Two brown to blue-black stripes extend along the sides: the upper one from the snout, through the eye, to the upper part of the caudal base; the lower one from the throat, through the base of the pectoral fin, to the lower part of the tail. The unpaired fins are streamer-like: the dorsal red, especially along the outer edges, with some black markings; the anal yellowish to red, with some reddish brown to purplish black pigmentation along the margin. The elongated top and bottom parts of the caudal fin are yellow to yellowish red edged with blood-red or reddish black; the centre is red, or red-spotted on yellow, in the base, shading to green or yellow. The ventral fins are green; the pectorals are colourless. *A. biwatianum* is found from the Niger Delta to the Cameroons, and usually lays its eggs in vegetation growing near, but not on, the bottom. It attains a length of just over 2 in. and is popularly known as the red lyre-tail.

A. filamentum, another species from the Cameroons and, perhaps, further north, is commonly called the plumed lyre-tail. The general appearance of the male is bluish, light to dark, with a sprinkling of red spots and streaky markings over the fins and body, and three or four oblique red bars that extend across the gill-covers to the nape. The caudal and anal fins are full, almost voluminous, and some of the rays in them extend well beyond the membrane and terminate in fine points. In the main

Continued at foot of page 171

Photo: Hadden Aquatic Society

Aphyosemion
australe



Echinodorus grisebachii

by B. WHITESIDE

LIKE the *Sagittaria* species, the genus *Echinodorus* belongs to the plant family *Alismaceae*. In the genus *Echinodorus* we find a relatively large number of species suitable for the tropical aquarium. Coming from swampy bog areas of the American continent, the plants all appreciate some form of feeding at their roots, but even without this, many will do well as submerged aquatics in the home aquarium.

It is perhaps unfortunate that plants of the genus are usually sold by the general dealer under the name of Amazon Sword Plants. Such a broad label covers many species of the genus and to ask for an Amazon Sword Plant is like asking for a rose bush without naming the species or, more commonly, the variety which is wanted. If one wants a specific species of *Echinodorus*, it must be ordered by its botanical name, preferably from a specialist dealer or grower who is sure of the correct name of the plants which he is selling.

Echinodorus grisebachii is one of the smaller sized plants of the group which deserves a place in any aquarium which can supply its needs. In the aquarium the plant's pale green leaves are about 1/2 in. broad and reach a length of about 1 1/2 in., including the petiole which is relatively short. This minute looking little plant can carry many leaves at once and has the added advantage, after settling down in a new aquarium, of producing terrestrial runners which bear chains of baby plants. The terrestrial runners, as opposed to aerial runners, obviate the need for pegging down the plant thus produced on the chain as is necessary with aerial runners. Young plants of *E. grisebachii* root themselves freely into the gravel. A young specimen which I planted in my aquarium some weeks ago, when the photograph was taken (see centre foreground for plant) has, in the past four weeks, produced a chain of five new plants and the runner is still growing. The young plants are progressing well and should eventually form an attractive carpet in the front area of the aquarium. When the plants get larger the runners may be cut and the growing youngsters transplanted to another position or tank after a few days.

Conditions under which I have grown the plant successfully are—temperature 79°F., water pH, 7.3, DH 7°, good CaCO₃, iron with an under gravel filter in use and some feeding supplied with one tablet of a special organic food for aquarium plants pressed into the gravel, near the plant's roots, every three months; lighting 6 hours of 40 watt (tungsten) per day for a 20 in. x 10 in. x 12 in. tank.

Of the commoner *Echinodorus* species available, I find *E. grisebachii* the most useful. It is intermediate in size between the small chain sword, *E. tenellus*, and the larger Amazon sword, *E. paniculatus*, in the tropical aquarium, and is a robust looking little plant. Undemanding in its requirements, *E. grisebachii* can provide a useful carpet of pale green for the front half of the aquarium and at a cost of 2s. 6d. is, I think, very good value in every way.



Echinodorus grisebachii in centre foreground

continued from page 170

Aphyosemion, top of the pops by Jack Hems

these fins are blue, with red and yellow markings. The dorsal is similarly coloured. This species attains about 1 1/4 in. in length and spawns sometimes at the bottom of the water, and sometimes at the top.

A. goetschi or the red fundulus, is remarkable in that its eggs, which are laid in the mulm, take about twenty weeks to hatch out. The male of this species is, generally speaking, mahogany-red above, golden below, and broken blue to blue-green posteriorly, marked with a sprinkling of red spots. The throat is brilliant blue. The gill-covers are blue, adorned with red dots, dashes and short bars. The dorsal and anal fins are orange-red in the base, blue towards the centre, and red, bordered with yellow to white along the margins. The caudal fin is blue, with red stripes in the upper and lower sections, and some additional red, violet and yellow markings in the base and posteriorly. The pectoral and pelvic fins are blue to green. *A. goetschi* hails from the Guinea Coast to the Cameroons and attains a length of about 3 in. In its larger sizes it can be a savage fish, and must always be kept with its own kind.

Not all aphyosemions are readily obtainable, but all the time, as the demand for them grows, and membership of the British Killifish Association (which has done such a lot to commend them to tropical aquarists) increases, more will become available to meet the demand. One thing is certain: the fact that the eggs of aphyosemions can be posted to any address in the world, and hatched after arrival at their destination, makes the keeping of them all the more fascinating and interesting.

our readers

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



write

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

Fish Food Costs

THE letter in September's *Aquarist* by A. Boarder has much to be commended. The prices charged for packet food are far too excessive. While Aquarists are prepared to pay exorbitant prices manufacturers will only be too willing to charge them. I doubt whether the Prices and Incomes Board will help much on this score, as fish keeping is a hobby, and it wouldn't come into the cost of living index. No! What is needed is a lot more shouting from a lot more Aquarists. Club members could put their heads together and discover free sources of natural food, and make such places known to their members. After all 2s. an oz. for dried *Daphnia* when one can scoop it out of a pond alive for nothing, is too much. No doubt we will get the usual tale from the manufacturers about increased costs. Even so we should start something to lower these prices now Mr. Boarder has started let's keep it rolling.

Yours faithfully,
J. A. WHITE,
Southall.

Re Water Measurer

I READ with interest Mr. Boarder's letter in the September issue regarding my article on the Water Measurer in which I said: "unlike the Pond Skater it never ventures below the surface".

I wish to thank Mr. Boarder for drawing attention to this error, for the most that can be said about the Pond Skater (at least going by my own experiments) is that if this quite strong and agile insect is pushed below the surface it is able to force its way back, apparently unharmed in any way. But so great is the difference in build between the two insects that one finds it difficult to imagine the Water Measurer even surviving such an experiment.

Yours Sincerely,
F. WILMOTT,
Shirley, Croydon.

Good Home Required for a little Terrapin

MAY I ask through your magazine, if there is any keeper of Terrapins (red eared variety) who would be willing to take a healthy little fellow of 1 year (weight 3 oz.) who is now on his own? The conditions for these little fellows, as anyone keeping them knows, has to be kept suitable for their welfare. Therefore, O kind Terrapin keeper, if you want another please write: Miss R. COMELY, St. Julians, Coolham, Hooeham, Sussex.

No Andover Aquarists?

HAVING moved to Andover recently I have been surprised to find that there is no aquarist club or society in this area. In fact when I enquired at the local library, I was greeted with dead silence and their mouths opened and shut like fish out of water, and in consequence I have had to write to you.

Cannot a branch be started in this area?

Thank you for any help you may give.

F. J. STRAFFON,
8 Goddard Square,
Cricketers Way,
Andover, Hants.

Disheartening

ON Saturday, September 3rd, I visited an open show staged by one of the oldest aquarium societies in this country. But what I found there was disheartening rather than pleasing. Firstly, not a single tank among the fishes had a label on it giving the common and/or scientific name of its occupant. As for the programme (. . . much thought has gone into its contents . . . the Show Secretary writes in the foreword), this was bad enough to put anybody off joining the society. For instance, 'CYPRINIDAE (BARBS)'. These species belong to the tooth Carps and in many instances are barbled, that is fishes with Barbs, but not all Barbs carry this characteristic. Much has been done to separate them as a group by calling them Pontius.

Under the heading 'CHARACINAE (CHARACINS)'. Characins are another family of carps . . . Followed by ' . . . in size from 1 in. like the Neon Tetra to two feet, like the pilot-type species *Luciocharax Incupatus*'.

Of 'POECILINAE (LIVERWORMERS)'. This section comprises all the liverbearing fishes, that is, fishes producing live fry. This must have caused some cackles. But wait. 'CALLICHTHYIDAE-COBTIDAE. Catfish and Loaches, those species which spend their time at the bottom grovelling around foraging for food.' Be this as it may, 'Loaches vary from eel like coolies to Botta types.' (Extra rations of rice and plenty of P.T. will no doubt make coolies less eel-like.)

'DANIO-TANGCHITIDAE-RASBORA. This group of fishes are commonly known as minnows. . . Fishes in the whole of the groups are easily bred, and are egg scatterers with the exception of the Harlequin and Maculata where the eggs are placed on the underside of a leaf.' (If the harlequin fish and the spotted rasbora are easy to breed it is news to me.)

THE AQUARIST

SCIENTIFIC (RAINBOWS). Quite a small group of fishes, two of which come from Australia, namely Maccullochi and Nigrans. The more spectacular species Ladigei or Cadebes Rainbow, from Madagascar. Presumably the compiler of this rubbishy production was too tired to include the generic names of the fishes in question. As for the Cadebes Rainbow, from Madagascar, I give up. The sort of slipshod behaviour is not doing the hobby any good.

I remain, Yours faithfully,
JACK HEAMS.

Discovery of a new chemical that kills nuisance weeds in Ponds, but harmless to Fish

WILLIAM Hilsenhoff, staff research insect specialist of the University of Wisconsin in the United States, has recently tested a new chemical, called "Diquat". According to test results, "Diquat" kills nuisance weeds in ponds but harmless to fish, insects and other pond animals.

"Diquat" was tested on a 5-acre Wisconsin pond to control the nuisance weed Elodea; its effects on aquatic insects and animals were closely studied.

The new chemical killed all the weeds six days after treatment, except for the bases of those in deep water. The weeds started to discolor two days after the chemical was applied.

"Diquat" had no direct effect on insects, animal and fish in the pond. No dead or abnormal animals were observed on the day of treatment or during the following week. Duck trout remained abundant one month after treatment.

However, the indirect effect of "Diquat" were evident. By destroying the weeds, the chemical also destroyed the habitat of insects. Consequently, this either caused a reduction in their populations or made them migrate to new habitat.

MICHAEL LOMANT,
London, W.5.

Creeping Jenny

WITH reference to the "Tropical Fish-Keeping Queries" in the August issue of *The Aquarist*, on setting up a Tropical Tank a year ago I introduced Creeping Jenny which is still flourishing. The terrestrial form was dark green in colour and not golden yellow. I have managed to change its dark colour however by planting it on the bottom of a 15 in. deep tank under a canopy of flourishing Cabomba, this has caused the internode of the Creeping Jenny to become etiolated and the leaves to become smaller. Its growth has also become retarded and to prevent an annoying film of algae I introduced a pair of red-tailed black sharks. The growth that has occurred though, is minimal (due to the support of the water) producing an over plant. As the coloration is now bright yellow the Creeping Jenny serves to brighten an otherwise dark spot near the Cabomba.

Yours faithfully,
J. TANNEY,
Hanworth,
Feltham, Middx.

Booquet for Llanerch Park Zoo

WHILEST in N. Wales this week on business, I read a letter in *The Aquarist* (September) about Llanerch Park Zoo which, to my mind, was very misinforming.

I am a very keen amateur Tropical Fish hobbyist and also a naturalist of many years standing.

I found the aquariums at Llanerch Park Zoo to be very nice, interestingly set out with about forty-fifty different varieties of fish, and the reptile house, which adjoins it, to be extremely interesting. It contains the only living giant Water Mole Terapin in this country.

The rest of the Zoo is very well laid out amidst pleasant

surroundings and contains a large number of interesting and beautifully kept animals.

I had the chance to talk to the director, Mr. Petris, who tells me he is thinking of setting up a Marine Aquaria in the near future.

In my opinion it is 3/- very well spent to pay a visit to Llanerch Park Zoo!

PETER ISAACS,
9 Bideford Avenue,
Leeds, 8.

Price of Fish Food

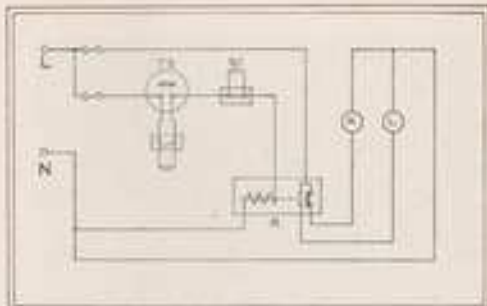
IT was very interesting to hear from Mr. Boarder on the subject of the price of foods—it certainly sounds scandalous. Perhaps you could get a reply from the manufacturers?

Yours faithfully,
M. R. FITZGERALD,
Nr. Bristol, Somerset.

ED: Manufacturers of Fish Foods are of course, welcome to space in these columns for the purpose of replying to their critics.

Electrical Hazard

I HAVE just received my copy of *The Aquarist* for June, in which is an article entitled "Automate your Aquarium". In case your attention has not already been drawn to the fact, I feel I must point out that the diagram of connections reproduced on p. 55 represents a most serious electrical hazard. It should be corrected immediately in the interests of the safety of any reader who wishes to control his aerator and lamps by means of a time switch.



The errors in the diagram are in the connections of the time switch and its associated "override" switch. The object of this override switch is to close the relay coil circuit when the time switch contacts are open. Hence, the override switch must bridge the time switch contacts. The bridging connections have been omitted in the diagram but if they are added, it will be seen that a dead short circuit is immediately created across the mains.

The fundamental error in the diagram is that the time switch contacts are in the neutral lead, thus constituting a violation of the I.E.E. Wiring Regulations.

I have re-drawn the diagram and suggest this should be published in a forthcoming issue.

Yours faithfully,
S. C. BROWN,
Wellington, C.1
New Zealand.

The Junior Aquarist



Rufus

by C. Pearce



FOUR years ago we lost the majority of our fish through the bad winter. Mirror carp, common carp, tench and goldfish, all were encased in ice. The big carp was just beginning to become a firm favourite and my wife tamed it Rufus. She could almost stroke him, he became so tame. They say that all that is lost is not lost and something for the best will turn up. This did happen!

With all the family having a go we drained the two ponds. Excitement grew as the water drained away and a goldfish came to light, then two small carp, followed by two tench. To top the already excited pitch, some twenty-odd baby fish were gradually sifted out of the weeds and mud. Everything was found in the mud but the kitchen sink. Tins, stones, broken boots and even a bicycle pump.

The ponds were duly cleaned and several cracks mended and the plants returned. The remaining fish were separated with the tench in the smaller pond and the carp and the one goldfish in the larger pond. We bought a few more goldfish and fan-tails and by the summer of that year we could at least see a few fish swimming about.

On a fishing excursion I managed to catch a nice-sized tench of about two pounds. He was put in the lower pond. Just a week later one of the local lads brought a polythene bag containing a smashing fish which he had caught. All the family were present as well as a couple of the local fish enthusiasts. An argument followed as to the type of fish he was. It couldn't be a tench because of the two small barbels at the bottom of his mouth. Its bronze colouring and the fins, however, indicated it must be a tench, and that

ended the argument, the fish being put in the bottom pond along with the other tench.

Winter came and the ponds were covered in polythene sheets. A regular watch was kept on ice forming which was drilled and melted with buckets of boiling water stood on the ice. Never once did we hammer the ice for fear of killing the fish. The goldfish seemed to be always around but there was no sign of the tench and only just an occasional glimpse of the carp.

The Spring came and still there was no sign of the tench, and one day my youngest boy, who was only three, was seen tickling the water. "What are you doing Brett?" asked my wife. "Big fish mum, come and watch." The family took up water-tickling and fed the fish on worms, beetles, fresh-water shrimps and the fish began a life of luxury. The big tench took over the name of Rufus and came to anyone who tickled the water and even made a sucking noise to attract attention.

By maintaining a careful watch when I am home and keeping the camera handy, I have managed to catch some interesting pictures of the tortoise, Rufus and the cat all taking an interest in each other.

On one occasion a cat took a drink from the pond. Rufus must have thought it was his curtain call and gave a terrific sucking noise right under the cat's nose. Boy! Every hair on the cat's back stood up as it stood petrified on the spot.

Since Rufus has become tame all the other fish are gradually following his example. Now, when a hand is placed in the water all the fish in turn will swim through and around the fingers.

Anyone who comes to the house for the first time must stroke Rufus. Susan my eldest daughter, lets Rufus swim and jump over her hand and spends more time with him than most of us.

The taming of the turtle

by Rémy, Tiny, and Frédérique Ganté



The daughter Frédérique (18) with the baby turtle.



A diver plays with the turtle that has now grown up and been set free.

ONE day when we were big game fishing off Malindi, Kenya, two years ago, we came across a tiny turtle floating in the middle of the big blue sea. Its eyes were still closed and it was so small it could not dive. Blind and so fragile, how had it managed to swim so far from the beach where it had hatched? A group of sharp-billed hungry gulls was hovering over it, so we took it aboard our Zodiac boat and brought it to the Turtle Bay fish sanctuary where it was given a basin to itself and fed on raw oysters. Every day it was taken out to sea for an hour's swim so as not to lose contact with its natural element. All its behaviour, its progress, its reactions to human interference were carefully noted and photographed.

When we returned to France two weeks later, it would feed from your hand and you could finger it without frightening it.

On returning to Kenya the following winter, we went to pay a visit to our turtle. It had been freed at the age when it is customarily admitted that a turtle is mature enough to fend for itself and lead its own life. But it has not disappeared for that. It seems to keep to the playgrounds of its childhood and if you go swimming at Turtle Bay, you are very likely to meet it. It is quite tame and if you catch hold of it, it will willingly give you a tow over the coral gardens.

continued from page 161

Around the aquariums

by Mike Sheedy

searching he imprisoned the queen bee in the box and this caused her followers to leave the cage and depart from the zoo.

★ ★ ★

Mr. Jack Fearnley has been appointed General Manager at Belle Vue Zoo, Manchester. Mr. Fearnley was transferred in 1945 from St. Helens to the Broughton Rangers club who played at Belle Vue. The transfer perks included a job and a house at Belle Vue.

Apart from looking after the animals at Belle Vue, Mr. Fearnley has done most of the jobs at Belle Vue. He has been its business development manager, advertising chief and entertainment boss. As entertainments manager he was responsible for bringing pop groups like the Rolling Stones and Freddie and the Dreamers to Belle Vue. He also began negotiations which brought the Moscow State

Circus to Belle Vue and also set up Gigli's last performance in England.

★ ★ ★

Creating a paradise for a family of coral fish set a problem for Keeper Alf Elliot in the Zoo's Aquarium. For not only do these lovely tropical fish live in sea water it is also sea water that must not drop lower in temperature than 75°F.

Now the family of coral fish are settling down happily, thanks to sea water provided by salt grains. The water is heated and constantly filtered through a high efficiency pump. The new fish have a sweet tooth for water fleas from the Zoo lake, but they like their fleas alive and as the salt kills the fleas the supply has to be renewed four times daily.

continued from page 157

Cichlasoma festivum

by Jack Hems

With regard to food, *C. festivum* eats almost anything, but as it is essentially a carnivorous species, a good measure of natural live food (gnat larvae, tiny crustaceans, and the like), and suitable substitutes for live food (shredded lean beef or shredded washed liver), should be included in its diet.

Although the flag cichlid in its smaller sizes is non-aggressive, and even in its larger sizes is unlikely to attack any companions too bulky to be seized and chewed up as food, it is always advisable (for its own sake) to give it a tank to itself—a thickly planted tank in which it can live its life without fear of molestation or disturbance.

The flag cichlid is not a ready breeder, but when it does decide to raise a family, the male uses his lips (and his pectoral fins) to clear away every particle of dirt from a smooth flat surface. A large pebble is a favourite spawning site, but it is not uncommon for a female to deposit her sticky eggs on a sturdy leaf of a broad-leafed plant. After spawning is over, the parent fish (if they are good parents) keep the water moving about the eggs by fanning movements of the tail and fins.

At a temperature in the low to middle eighties (°F), the fry hatch in about four days. They become free-swimming a few days later. The fry should be fed first on such things as large infusorians or brine shrimps followed, as their bodies increase in size, by tiny *Daphnia*, Grindal worms, pulverized flake food and anything else small



enough to be swallowed. When the parent fish lose interest in their offspring it is time to separate them that is to say remove the young fish to another tank for growing on. In those cases where parent fish persist in eating their eggs and/or fry, the only thing to do is to remove the eggs from the breeding tank and hatch them elsewhere. Given plenty of space for development, the fry should attain a length of 3in. in about a year.

Book review

Studies of reproduction in fishes, by C. M. Breder Jr. and D. E. Rosen. Natural History Press, New York. 776 pages, 50 cents. 1966.

In this monumental volume of over 900 pages, written by two of the world's foremost ichthyologists, all aspects of reproduction in fishes and fishlike vertebrates are examined. 675 of these pages are dense-packed informative text with supplementary charts of the reproductive habits of the fishes mentioned in the body of the work, followed by 235 pages of surely the most comprehensive bibliography ever to be presented regarding one field of study.

With this in mind it will be apparent that a good deal of the information will be of scant interest to most aquarists, and at a price which translates as something like six guineas the book may be prohibitively expensive. Such is the breadth of coverage and depth of scholarship however that it must rise to pre-eminence as the standard reference work to the serious student.

Besides the authors' own work there is collated for the first time all available information on such topics as:

"Breeding season, breeding sites, secondary sexual characters, sex discrimination, competition for mates, monogamy, mating, and parental care." It deals lavishly under these headings with the Characidae, Cyprinidae,

Cyprinodontidae, Poeciliidae, Cichlidae and Anabantidae, etc.

A minor criticism is that the authors, strangely, do not seem fully to have incorporated the results of Drs. Rosen and Bailey's work on the Poeciliidae*. On at least two occasions both *Lebistes* and *Mollisoma* are given full generic status just 3 years after Rosen and Bailey had relegated the former to subgeneric level within the genus *Poecilia* and the latter to complete synonymy with *Poecilia*.

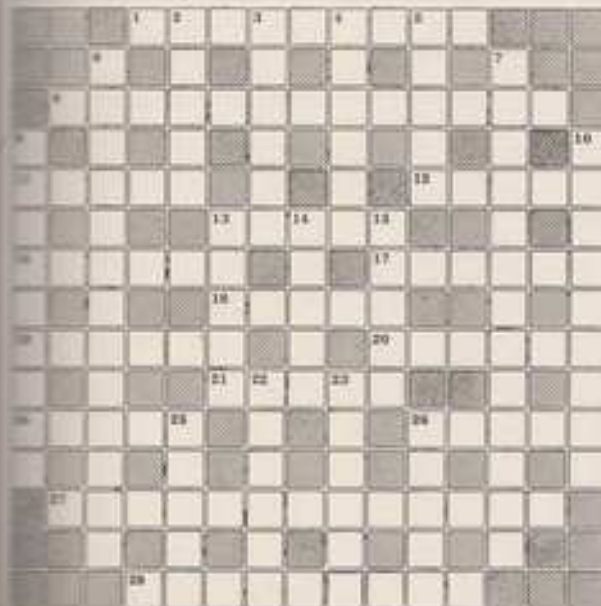
This aside, the aquarist who would wish to make a detailed study of the reproductive habits of his fish would do well to get hold of a copy of this book and to ascertain the schemes of observation, criteria and techniques which are accepted as standard in this type of research. As the authors point out, there is still a great amount which could be added to our knowledge by the informed amateur.

Societies could do no better than to put this book on their library lists; perhaps other aquarists could put judicious pressure on their local libraries towards the acquisition of what must be the most significant work on the subject to appear for many years.

Review by STEPHEN F. LANGTON.

* Rosen D. E. & Bailey R. H.: Bull. American Mus. Nat. Hist. Vol. 126 Art. 1, 1961.

The AQUARIST Crossword Compiled by L. BRADLEY



CLUES ACROSS

1. *Eleuthero* (8, 5).
2. They surround our island home (7, 4).
3. Spoken in Switzerland when the French create a noise (5).
4. The strips by which I get into a heavenly body (5).
5. Not a very warm haired fellow Jack (5).
6. Instrument with which a joiner makes chips? (6).
7. Greeting a monarch who takes his recreation this way (6).
8. Seen in the mirror (3).
9. Keeps the angers pool warm (8).
10. Edge (5).
11. There is a bone in the centre of this body of men (7).
12. Construct a zoo to the north east to get air of a stimulating nature (5).
13. Flag of sea it protects the incumbent (3).
14. The letter with a broken love affair? (4, 3).
15. I've lost out (anag.) (5).

CLUES DOWN

1. Returning to his hair the artist causes sparks to fly (3).
2. One who takes the *Aquarist* perhaps (6).
3. Are horses spurred on by these (4).
4. Is an abuser for building on (3).
5. Would the furrow-cutter produce fishy furrows if she passed into these (4, 5).
6. Have the go-kart (anag.) (4, 3).
7. Coloured loach giving rise to cold-water fish (3).
8. Its larva is a notorious enemy to fry (4, 3).
9. Moves busily about (5).
10. A giraffe-like animal which is all right to start with (5).
11. Malicious subject developed with varnish (5).
12. Sweet again in Hollywood (4).
13. Tiger (6).
14. Put up (3).
15. Harsh way of describing part of the boat (5).

Solution on page 180

F. Brown (Bristol A.S.), A.O.V. Litchester; 1, J. R. Wheeler (Trowbridge A.S.); 2, G. H. Jennings (Hampton A.S.); Breeders' Egg-layers: 1, J. Burgess (Newport A.S.); 2, F. Brown (Bristol A.S.); 3, R. Harris (Newport A.S.); 4, B. J. Main (Newport A.S.); Breeders' Livebearers: 1, J. B. Wheeler (Trowbridge A.S.); 2, P. G. James (Newport A.S.); 3, M. Wheeler (Trowbridge A.S.); 4, F. Brown (Bristol A.S.); Plants: 1, F. G. James (Newport A.S.); 2, A. Payne (Independent exhibitor); 3, A. G. W. Pemberton (Newport A.S.); Goldfish varieties: 1 and 2, G. Cox (Trowbridge A.S.); 3, B. Light (Bury A.S.); 4, C. Pearce (Trowbridge A.S.); A.O.V. Goldfishers: 1 and 2, B. Light (Bury A.S.); 3 and 4, C. Pearce (Trowbridge A.S.); Native Fishes: 1, 3 and 4, Miss P. Blackwood (Marine Study Aquatic Society of Gt. Britain); 2 and 5, G. H. Jennings (Marine Study Aquatic Society of Gt. Britain); Parrotfish Aquaria: 1, F. G. James (Newport A.S.); 2, N. Newman (Newport A.S.); 3, T. G. Webb (Newport A.S.); Junior classes: (A) A.V. Egg-layer; 1 and 2, Master Nigel John (Newport A.S.); 3, Clive Pemberton (Newport A.S.); 4, Master David Hodge (Independent exhibitor); (B) A.V. Livebearer: 1, 2, 3 and 4, Master Clive Pemberton (Newport A.S.).

INFORMATION and entertainment were provided in masterly style by Jim Kelly talking about his tour of America at a recent meeting of the Warrington A.S. Club sociale is very high and attendance at meetings have never been better. In recent months displays of fish to the total of 14 tanks have been set up in local horticultural shows. Recent discussions in committee have increasingly turned to the question of "food raising" and the secretary, Ron Trench, 289 Manchester Road, Warrington (Telephone 31635) would be pleased to hear of any new ideas.

At the Thomas Board's annual horticultural show the results of the Parrotfish Aquaria competition were as follows: 1, Patie Norris and Ken Daniels (a later effort); 2, Mr and Mrs. B. Worrall; 3, Mr and Mrs. G. Hall. Other tanks were set up by Mr and Mrs. B. Bewick, Mr. Jim Higham, Ron Trench and Ted Clarke, Vic Hill, Kim and Malcolm Nadin, and the committee has decided to award a letter of commendation to each participant in recognition of their fine efforts. Members are looking forward to a Hot Pot supper in November and December and with tickets limited to 150. Early booking will be necessary.

THE Independent A.S. recently commenced its programme for the current season which will include lectures on Egg-layering, Tooth Carps, Salt Water Aquaria, raising Fish Fry, unusual Livebearers and a film on the breeding of Angels. There will also be various table shows, between both club members and other clubs. The Independent A.S. which is an active member of the North West London Group of Aquaria Societies, holds its meetings weekly on Monday evenings at Montrose School, Hornsey Road (corner of Hornsey Road and Seven Sisters Road, N.4). New members are always welcome whether beginners or established fishkeepers.

THE activities of Gosport and District A.S. for September included a shopping expedition to Chiswick, where most members were delighted by the beautiful display of marine fishes for sale, and many resolutions were made to save regularly in order to enter this branch of the hobbying hobby. The afternoon was spent visiting some of the interesting nurseries in London. Mr. Brown of Salisbury Green led the monthly table show results which were as follows: Characins: 1, Master Fernan; 2, Mr. Pullington; A.V. Sovereigns: 1, Mr. Clough; 2, Mr. Pullington; Goldfish: Master Rive.

THE Hastings and Heshill A.S. has designed its programme this year to take the beginner step by step through the various stages towards achieving every aquarist's ambition, a healthy balanced aquarium. Be let the subjects dealt with have been—Giving your own tank, setting

up your tank, plans for your aquarium, choice of suitable fish for your aquarium, and at the meeting on the 26th September the subject was "Feeding your Fishes."

First Mr. P. Martin gave an interesting talk on collecting one's own live food from local ponds, and brought along many samples of the kind of minute life which may be found in almost any natural pond. Then Mr. A. McCann spoke on cultivating foods for young fish, and brought along his own cultures for members to examine; these included micro-worms, goldfishworms and white-worms. Finally, Mr. P. Silver gave members a few words of advice on dried foods and the necessity to avoid the monotonous "your fishes" diet. He brought along a special mixture of his own which he had found popular with his own fishes, and members were able to purchase small packets to try for themselves.

Also included in the programme was a Ladies' table show. After announcing the winners the judge, Mr. Silver, went on to explain just why they had won and briefly pointed out the good and bad points of each of the fish shown. Dorothea present had an enjoyable and instructive evening.

A visit was made to Crawley College A.S. by Brighton and Hove A.S. recently for an inter-club contest. The judging was done by Mr. J. Stuart, F.R.A.S., and the results were as follows: 1, Mr. M. Lewis (Crawley) 93 points; 2, Mrs. J. H. Partridge (Crawley) 82 points; 3, Mrs. J. H. Partridge (Crawley) 81 points. The final points were Crawley 1244 and Brighton 1231.

THE results of the Nottingham and District A.S. open show were as follows: Tropical Fish—Fighters (male): 1, A. Mason; Fighters (female): 1, P. Reynolds. Thick-lipped Gourami: 1, R. J. Acton; Dwarf Gourami: 1, J. H. Dennis; Leryi Gourami: 1, D. Batters; Characins: 1, K. Riley; A.O.S. Gourami: 1, W. Parkin; A.O.S. Anabantid: 1, F. Underwood; Barbos Aquaria: 1, K. Hallam; Barbos Royce: 1, K. Riley; Barbos Cameron: 1, A. Saxon; Barbos Niger: 1, G. Hodgkinson; Barbos Chalcis: 1, A. Sanderson; Barbos Tiger: 1, K. Riley; Barbos A.O.S. Dwarf: 1, L. McCourt; Barbos A.O.S. Large: 1, D. Bennett; Red Tail Shark: 1, P. Reynolds; Black Shark: 1, W. Parkin; Silver Shark: 1, Master G. Rich; Characins (Plants): 1, A. Mason; Characins (Glow-light): 1, A. Hill; Characins (New): 1, P. Saunders; Characina (Root Taxis): 1, S. Hill; Characins (Bleeding Heart): 1, J. H. Dennis; Black Lined Tetra: 1, A. Mason; Black Surge: 1, J. H. Dennis; Black Cardinal: 1, J. H. Dennis; Hemimarginatus Species: 1, A. Hill; Black Willow: 1, B. C. Dutton; Purgine: 1, H. W. Hughes; Pristella: 1, C. A. Hill; Nan. Anabantid: 1, A. T. Gaskell; Nan. Margaratus: 1, A. T. Gaskell; Mottosm Species: 1, W. Taylor; A.O.S. Characin: 1, H. W. Hughes; Headstander: 1, E. Peize; Anemonefish Anemonefish: 1, C. E. Mason; Green Swordtail: 1, J. D. Turner; Red Swordtail: 1, K. W. Searle; A.O.V. Swordtail: 1, J. H. Dennis; Moon Flay: 1, J. H. Dennis; Wapal Flay: 1, A. Bradley; Variegated Flay: 1, C. P. Rich; Yellow M-Dy: 1, K. Hallam; A.O.S. Mottosm: 1, K. V. Smiles; Dapper Goldfish: 1, H. W. Hughes; Grey Goldfish: 1, A. Baker; A.O.S. Livebearer: 1, P. Reynolds; Zebra: 1, E. Gregory; Giant Danio: 1, K. Hallam; White Cloud: 1, F. B. Rogers; Harlequin: 1, J. H. Dennis; Silverfish: 1, P. Gregory; A.O.S. Barbos: 1, J. H. Dennis; Anemonefish Species: 1, J. H. Dennis (Best Fish in Show); Chthonoma Species: 1, B. J. Serrinow; Aquarist Species: 1, A. Sanderson; Angels: 1, J. H. Dennis; Jewel: 1, C. A. Hill; Cichlid under 3 inches: 1, A. Mason; Cichlid over 3 inches: 1, P. Miller; Apistogramma: 1, K. H. Lewis; Micropterus: 1, K. Riley; Kribia: 1, K. R. Lewis; Top-Minor A.O.S.: 1, B. J. Serrinow; Bronze Cat: 1, E. Leggett; Spotted Cat: 1, T. Palmer; Peppered Cat: 1, C. A. Hill; Corydoras A.O.S.: 1, K. Witherburn; Cornish A.O.S.: 1, G. Hodgkinson; Kribi Loach: 1, K. Heringway; Goldfish: 1, K. Heringway; Rainbow: 1, Master M. Ham-

mett; Tropical fish A.O.S.: 1, L. McCourt; Fairy Gourami: 1, E. Peize; Fairy Barb: 1, F. C. Smith; Fairy Characina: 1, W. Parkin; Fairy Cichlid: 1, C. O. Hammett; Fairy Livebearer: 1, K. Heringway; Breeder's Livebearer: 1, J. H. Dennis; Breeder's Egg-layer: 1, K. Witherburn; Goldwater Fish, Goldfish: 1, C. Hill; London Showman: 1, Master D. Board (Best Tame Story); Striped Shorthead: 1, L. G. Emery (Best Goldwater); Scaled Plant: 1, H. T. Jago; Calico of Veldin: 1, L. Emery; Oranda: 1, C. Hill; Orle: 1, C. Hill; Roud: 1, C. Hill; Tanch: 1, Miss A. Hill; A.O.S. Goldwater: 1, L. G. Emery; Breeder's Goldwater: 1, L. G. Emery (Best Breeder); Parrotfish Aquaria Tropical: 1, P. Reynolds (Best Parrotfish Tropical Aquaria); Parrotfish Goldwater Aquaria: 1, G. Farr (Best Goldwater Parrotfish Aquaria); Plants: 1, P. S. Moorhouse; Marine Goldwater: 1, G. H. Jennings.

THE results of the Members Show of the Bradford and District A.S. were as follows: Livebearers: 1, D. Parkin; 2, Mrs. Brown; 3, C. Holdsworth; Labeonids: 1, B. Shepherd; 2, C. Holdsworth; 3, P. Moorhouse; Fishes: 1, C. Brown; 2, Mrs. M. Firth; Barbos: 1, A. Firth; 2, C. Holdsworth; 3, R. Trench; Characins: 1, Mrs. M. Firth; 2, Master G. Cox; 3, W. Bates; Cichlids: 1, Mrs. M. Firth; 2, R. Warren; 3, B. Berlin; Carps and Minnows: 1 and 2, D. Carr; 2, J. Hodgkinson; A.O.V. 1 and 2, C. Holdsworth; 3, Master Hodge; Breeder's Livebearers: 1, R. Margard; 2, Mrs. M. Firth; 3, Mr. Kennedy; Breeder's Egg-layer: 1, A. Firth; 2, B. Shepherd; 3, P. Moorhouse; Goldfish: 1 and 2, L. Brock; 3, R. Witherburn; Plants: 1 and 2, R. Witherburn; 2, Mrs. L. Hardy; Best Fish in Show: Mr. C. Holdsworth.

SEVEN new members were enrolled by Maresfield A.S. recently after this interesting society had distributed some special rates letters to the Liverpool show. The subject of the letter was the work and object of Aquaria Societies. A fine response to an excellent idea.

On the 31st October a film will be shown, "The River of Life" in Eastmancolor, from the Rank Organisation. This is a wonderful film and a hearty welcome is extended to the neighbouring counties. The secretary of Maresfield A.S. is Mr. Robert Moorcraft, 34 Princes Road, Liverpool, 4.

SECRETARY CHANGE
Widnesbury A.S.: Mr. B. Coley, 55 William Green Road, Widnesbury, Staffs.

Crossword Solution

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

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Now read on and see what YOU wrote

"Thank you for the free-sample of Freeze-Dried Tubifex. All that I can say is that this food is really good. Within one minute of placing the Tubifex against the glass all my fish were pulling pieces off . . . I have two Brown Discus which liked it very much . . . I must say my fish really enjoyed it . . . I was delighted to see my fish relish this new food. My Veiltail Guppies especially liked it, and some young fry, less than a month old, ate it heartily. I shall be buying it regularly . . . I received your free sample of Freeze-Dried Tubifex, they are very good . . . I received your sample this morning and was so pleased with the way in which it was eaten by my fish that I went straight away to get some . . . An amazing product, my fish came from all directions when the first piece of sample was stuck on the glass . . . I would like to state that after trying only a sample of this new food I am of the opinion it is every bit as good as reported to be and will surely be especially beneficial during Winter when supplies of live foods are scarce. It was most amusing to watch how cautiously the fish approached it at first and then quickly devoured it. And the following evening they kept hovering around the place where it had been put before! . . . My findings were that the majority of fish just drool over it."

We could continue to extol the virtues of this remarkable food, but we feel that you've already done it for us so much more eloquently, and we therefore confine ourselves to just one suggestion. If you haven't yet tried MIRACLE FREEZE-DRIED TUBIFEX for your fish, we suggest that you go along to your Dealer and buy a 5-gram pack in the screw-top plastic container. (Be sure to specify MIRACLE FREEZE-DRIED TUBIFEX as it is the only one to which all the above comments refer). You'll be amazed at the results—and the price.

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THERMOSTATS

Ex Ex "Minor"	12-4
Ex Ex "Major"	15-0
Ex Ex "Maximal"	20-4

THERMOMETERS

Ex Ex Dumpy	6-4
Floating Spire	2-4
Standard Spire	3-0
Isomax Spire	3-0
Spire Dumpy Rings	4

AIR PUMPS

Jeco Mini	1-1-0
Jeco Silent	1-10-0
Footrose Major	1-1-0
Footrose Major	1-4-0
Zeebeko Super	2-14-0

PISTON PUMPS

Hylo "B"	5-7-4
Hylo "A"	4-10-0
Hylo "B"	3-5-0
Hylo "C"	12-10-0

AIR PUMP

Accessories	
Tubing clamps	1-3
Clear plastic tubing per ft.	3
Raff rubber tubing per ft.	4
Diffuser screen 10"	5
" " 12"	6
" " 15"	8
Cylindrical diffuser screen	1-4
HyFo gang valve	3-3
HyFo regulator	4-0
Airtone valve	2-3

AIR PUMP

Spares	
Jeco Mini diaphragms	1-4
Jeco Silent diaphragms	1-4
Footrose Major diaphragms	1-4
Footrose Major diaphragms	1-4
Zeebeko Super diaphragms	2-9

RUBBER SUCKERS

Koob Type	3
Double sided	8

FILTERS

Hylo Jar	3-0
Hylo De Luxe	12-4
Cire Well Subtle Up	25-0
Sim. Jar, external	17-4

FILTRATION

Accessories	
Datum glass seal	1-3
Datum glass alk.	1-3
Datum filter carbon	1-3

CLEANING EQUIPMENT

Windmill Air Rejuvenator	10-0
Windmill Hand Rejuvenator	13-0
Aqua Vet Standard (Batons)	40-0
Spore bags (3)	4-0
Fish Tail siphon	1-0
Automatic Fish Tail siphon	4-0
Rubber Tubing for siphon- ing, per ft.	4
Aluminium siphon strainers	2-3
Secatongs	4-4

NETS

Oblong Aquarium Nets, Green Nylon	
Mesh	
2' x 2'	1-2
2' x 3'	1-4
3' x 6'	2-3
3' x 9'	4-4
White Dacron	
2' x 2'	3-9
2' diameter Green Nylon	1-0
Daphnia Nets, 12" dia.	18-0

Breeders Nets, Nylon cord net- ting and varnished wooden handles	
4' x 5' Handles 5"	15-0
7' x 8' Handles 5"	21-4
7' x 8' Handles 10"	24-4

BREEDING TRAPS

Growth Saver concentrate 28-4	
Hylo Fish Breeder, Fine and Coarse	7-0

MISCELLANEOUS

Arborea Aquarium Potty	
1 lb. tin, Green or Cream	2-0
Aquarium sealer (Black)	1-0
Crystal sealer (Green)	1-0

TANK BACKINGS

Aquarium, 16" x 11"	14-4
Rocks and Caves, 14" x 9"	13-0
Shipwreck, 16" x 9"	14-4

FEEDING EQUIPMENT

Floating Dry Feeder	1-0
Worms Alive automatic feeder	8-0

COLORMETER PH

Ft. Testing Kit	37-4
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DUROGNOST

Water hardness testing kit 17-4	
Spore tablets (in 10s)	1-0
Strength No. 1	1-0

FISH FOODS

Wardleys	
Guppy fare	1-2 & 2-3
Salmon Eggs	1-2 & 2-3
Liver Meal	1-2 & 2-3
Red Meal	1-2 & 2-3
Fish Meal	1-2 & 2-3
Crab Meal	1-2 & 2-3
Molly fare	1-4

Other Types	
Dried Daphnia	4 & 1-4
Acis Eggs	5
Dried Fleas	5
Hylo concentrated Goldfish food	1-0 & 2-0
Hylo medium blocks	1-0

FRY FOODS

Brine Shrimp Eggs	1-4
Hardened Fry Food	2-4
Liquifry No. 1 (Egglayers)	2-4
Liquifry No. 2 (Livebearers)	2-4
Starogrow Fry Food	1-4

REMEDIES

Malavid	3-4
Oxycan Aquarium Salt	1-3
Wardley's Pump Food	7-4
Clorox (Clears Algae)	2-10 & 13-4

PLANT

Accessories	
Plant Growing Compound	1-4
Flora Fide	4-4
Planting Socks	1-9

AQUATIC

Literature	
Dickfield Little Wonders All at 9d. each	
Garden Pond Construction	
Tropical Fishkeeping	
Goldfish	
Complete Aquarium	
Stocking Garden Pools	
Tropical Aquarium for Beginners	
Soft Cover Books	
Tropical Fishes	2-6
The Goldfish	3-4
Live Foods for Aquarium Fishes	2-0
Garden Ponds	1-4
The Aquarium	3-0
Goldfish for the Novice	2-0

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continued on page six

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Line Regal—25, 40, 60, 75, 100, 120, 150, 200w. 9 4	BOW FRONTED BOOKCASE SETS	Super Summit ... £1 5 0	Neoprene filter carbon ... £ 2	Windmill combined breeding and rearing ... £ 4
Ex Ex Flexible—100w. only 19 4	36 x 15 x 12 in. £19 17 4	Plumrose Floor ... £1 9 0	Datum glass wool ... £ 2	Hydra 3-in-1 ... £ 0
Elephant—25, 40, 50, 60, 75, 100, 150, 150w. 10 4	48 x 15 x 10 in. £21 0 0	Plumrose Floor ... £1 9 0	Datum filter carbon ... £ 2	Baltic 3-in-1 ... £ 0
Rena—25, 50, 75, 100, 150, 200w. 10 9	BOW FRONTED PLAIN STANDS	Mini Pump ... £1 7 0	Datum Air, pac. ... £ 4	Grown Sweet Amari ... £ 0
	24 x 12 x 12 in. £13 10 0	Fairy Pump ... £2 5 0	Nylon filter medium ... £ 2	Hydra fish breeders, box and coarse ... £ 0
COMBINED HEATER & THERMOSTAT	30 x 15 x 12 in. £15 0 0	Star ... £2 0 0	Starayl ... £ 2	
Ex Ex Dial-O-Matic—100, 150w. £2 1 4	36 x 15 x 12 in. £16 0 0	Jar, Zoobako ... £2 3 0	Datum Filter Pads ... £ 4	AQUAMASTIC
Ex Ex Fresco-Matic—50, 100, 150w. £1 4 10	48 x 15 x 10 in. £21 0 0	Zoobako ... £2 14 0		1 lb. tin 2/8 plus p. & p. 2/6
Interpet Submersible—100, 125, 150w. £1 13 4	TWO TIER STANDS	Ilansa ... £2 9 0	CLEANING EQUIPMENT	2 lb. tin 3/9 plus p. & p. 3/-
	18 x 10 x 36 in. £1 17 4	Rena 100 ... £2 10 0	Windmill Air Receptor ... £ 0	4 lb. tin 4/- plus p. & p. 4/4
THERMOSTATS	18 x 12 x 36 in. £2 2 4		Windmill Hand Receptor ... £ 0	7 lb. tin 5/6 plus p. & p. 5/-
Line Popular ... £9 0	24 x 12 x 36 in. £2 7 0	AIR PUMP ACCESSORIES	Agua Vac Standard (Battery) ... £4 8	14 lb. tin 7/6 plus p. & p. 9/-
Line Pop/Neon ... £2 4	30 x 12 x 36 in. £2 15 0	Nylon slings ... £ 0	Agua Vac Super (Battery) ... £6 0	DUROGNOST
Line Inside Control ... £2 0	30 x 15 x 36 in. £2 5 4	Tubing clamps ... £ 0	Spare bags 5 for ... £ 0	Water hardness testing kit ... £ 0
Line Outside Control ... £2 0	36 x 12 x 36 in. £2 10 0	T-pieces ... £ 0	Windmill Hand Receptor spare bags ... £ 0	Spare tablets Pils. of 10 Strength N.F. or N.S. 1/-
Line Comet Top ... £3 0	48 x 12 x 36 in. £4 5 0	2-way pieces ... £ 0	Windmill Hand Receptor spare bags ... £ 0	Inducers each ... £ 0
Line Comet Top Neon ... £7 4	48 x 15 x 36 in. £5 0 0	Small oblong diffuser stone ... £ 0	Windmill Hand Receptor spare bulb ... £ 0	COLORMETER PH
Ex Ex Minor ... £0 0	VICTOR ALL OVER SHADES	Diffuser stone 12 in. ... £ 0	Windmill Rubber ... £ 0	Ph. testing kit ... £ 4
Ex Ex Major ... £5 0	18 x 10 in. ... £1 2 4	12 in. ... £ 0	Windmill Blade Algae Scraper ... £ 0	MISCELLANEOUS
Ex Ex Sentinel ... £4 4	18 x 12 in. ... £1 5 0	24 in. ... £ 0	Hydro 3-in-1 scraper ... £ 0	Hydra Aqua Sealer ... £ 0
Elephant Standard ... £10 0	24 x 12 in. ... £1 7 4	P.V.C. flexible non-toxic air tubing ... £ 0	Woodmill Automatic Syphon ... £ 0	Hydra Leak Sealer ... £ 0
Elephant Key Set ... £12 0	30 x 12 in. ... £1 13 4	per ft. ... £ 0	Windmill Fishkill ... £ 0	Acosero ... £ 0
Rena Top/Control ... £10 4	30 x 15 in. ... £1 17 4	Rubber air tubing ... £ 0	Scrapers ... £ 0	OTHER FISH FOODS
Rena Top/Control with Neon ... £22 4	36 x 12 in. ... £2 0 0	P.V.C. air tubing ... £ 0	Aluminum Algae Scraper ... £ 0	Cherry Pie ... £ 4
Wind ... £16, 12 4, 18 4	36 x 15 in. ... £2 5 4	60 ft. coil ... £ 4	Hydro 3-in-1 scraper ... £ 0	Wheat Germ Flakes ... £ 3
	48 x 12 in. ... £2 12 4	Hydra gang valves ... £ 0	Syphon ... £ 0	Shrimp Fleck, Medium ... £ 2
	48 x 15 in. ... £2 3 4	Air Line Valves ... £ 0	Windmill Fishkill ... £ 0	Shrimp Fleck, Large ... £ 2
OUTSIDE FITTING THERMOSTATS	ARBE PLASTIC AQUARIUMS	AIR PUMP SPARE PARTS	Rubber tubing per ft. syphon per ft. ... £ 0	Turtle Food, Small ... £ 1
Springfield ... £1 5 0	Row frontal ... £8 0 0	Fairy Diaphragms ... £ 2	Windmill Dia Tube 12 in. ... £ 0	Turtle Food, Large ... £ 2
Constat Q.R./Neon ... £1 5 0	18 x 12 x 11 in. £8 0 0	Fairy Air Chambers ... £ 0	Hydro take-away sediment remover 12 in. ... £ 3	Infusoria Powder ... £ 4
Constat J.L./Neon up to 1,000w. ... £1 14 0	23 x 12 x 11 in. £9 17 4	Zoobako Diaphragms ... £ 0	15 in. ... £ 0	Infusoria Tablets ... £ 0
Sik-Stat ... £1 2 0	24 x 15 x 12 in. £12 17 0	Bito Diaphragms ... £ 0	Seas Temp ... £ 0	Conditioning Goldfish Food Large ... £ 0
	36 x 12 x 14 in. £14 19 0	Ilansa ... £ 0	Planting Socks ... £ 0	Conditioning Goldfish Natural, Large ... £ 1
	36 x 15 x 14 in. £22 10 0	Rena Diaphragms 2 for ... £ 0	HEATER HOLDERS	Glow Tablets (20 tabs) ... £ 0
THERMOMETERS	FANTASY GRAVEL	Summit Diaphragms 6d. ... £ 0	Windmill Heater Holder ... £ 0	Treat Packs (7 different foods) ... £ 0
Ex Ex Dummy ... £ 4 4	Mottled Lavender ... £ 0	RUBBER SUCKERS	Heater Bracket ... £ 0	Liquid smell fry Live-beaters ... £ 0
Hydra Spirit Thermometer ... £ 0 0	Mottled Green, Mottled Red, Mottled Primrose, Mottled Blue, Glass ... £ 0	Knob type ... £ 0	One Glo-Glo Heavy ... £ 0	Baby Food Eggsavers ... £ 0
Rising Spirit ... £ 0 4	Black, Matt White ... £ 0	Blank type ... £ 0	Miracle Shrimp Packs ... £ 0	Miracle Food, Dried Worms ... £ 0
One Blue One ... £ 0 8	2/- per 1 lb. s. & p. 2/4	Double ended ... £ 0		
One Petropack Back Mercury ... £ 0 3		Hydra Plastic ... £ 0		
Spare Dummy Rings ... £ 0 4				

ESTIMATED POSTAL CHARGES AT APPROX.

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HARD COVER AQUATIC BOOKS		FEEDING ACCESSORIES		FISH FOODS	
Illustrated Dictionary of Tropical Fishes (Frer)	10 0	Windmill Feeding	1 8	Broken Tropical Fish Food	1/4, 2/4, 10/-, 17/4
Encyclopedia of Tropical Fish (Astrand)	45 0	Windmill Feeding Dry	1 8	Broken Bro-Vit	6/-, 1/4
Essential Aquarium Fishes (Innes)	55 0	Food Feeder	1 0	Broken Food Fish Food	1 0
Tropical Fish as a Hobby (Assind)	35 0	Windmill Feeding Live	1 8	Hydrolytic Tropical Fish Food	1/4, 2/4, 5/-, 4/4, 13/4
How to keep and breed Tropical Fish (Dr. Emmerson)	40 0	worm feeder	1 8	Sungrow	1/4, 2/4
Seawater Aquarium Fishes (Astrand)	45 0	Windmill Feeding Live	1 8	Datum Dried Daphnia	1/4
All About Tropical Fish (McInerney)	75 0	and dry feeder	2 0	Datum Shrimp	2 6
Color Guide to Tropical Fish (Astrand)	45 0	floating dry feeders	2 0	Datum Ant Eggs	6/-, 1/-
Fishes in Colour (Gwynne Myers)	12 0	floating worm and dry	1 8	Datum Pond Fish Food	1 4
Exotic Tropical Fishes (Lance Leaf)	150 0	feeders	1 8	Essic Flakes	1 0
Exotic Tropical Fishes (Bound Cover)	34 0	Hydro Sponges-one feeder	1 8	Hydro Natural Flakes	1 0
Freshwater Fishes of the World	27 0	Small 1/8	2 0	Hydro Shrimpsmeal	1 0
A Manual of Aquatic Plants (Row)	24 0	Uno 1/8	1 8	Hydro Dried Flies	2 0
Tropical Fish in Your Home	35 0	Uno stock on square	1 8	Hobby Fish Food	2/-, 2/-
Aquarium Plants (De-Wit)	35 0	floating dry feeder square	1 8	Hobby Leaf green flakes	2/-, 2/-
Under the Sea (Burton)	25 0	Ex Ex Piarro Matt	8 0	Hobby Fish Flakes	2 0
Tropical Aquarium Fish (Nieuwenhuizen)	90 0	Worms Alive Assoc worm	9 0	Hobby Fish Food (Brooders Pack)	3 0
Tropical Fish in the Aquarium (Lodewitz)	14 0	feeder	9 0	Hobby 'Blue Daily'	3 0
SOFT COVER BOOKS		WARDLEYS FISH FOODS		REMEDIES	
Tropical Fish (T.F.H. Publ.)	15 0	Wardley's mix (8 foods in one)	3 3	Wardleys	
Encyclopedia in the Aquarium (Wickertson)	7 4	Supreme Conditioner	1 3	Halamid Tablets (New)	4 0
A Manual of Aquatic Plants (Row)	17 4	(Fins, Med., Coarse)	1 3	Vitamin Tablets	2 4
Starting Right with Tropical Fish (Gannon)	4 0	Supra Super Homogenised	3 4	Anti-Chlorine Tablets	3 0
Starting Right with Goldfish (Gannon)	4 0	Nitro Pelleted Food	3 4	Pressure Chest Neutraliser	3 0
All About Guppies (Astrand & Whitern)	12 0	(Fins, Med., Coarse, Ex. Coarse)	8 0	Ph. Test Kit—	
Garden Pools (Paul Stoen)	4 0	Vitalare (Fins, Med., Ex. Coarse)	1 3	Junior	7 4
Chassees (Rolf Gieseler)	4 0	Hi-Glow "30" Colourfood	4 4	Senior	14 4
How to Keep and Breed Tropical Fish (Dr. Emmerson)	22 4	(Fins, Med., Coarse, Communit)	4 4	Bronchomyl Blue Ph. Indicator	4 0
All About Aquariums	12 0	Fry Fare Guppy Food Lge.	2 4	Aquatic Tonic (general tonic and remedy)—	
The Educational Aquarium	7 0	Moby Fare	2 4	1 L. oz.	3 3
Your Terrarium	4 0	Fancy Guppy Food	2 4	4 L. oz.	10 8
Playful Turtles	3 0	Guppy fare	4 4	Anti Chlorine Compound—	
Marine Turtles	22 4	Small 1/3	4 4	1 L. oz.	2 4
All About Breeding Tropical Fish (T.F.H. Publ.)	12 0	Dried Daphnia	3 3	4 L. oz.	8 0
Breeding Aquarium Fish	10 4	Small 1/3	3 3	Fungus remedy (sublethal and stainless)—	
Aquarium Plants	10 4	Small 1/3	3 3	1 L. oz.	3 3
Aquarium Hygiene	10 4	Small 1/3	3 3	Sprout Plant food	24, 8/-
Food Life in the Aquarium	10 4	Small 1/3	3 3	Methylene Blue	4/-, 10/-
T.F.H. PUBLICATIONS 2/- EACH		TETRAMIN FISH FOODS		Tetracare	
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Tropical Fish Guide	2/-	Tropicals		General Tonic. As a regular tonic in the Aquariums	
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Tiny Tetras	2/-	Size 2	2 2	Blackwater tonic. Reproduces natural tropical soft	
Beautiful Goldfish	2/-	Size 3	3 3	acid water conditions in Aquariums.	
T.F.H. PUBLICATIONS 2/- EACH		Tetramin Staple Food in		Fungus cure	
Asia	2/-	Tablets Form	3 0	White spot cure	2 4
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Aquarium Repair Manual	2/-	(for Marine Fish)	4 4		
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Fancy Guppies	2/-	For Tropicals	2/6 & 5 0		
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Garden Pool Construction	2/-	Why not give our showrooms a visit or write for a copy of our illustrated catalogue, price 2/6.			
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Goldfish	2/-				
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OTHER BOOKS					
Aquatic Insects	1 8				
Tropical Fishes	2 4				
Live Foods	3 0				
Marsh Gardens	1 4				
FRY FOODS					
Brite Shrimp Eggs 1/4, 2/-, 4/6, 12/4, 25/- and 1/2 pt. 40/-					
Red Plankton Culture	2 4				
Infect	2 4				
Broken Fry Culture	2 4				
Liquor—Egglayers (red), Livebearers (green)	2 4				

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