

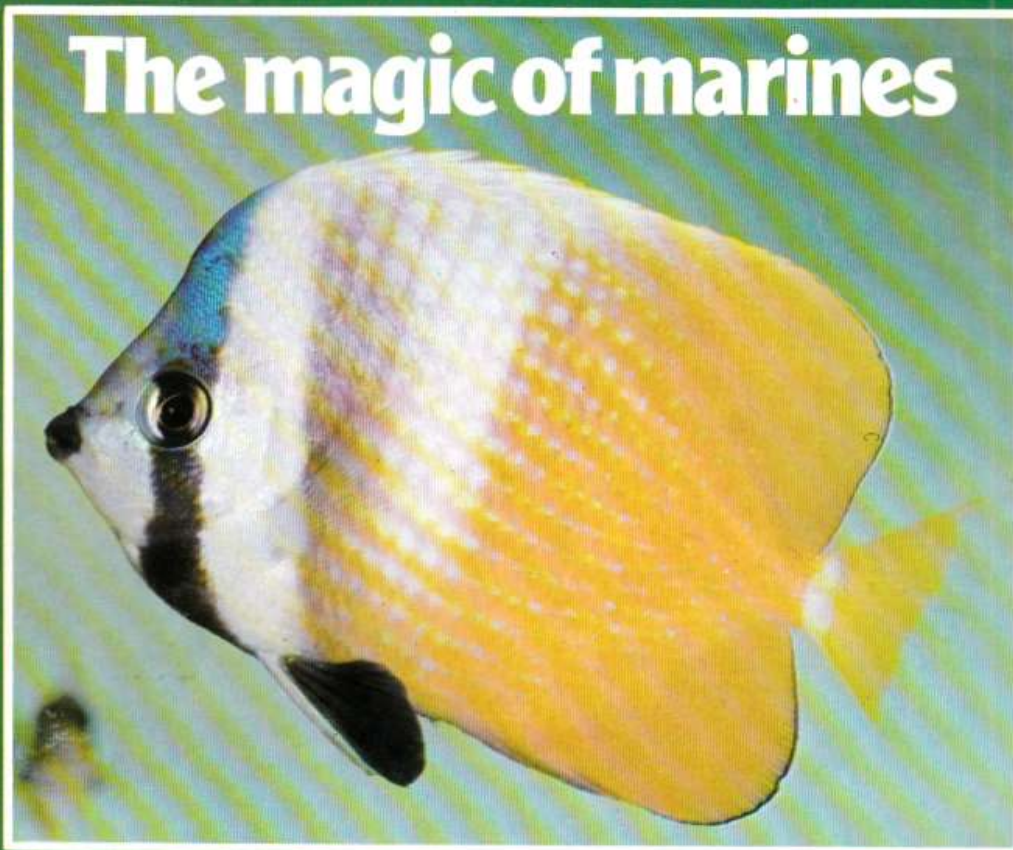
December 1978 50p

# Practical fishkeeping

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## Welcome to Practical Fishkeeping

(yes, the words pet fish have gone!) — and the first issue in EMAP hands.

We are sure it will mark the start of an exciting new era in the history of the magazine. Certainly, it will live up to its title — a practical publication aimed in practical fashion at all participants, from the beginner with one tank to the enthusiast with a dozen.

It will embrace all aspects of the hobby — from tropical, marine and coldwater species to the plants and ponds which make it such a fascinating study.

Joining EMAP Nationals has brought considerable advantages to Practical Fishkeeping. A distribution in excess of

40,000 means a greater degree of availability — and that's great news for many of you, particularly in the north. Better availability means better readership, better sales — and that in turn is great news for the advertiser, who can also benefit from our fabulous 'three for the price of two' offer running through January, February and March. More details about that on page 60.

New names and new ideas play a big part in this issue — and will continue to do so in the months ahead. So make sure of a regular copy by ordering it through your newsagent and, remember, the magazine will be available on the first of every month. I am sure you will find it a good read.

*Bob Feetham.*



**Bob Feetham:** Editorial Manager, responsible for content and planning of the publication.



**Clive Nicholls:** Chief photographer of several publications, he now adds P.F.



**Clive Nash:** A writer with the company, he has built up a number of tropical tanks.



**Nick Fletcher:** A writer with EMAP Nationals, he is a keen tropical fish enthusiast.



**Gerry Bellenger:** Advertisement manager who will operate from his London office.



**Dave Stirling:** EMAP Nationals' art editor, he is responsible for design.

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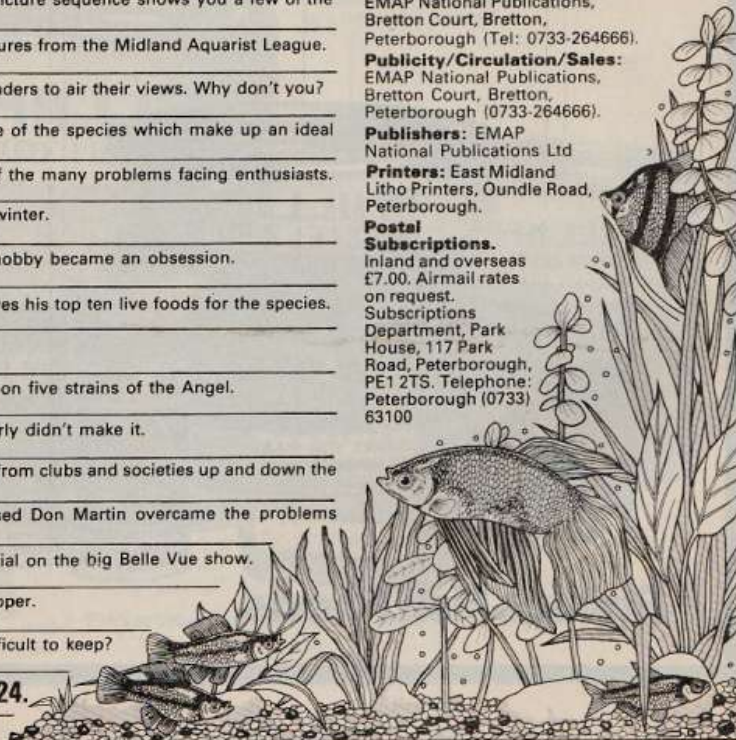
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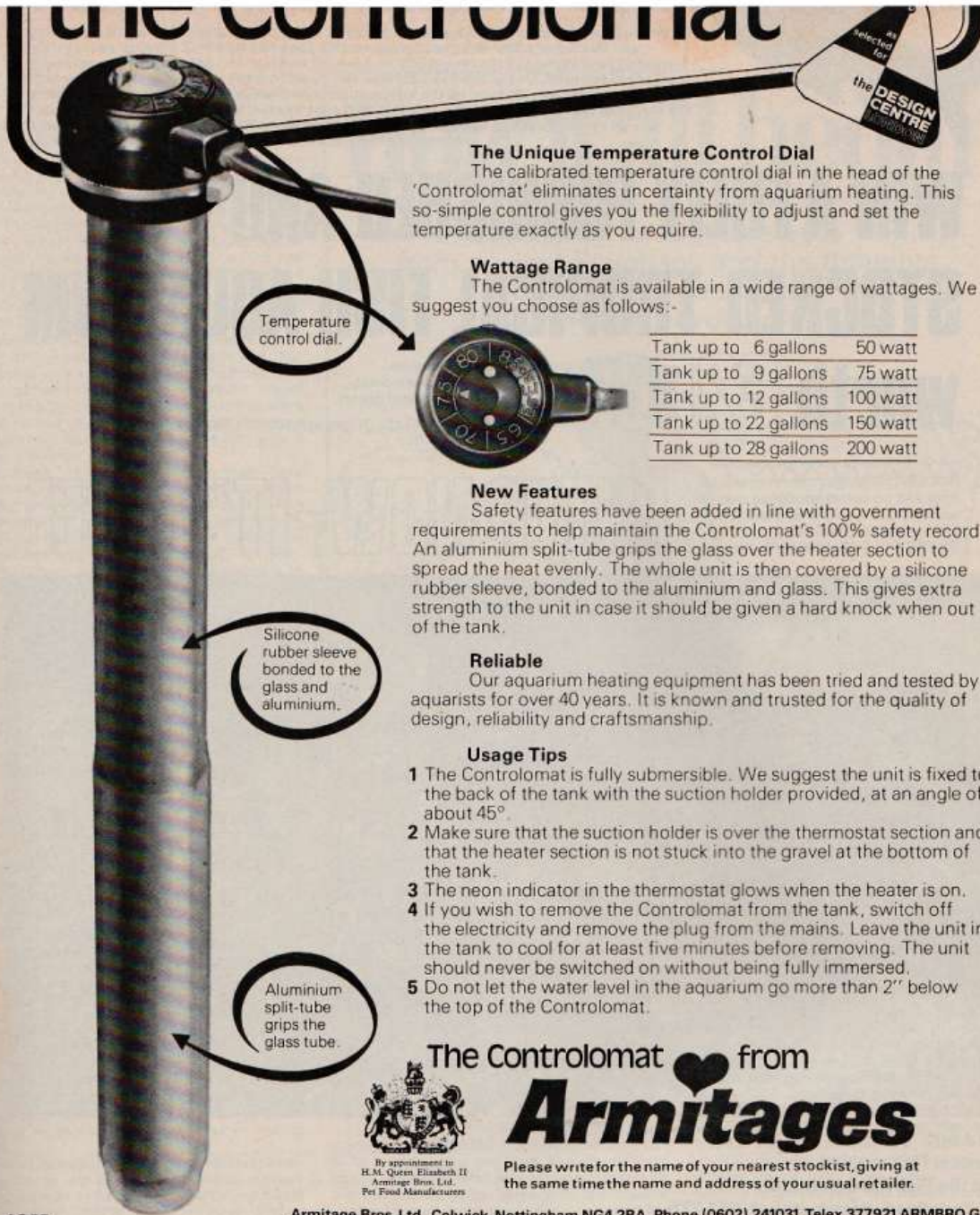
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PRACTICAL FISHKEEPING

7

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## AQUATIC QUERIES

Research by Nick Fletcher



FISH have been kept in captivity since the dawn of civilisation. The ancient Egyptians were probably the first to appreciate their beauty of colour and form, for tomb paintings and mummified fish have been found in the Pyramids — but nobody knows whether these fish were kept purely for aesthetic reasons, or as a readily available source of food.

The Romans, we know, built special ponds near the Mediterranean coast, where marine fish were kept for the table. A popular choice was the Muraena, or moray eel, which not only tasted good, but was a handy way of getting rid of unwanted slaves.

In Britain, the first people to keep fish were monks. Most monasteries have the ruins of old stew ponds, in which British native freshwater fish — probably perch to begin with, but later carp — were raised. These fish not only provided food on fast days, when the monks were not allowed to touch meat, but they were a fine source of fresh protein at a time when transporting and keeping food fresh was a major problem.

All these ancient fishkeepers may have derived pleasure from their charges, but to the Chinese must go the credit for true captive fish appreciation. It was over 2,000 years ago, in the Sung dynasty, that someone netted the unexciting looking feral goldfish, a drab, greeny-brown carp native to the streams of China, and retained it for study. It was not long before specimens showing more brassy coloration than normal were segregated and bred to produce the fish we know today.

It was the Chinese, too, who wrote the first book on fishkeeping. In 1596, Chang Chi-en-te produced the 'Book of the Vermillion Fish'.

Two dates have been put forward for the introduction of goldfish into England, 1611 and 1691. But Samuel Pepys, the diarist, wrote in May 1665 of 'fishes kept in a glass of water, that will live so for ever, and finely marked they are, being foreign'. Few fish but the goldfish would fit that description, or survive in such conditions.

It was in the eighteenth century that goldfish began to be imported in quantity into Britain. These early arrivals came from the Island of St Helena, where a colony had been established in ponds. Until 1781, most pet fish were kept in this way, but that infamous invention, the goldfish bowl, appeared in 1781 and has been with us ever since.

Curiously enough, it was the marine side of the aquarium hobby that first attracted scientific study, due to the work of one Philip Gosse. In 1851 he was forced by ill health into retirement by the sea and in order to study marine life around the Devonshire coast he kept specimens alive in containers of sea water, which was changed frequently. This was time-consuming, and he tried instead to set up a balanced environment in which his charges — mainly sea anemones — would thrive.

It was Gosse who established the first public aquarium in the London Zoo (1853). Others soon followed — Paris (1859), Hamburg (1864) and Naples (1873). The Crystal Palace Aquarium at Sydenham, opened in 1871, was the first of its kind to be artificially lit.

Like many Victorian pastimes, however, the aquarium craze all but died as quickly as it had risen to the fore, and in England it had almost exhausted itself by the 1860s. Luckily, by that time the Germans had caught on to the hobby. They were the first nation to breed and export tropical fish to the United States, and kept interest alive.

The first tropical fish, as distinct from native marines, to be kept in Britain were probably Paradise Fish. They were brought to Paris by the pioneering explorer Charbonnier from their native China, and ironically their chief claim to fame was downright aggressiveness. At that time, however, there were no other

PRACTICAL FISHKEEPING

# How it all began

Fishkeeping through the ages —  
from ancient Egyptians and the thoughts  
of Chang Chi-en-te to a  
modern revolution



species for them to terrorise, for the community tank was to gain real popularity much later, between the two world wars. That was when air travel enabled exotic and hitherto unobtainable species to be flown from one country to another — though freight costs were sky high, too.

All the time, technical progress was being made that enabled fish not only to be kept, but to be kept healthy and bred. The simple light bulb in the tank hood was replaced, first with the fluorescent tube, later with the special Grolux type of lamp originally developed for horticultural use. New forms of heating and filtration evolved, and, perhaps most important, tanks came on the market that not only held fish but looked good too. The heavy, angle-iron affairs glazed with flat plate glass gave way to bow-fronted aquaria, and the development of sealant compounds meant that all-glass tanks were now a possibility.

At last the fish tank itself was seen as a thing of beauty and much of the credit for the change in attitude must go to Reginald Dutta, director of one of London's largest fishkeeping concerns. A designer of aquascapes for royalty, Reginald kept right up to date with modern materials and used them to the best effect.

Apart from a slight slump in the period after the second world war the aquarist hobby has

never looked back, and now it is turning full circle. The Victorians were the first to set up crude marine aquaria, then freshwater tropicals became the vogue. Now, looking to the future, it is the marine facet of the hobby that is attracting renewed interest. Since chemical compounds arrived that can duplicate real sea water, people are realising that marines, and tropical marines at that, are neither beyond their pocket nor their capability.

Now, more than ever before, people are turning to fishkeeping, and it's not hard to see why. Space is now at a premium, and for those living in urban areas, a fish tank is often the only way of looking in on the world of nature. Then there are the pressures of modern living, which can evaporate before the tranquil, silent environment you have created for your charges. It's no coincidence that your first glimpse of a tropical aquarium was probably as you sat waiting for a painful appointment with the dentist!

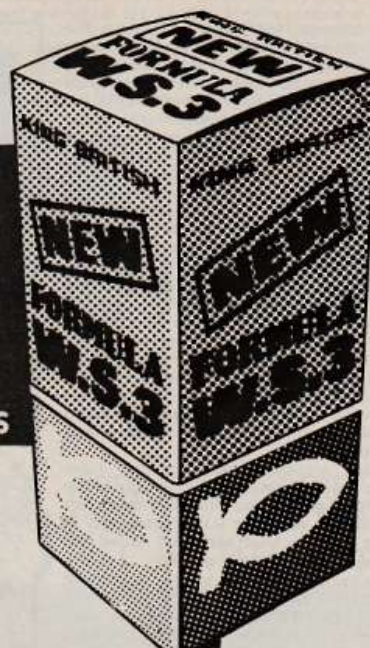
So whichever way you look at it, fish make sense. It is only the way you treat them that decides whether or not you can be classified as an aquarist, and it is the object of this magazine to help you get to know more about your hobby, and so derive increasing enjoyment from it.

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The ideal diet for any fish is the same food that they eat in their natural habitat. Unfortunately, this cannot be supplied in the aquarium because of the inevitability of introducing diseases and parasites, not to mention the difficulty in collection.

The human race is civilized (some members included) and the food supply is no longer routinely hunted but purchased in a sterile or clean form, often modified by technology into diets far removed from a natural one. Since all fish are brought into this domesticated world another possible source of food is that same sterile diet that humans (or those other domesticated animals, dogs and cats) eat. In other words, kitchen scraps.

The scrap diet has been tested in the Leices-tershire-based fish laboratory of Animal Studies Centre, where typical community fish were fed on diets such as canteen food. The results were that although the fish fared well at first, loss of odour occurred, followed by listlessness or nervousness. Within a year all the fish had died. Postmortem examination showed nutritional deficiencies were the problem, particularly certain vitamins.

It should be remembered that we developed from the fishes and so our basic nutrition is similar. However it appears that fish have simpler digestive and body building systems than us.

Being lower down the evolutionary scale, this is not surprising. Hence higher levels of essential food ingredients such as vitamins, certain amino acids and oils are necessary to the fish. Although we (as mammals need the same elements, we can utilise them more efficiently and so require less. All this means that human or pet animal scraps are inadequate for fish. They can still be used as a supplementary diet, of course, but not for exclusive feeding.

The ideal diet for Tropical fish is a commercial food specially developed for aquarium use. Such foods are the result of continuous research and development to give the best diet for healthy and hence long-lived, colourful and lively fish. There are many such foods on the market in flakes, granules, freeze-dried and frozen forms. Prices vary with quality and the amount of research backing the product.

Good fish are not cheap, and equipment is very expensive, so to spend a large amount of money establishing a community aquarium and then economise by buying cheap food does not make sense. A good diet is no less important in maintaining healthy fish than good water quality or stocking levels, etc. So always buy a top quality commercial fish food and use it as a basic diet. If the cost is a problem, the food can be supplemented with scrap food on two or three days a week.

If the fish are needed for showing, some live foods are necessary to produce that extra sparkle. Similarly, live foods are often necessary to bring fish into breeding condition. To avoid the disease problem, use live foods from a non-aquatic source. The garden earth-worm is ideal (the small red coloured variety). Live insects can be fed providing they are not collected where insecticides are used. Try using a fine mesh fish net to the bumper of the car when driving on a summer's evening (this will collect a bumper crop of insects or just whatever according to where you drive).

Caterpillars (non-hairy), green fly, slugs and so on are all available free in any garden. If your fish do not find any of these foods desirable they will soon show you by simply rejecting them.

Specialty cultured live foods are also useful such as white worms, micro worms, fruit flies and so on. These will be the subject of a later article in this series. Two live foods that can be bought from aquarium shops are Tubifex and Daphnia. However these are sources of disease and parasites as explained before, and



# Correct feeding

Good fish are not cheap — so learn to give them the right basic diet

by Dr David Ford

Dr David Ford has spent 35 years studying tropical fish. He is head of the modern Aqualab at Pedigree Petfoods in Melton Mowbray, Leics, and will soon be joining the world-famous Animal Studies Centre at nearby Waltham-on-the-Wolds.

Nottingham-born, Dr Ford has travelled the world in developing his range of Aquarian fish foods.

He is a chartered chemist and has a Masters Degree and Ph.D in research on the physical chemistry of aqueous systems. His knowledge is immense — as is underlined by the huge demand on his time as a lecturer. This month he begins an absorbing series in Practical Fishkeeping which will help experienced aquarist and beginner alike.

Based on health and food, the information will prove invaluable — yet easy to follow. So make a date with David Ford every first of the month.

NEXT MONTH

Healthy fish! How to keep them that way

adding chemicals such as Acriflavine to their holding water does not overcome the problem. I know that many aquarists have used these live foods for many years but it is always a gamble and beginners should not take such risks.

Scrap foods include almost anything from the kitchen. Beef heart is a popular food. This can be deep frozen and shredded on a cheese grater for small fish or cut into lumps prior to freezing. Always remove any fat because it is not suitable for fish.

Another popular food is liver; the frozen broiler chicken's liver can be saved from the giblets bag. Any meat, raw or cooked, can be fed. Fish and crustacea too, but it is best used after cooking to avoid diseases. Most fish particularly like crab and shrimp flesh.

For the herbivorous fish, boiled peas can be fed whole, or squashed for smaller fish. Any other greens from the plate can be used (but not swimming in butter or covered in pepper).

The basic diet, however, is a prepared food and of these the best choice is a good quality flake. The advantages of flake are that top feeders can be catered for by placing the flake flat on the water surface. For small fish the flake can be crumpled to give a floating layer of tiny flakes. The flake will wet out and slowly sink and so mid-water feeders can be catered for. Surplus flake will eventually lie on the gravel for bottom feeders. If only bottom feeders are present, the flake can be inserted edge ways into the water to make it sink immediately.

The most common question asked by new aquarists is "How much should I feed?" and it is almost impossible to answer because the precise quantity of flake will vary with species, age, size, water quality, temperature and so on. This is why most manufacturers put the phrase "feed for two or three minutes" or something similar. This ties the quantity fed to a time, which is roughly the same for all fish.

Remember that a flake is food with the water removed to give it a reasonable shelf life. Since water can be 80% or even 90% of the total bulk food before drying, one small flake is made from food up to nine times its apparent bulk. So even one flake is quite a meal for an average Tropical fish. On average, a one inch Tropical fish can live happily on a couple of half inch flakes daily. Most aquarists feed far more than this because fish can eat as much as they are offered and digest their needs, and then excrete the rest. This means the aquarist is merely polluting the tank via the fish.

Another reason for over-feeding is that the fish soon associate your appearance with food. When you approach the aquarium with their food, the fish go into a characteristic dance, especially if food is always given at one particular spot. The dance also affects you the aquarist, and when you approach the tank to just view the fish, they go into their feeding dance and you respond by reaching for their food. This must be resisted.

It is useful to starve the fish occasionally because a cycle of feeding during times of plenty and starving in between is a natural occurrence in the wild. Fish store oils to use as a food supply during lean times so there is no danger in leaving fish unfed for a few days; in fact a regular blank day (e.g. every Sunday) seems beneficial. Certainly there is no need to use holiday blocks, automatic feeders, or neighbours, when going away for a week, or even two if the fish are adult and healthy.

So feed a few flakes twice daily, six days a week at regular times and at a special place in the aquarium. The idea of using a special place, such as one corner, is to attract the fish to one spot for feeding. This facilitates removal of surplus flake and also congregates the greedy fish in one area, leaving the shy fish separated for special feeding.

DAVID Shields is the man behind the Halifax AS successes in the tank furnishing sections at the 1978 British Aquarists Festival at Belle Vue, Manchester. His efforts gave the society first place in the tropical section and runner-up spot for a coldwater tank.

A 39-year-old sales manager from Halifax, David has kept fish since he was seven, and spent most of the time specialising in plant cultivation.



David Shields with his winning Tropical Society entry at the recent Manchester Show.

ASK any group of aquarists what their main problems are and it's a fair bet that most will say plants.

"Plants just won't grow in my tank," they claim, or: "They seem alright for a few weeks and then just rot away."

Unfortunately, it's perfectly true. A lot of people just cannot keep plants healthy in their tanks.

But it's no use just complaining and coughing up regularly for a never-ending stream of replacements.

Aquarists spend hours and hours scouring every book they can lay their hands on to read all about their fish, but few seem to take as much trouble with their plants.

The successful gardener is the man who spends a lot of time with his flowers and vegetables, and the aquarist must do the same to expect similar results.

We put plants in our fish tanks for a variety of reasons. Decoration obviously plays a big part in their appeal, but there are other reasons too.

Some fish are timid, and need the cover of plants to escape bullying by more aggressive species. Other fish are territorial by instinct, and the inclusion of plants — and rockwork — help them find a well-defined area of their own.

And then there are the fry, particularly of livebearers. The parent fish often give birth to the live young in your community tank before you have a chance to isolate them.

Without the cover of a few dense clumps of plant, they would soon fall foul of other appetites — including their parents.

So we don't just have plants to keep the tank pretty — though that is obviously a major consideration.

How do you choose a good selection of plants that will grow well, propagate, and display your fish to their best? That isn't as

# Choosing the right plants

Decoration is not their only importance.

Clive Nash talks to David Shields.

difficult as so many people seem to believe. As with the gardener, the aquarist will soon find that some plants are easier than others. And it is these plants that we are going to start with.

You can't go far wrong with a selection that includes Vallisneria, Sagittaria, Cabomba, Hygrophilla, Wisteria and Amazon Sword.

The first thing to do is sort out the background to your tank. For this, it's hard to beat Vallisneria. Set a row of them at the back of the tank, but don't overcrowd them. All plants need room to grow, especially plants like Vallis that reproduce on runners — just like strawberries.

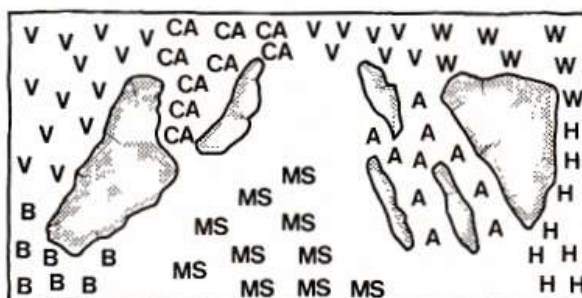
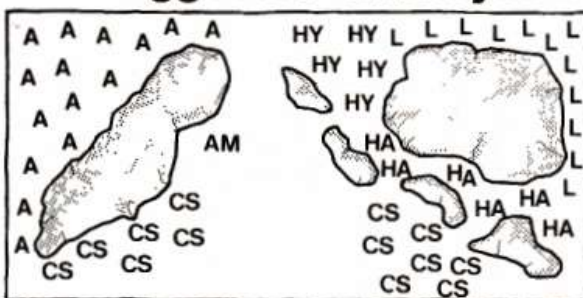
They will soon spread to cover the whole background, growing up towards the surface for a living curtain across the back glass.

You can add to the effect by intermingling a few sprigs of Cabomba. The large, feathery whorls of the Cabomba are especially useful to shelter fry.

Around the sides of the tank, you need bushy plants. This covers up the sides of the tank and provides plenty of cover for the fish that need it.

One of the best plants for this is Hygrophilla. With the tips pruned as they reach the surface of the water, the plant spreads to form a real aquatic bush. For variety, add some Wisteria.

## Two suggested tank layouts



CODE	SCIENTIFIC NAME
A	Ambulia Heterophylla
L	Ludwigia Mullerti
HY	Nomophila Stricta
M	Echinorus Paniculatus
CS	Echinodorus Pusillus
HA	Eleocharis Acicularis

COMMON NAME
Ambulia
Red Ludwigia
Giant Hygrophilla
Amazon Sword
Dwarf Chain Sword
Dwarf Hairgrass

CODE	SCIENTIFIC NAME
V	Vallisneria Spiralis
CA	Cabomba Caroliniana
W	Synnema Triflorum
H	Hygrophilla Polysperma
B	Bacopa Monnieri
A	Acorus Pusillus
MS	Sagittaria S. Pusilla

COMMON NAME
Straight Vallis
Fanwort
Water Wisteria
Dwarf Hygrophilla
Baby's Tears
Dwarf Japanese Rush
Micro-Sagittaria

this particular plant is that it can grow too well — becoming an aquatic “oak” that can soon dominate a tank.

That is taking a feature plant too far. But, as I said, it's perfect for the beginner. Plant it around halfway between the back and front walls of the tank. I like to keep it off centre as you view through the front plate.

I find that this gives the tank more depth. It doesn't look unnatural, with the rest of the tank revolving around the feature plant.

And then between the Amazon Sword and the Hygrophilia, I like to add a few dwarf Sagittaria. They don't grow much more than a few inches high, but soon spread on runners to carpet the floor of the tank.

You can also allow these to spread to the foreground of the tank, where bigger plants would obstruct the clear swimming space you need to keep your fish happy.

Remember to leave plenty of room between individual plants. You don't expect instant results from your garden, so don't expect it from your aquarium. The plants will soon thicken out and spread, producing a thickly-planted and attractive layout.

Choosing the actual plants for your tank isn't too difficult. It's a matter of common sense. Look for healthy, strong looking specimens, preferably with a good root system.

Don't worry if there isn't an advanced root system. Many aquarium plants are sold as cuttings, which soon produce their own roots if they are left undisturbed.

Don't go for those pretty plants you often see in dealers' tanks unless you know exactly what you are buying. Many of the prettiest plants in the shop are often not true aquatic plants at all.

They are bog plants, which grow in marshy land. They will survive a short time totally submerged, but nearly always end up rotting and possibly polluting your water.

Plants can survive a wide variety of water conditions, but grows in different parts of the country can come up with conflicting reports of their successes.

Plants which grow perfectly well in one area can be a difficult species in another.

The best advice here is to join your local fishkeepers' club. Their water conditions will be the same as yours, and they will almost certainly have gone through all the heartaches of finding the best plants for their tanks.

Their advice will save you a lot of time, money, and disappointment.

And don't be afraid of asking your local dealer's help. He is nearly always a keen expert himself — especially if he sells only fish and not other pets.

But use your common sense here. It's no good trying to chat up your dealer on a Saturday afternoon, when he is being rushed off his feet by customers. Pop in during the week when it's usually quieter and he will have more time to help you.

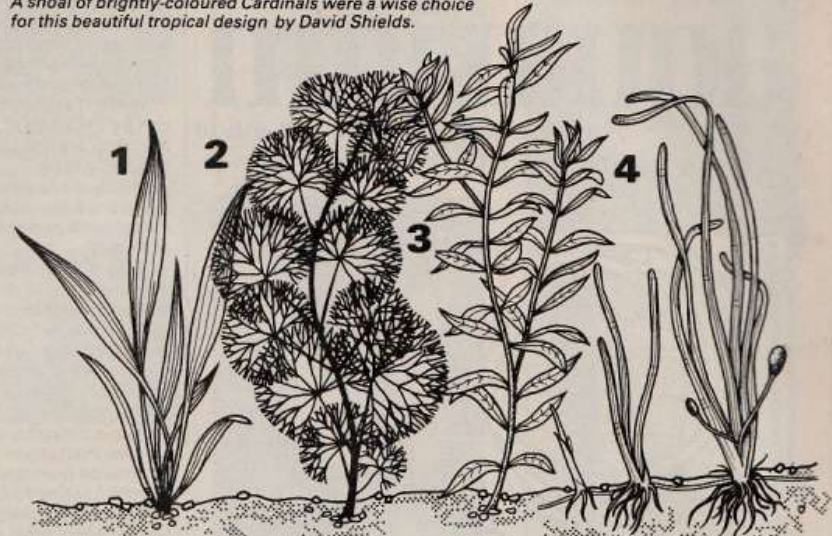
As with any other hobby, he will probably be only too glad to chat at length about his favourite interest.

And don't forget the value of a good book, whether you buy it or just borrow one from the library. These will usually have drawings and photographs of the wide variety of plants available, together with their history, requirements, and cultivation.

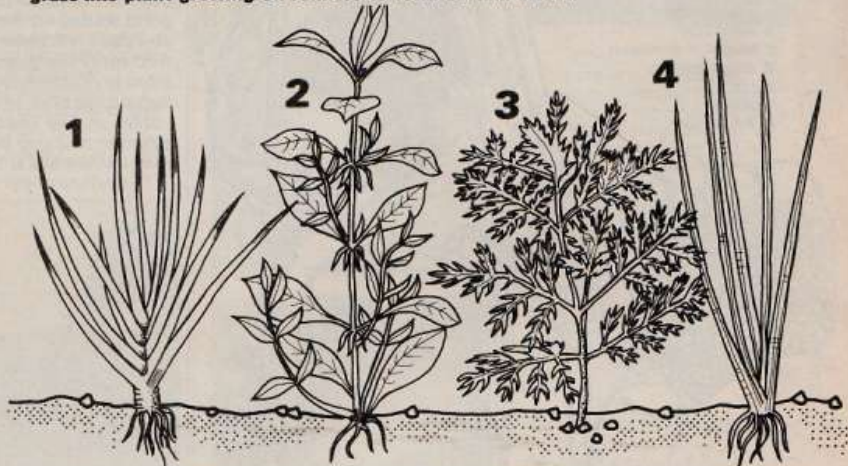
PRACTICAL FISHKEEPING



A shoal of brightly-coloured Cardinals were a wise choice for this beautiful tropical design by David Shields.



1 Amazon Sword (*Echinodorus paniculatus*). Slow growing dark green plant with long wide leaves. 2 Camboba (*Camboba carolina*). Long stems with delicate, fan-like whorls. Easily grown from cuttings. 3 Hygrophilia (*Hygrophilia polysperma*). Bushy, light-green plant. Very easily grown from cuttings. 4 Vallisneria (*Vallisneria spiralis*). Long, grass-like plant growing on runners to form curtain effect.



1 Dwarf Rush (*Acorus pusillus*). Short, spiky, dark green plant. Good for foregrounds. 2 Ludwigia (*Ludwigia mullerti*). Similar to bean sprout. Top of leaf olive green, bottom red. 3 Water Wisteria (*Synema triflorum*). Green fern-like plant. A quick grower propagated by cuttings. 4 Sagittaria (*Sagittaria pusilla*). Grass-like dwarf for tank foreground. Spreads by runners.

## and now visit the ultimate in garden ponds

GEORGE Peacock is a single-minded person — so when he came home one night with a strange look in his eyes, uprooted two fruit

Floodlights, cascades, a garage full of worms and a

# your first tropical aquarium

An easy to follow picture guide on those first crucial steps . . .



## What you need

- a thermometer
- b filter box
- c heater/thermostat
- d algae scraper
- e plants
- f gravel
- g air pump

14

guide. But before you even start to set up your new aquarium, you must be certain that it is situated in the right place, and on a safe base. A gallon of water weighs around 10lb, and even a modest two feet long tank can hold more than 12 gallons of water — so that adds up to well over a hundredweight before you add gravel and rocks.

Modern angle iron stands can be obtained at little cost, and they are the safest way to support a tank.

Whatever base you use, there are a few places in the living room to avoid putting your tank.

Keep it away from windows, or the walls opposite windows. Direct sunlight doesn't harm your fish, but it does encourage the growth of unsightly algae on your tank glass.

You must never put your tank in a draughty place, or for that matter near a heat source, be it an open fire or a central heating radiator.

The sudden change in temperature from a cold draught, or from the heating being turned on, won't do your fish any good at all.

And the final important point is accessibility. It's no good setting up the tank if you can't reach the controls. And some things you will need to reach often have to lie behind the tank, like heater cables and air lines. So leave a reasonable gap between the tank and the wall.



Fish tanks come in all shapes and sizes, with several different methods of construction. Plastic tanks are available, but do not wear very well. They scratch easily and your vision of the fish soon becomes obstructed. Then there are the angle iron-framed tanks. These offer great strength, but the tops of the frame rust after a time because of the constant condensation rising from the tank. These have to be rubbed down and repainted from time to time. To avoid this work, choose an all glass tank. These are very strong and are bonded by a silicone rubber compound. In any doubt about the size and type of tank you want, ask the advice of your local dealer.

## 2. Taking the strain



If you buy an all glass tank, or one with a thin frame, you need to rest it on a layer of polystyrene ceiling tiles. A sheet of glass is never exactly smooth, and the weight of the water in the tank will soon show up any irregularities in the tank bottom. A layer of tiles allows the glass to find its own level, automatically adjusting to balance the irregularities.

PRACTICAL FISHKEEPING

THE feeding of fancy goldfish poses entirely different problems to the feeding of tropicals. The aim is to grow your fish on quickly, and the proteins, fats and minerals present in live foods ensures better growth and colouring than can be obtained by giving your charges dried preparations. Fancy goldfish should be

# Goldfish

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# Goldfish

### 3. Make certain your gravel is clean



Ordinary gravel is the most common aquarium compost in use today. But even the so-called pre-washed gravel available in shops is still too dirty to use straight away. Put a few handfuls at a time into a bucket, introducing water through a hose or straight from the tap. Stir the gravel around with your hand until the water overflowing from the bucket is clean. You then know all the dirt and impurities are out of the gravel, so you will not cloud your aquarium water when you introduce it to the tank.

### 4. Introducing the gravel



After washing each quantity of gravel, tip it straight from the bucket into the tank. Remember never to drop it from too high. A few pounds of gravel can have the same effect on a sheet of glass as a few pounds of masonry.

### 5. Creating a natural slope



Once all the gravel is in the tank, arrange it with your hands so there is a slope downwards from the back towards the front. You want a gravel depth of around four inches at the back, sloping to 1½ inches at the front. This serves two main purposes — to improve the appearance of the tank, offering a natural-looking slope on which to set the plants, and to allow debris to roll down to the front of the tank, where it can easily be removed.

### 6. Pouring in the water



If you pour water into the tank straight onto the gravel, you will destroy the slope you created. Instead, pour the water onto a saucer on top of the gravel. That foils the initial impact of the water, leaving the gravel intact.

### 7. Preparing the water



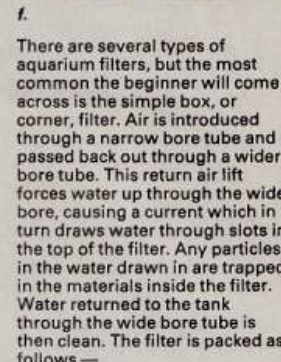
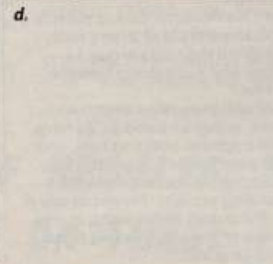
Now you should let your water stand for at least 24 hours, to allow the chlorine in it to evaporate. Chlorine can be very harmful to tropical fish — even the amount in our domestic water supplies. But if you are in a hurry to set up your tank, several brands of dechlorinator are available. Simply introduce it into the water according to the maker's instructions and your tank will be safe and ready for fish. At this stage, it is also useful to introduce one of the brands of tap water conditioner, which help to mature your tank water to keep the fish happier.

### 8. Keeping the water at the right temperature



The basic equipment you need for this is a heater and a thermostat, which automatically switches the heater on and off to maintain a pre-set temperature — 76 degrees Fahrenheit for the average community tank. These can be bought as separate items wired into the same circuit, or you can buy a combined unit like the one in this picture. The unit is fixed to the back wall of the tank using rubber suckers. Always make sure that the thermostat section of the unit is above the heater section. And if you use separate units, place them at opposite ends of the tank.

### 9. Keeping the tank clean



- a Cover the bottom with gravel to act as ballast.
- b Insert a layer of aquarium filter wool. Cotton wool is useless. Only use specially made filter fibre.
- c Add a layer of activated charcoal — as with the aquarium gravel, always wash before use.
- d Put in another layer of filter fibre.
- e Replace the filter box lid and connect to the air pump with clear plastic tubing. The filter is now ready for use.
- f Switch on the pump and the filter is working.





Midland Aquarist League Champions Nuneaton AS line up for Practical Fishkeeping's photographer after the results were announced at the Rugby show, the final round of a four event series.

Story by Allan Haines Pictures by Ray Gregory

# Nuneaton stay top

Evelyn and Fred Underwood topped the individual championship of the Midland Aquarist League with a total of 24 points. The husband and wife team are pictured with the trophy they received at the Rugby show.



## Very high standard in Midland league

NUNEATON AS are champions of the Midland aquarist League after pulling off a final leg victory in the four show series.

The Warwickshire-based society took an eight point lead into the final round and never looked like slipping from top place. Their fish, like most on show at the Newbold Village Hall, Rugby, were of a very high standard.

And at the presentation they stepped up to finish clear winners with 121 points to nearest rivals Leamington DAS with 97. Their championship tag came after fighting through a tough series of rounds in which six societies competed at different venues around the Midlands.

Points were awarded on a basis of four for a first place down to one for a fish placed fourth. An additional point goes to an entry awarded a 'best in show' card and each entry up to a maximum of 16 gets another point for benching.

The league is thought to be the only one of its kind in the country and although boasting only six societies is likely to increase before the start of the next series.

Applications are already being made for entry and organiser Fred Underwood is hopeful of seeing the league grow steadily

in future.

Although competition is fierce between societies there is certainly no lack of friendliness at shows within the league. During the afternoon judging session members of the six clubs were quick to exchange ideas and problems over a cup of tea — the ideal situation for newcomers to the hobby to pick up a few tips. Even the youngest competitors were made welcome — even though some showed they were already capable of collecting awards.

Andrew Hodges is typical of the young aquarists being attracted to the show bench. The 15-year-old, Kettering, Northants, enthusiast is a regular show entrant and at Newbold he proved that age — or lack of it — is no handicap when he collected awards for both his guppies.

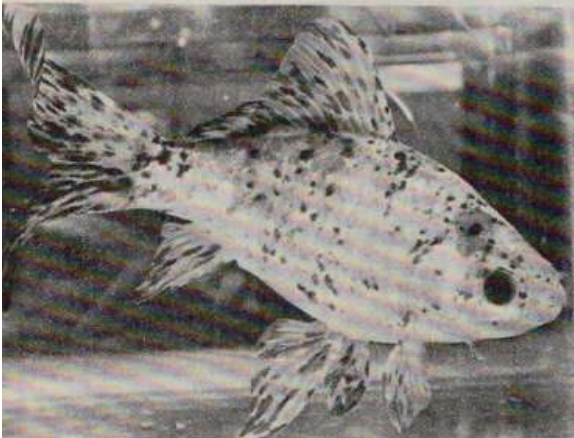
Andrew, a member of the Wellingborough based WAD AS, took second and third places with his fish and was quick to compare his entries with those of the winner.

"I thought the winning fish had a much better body than either of my fish so I am well pleased with two placings," said Andrew.

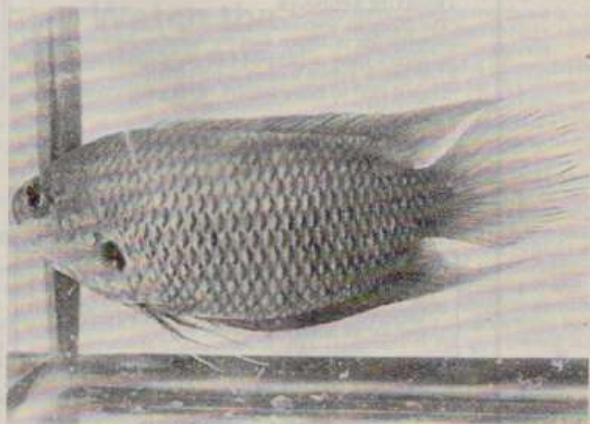
Included in the show series are classes for most varieties of trop-



There's no time for quick decisions as the three judges get down to the task of awarding points for each of the 181 entries in the final round of the league series. Pictured from left to right are: Ralph Tedds, Alan Dickerson and George Noble.



Leamington DAS member David Hoskins took first place in the single tailed goldfish section with this fine specimen of a shubunkin — a fish that has taken a first and second on its only two outings to date.



Bob Fyfe of Leamington DAS won the open class for anabantids with this finely scaled comb tail and it went on to win a special award for the best fish in the open class.

ical and cold water fish. Each show catering for eight open and four league classes.

In the final leg the cold water section for single tailed goldfish was perhaps one of the most keenly contested.

The standard was very high and judges had some difficulty in reaching a verdict. But Leamington's David Hoskins collected valuable points with his winning entry of a shubunkin — a superb fish that earned much admiration from the keen but critical attendance.

For David the win provided great satisfaction as he explained: It's only the second time I've entered this fish in a show and I am well pleased, especially as it finished second on its first outing.

"The standard has certainly been very high and to top 23 entries has made me feel very proud," added David.

But even with one win under his belt he faced a shock defeat of his ruby shark — a finely conditioned entry that could manage only third spot. "That's the lowest I've ever finished in a show and I must admit I'm a bit surprised," said David.

For others the show almost proved a disaster. Roger Cleaver

of Coventry Pool and Aquarium Society persuaded fellow club member David Callow to enter a valuable *Prochilodus*.

Roger collected the foot long specimen and carefully transported it to the Newbold Hall. But on arrival the fish looked far from healthy and at one time seemed likely to die before the show even opened.

"I was very worried for a long time but after giving the tank some aeration and the fish time to settle it recovered well," said Roger.

And just to prove it suffered no lasting ill effects the finely marked fish held itself perfectly to attract the judge's eye and take first prize in both MAL and open classes.

At the other end of the size scale the open contest for danios and white cloud mountain minnows went to a white cloud that showed outstanding colouration. Its blood red tail and fins underlined its potential as a big show winner and the tiny tropical proved it had show temperament by refusing to fade even under the strong floodlights being used by Practical Fishkeeping's photographer.

But although each individual class was of great importance to

individual entrants all eyes were on the team results board as points were added up.

Winners, Nuneaton AS added a further 40 points to boost their score to a winning 121 while runners-up Leamington DAS improved on a pre-final tally of 73, bringing their total to 97.

Also included in the MAL event was an individual points championship. This honour went to the Unit 59 husband and wife duo of Fred and Evelyn Underwood with 24 for the season. Runners-up were Mr & Mrs Salisbury, 19 and Jim Booth, 18.

## Full results

A. O. V. Tropical: 1 Mr. & Mrs. Salisbury, Nuneaton AS; 2 J. Booth, Loughborough & DAS; 3 D. M. Hoskins, Leamington & DAS; 4 Mr. & Mrs. Nesbit, Nuneaton AS. A. V. Characin (B): 1 D. Callow, Coventry Pool & AS; 2 S.M.I.N., Nuneaton AS; 3 Mr. & Mrs. Nesbit, Nuneaton AS; 4 R. Cleaver, Coventry Pool & AS. A. V. Killifish: 1 Mr. & Mrs. Cox, Nuneaton AS; 2 J. Lamb, Nuneaton AS; 3 J. Lamb, Nuneaton AS; 4 F. Hurst, Coventry Pool & AS. Single-Tailed Goldfish: 1 D. M. Hoskins, Leamington & DAS; 2 I. Purdy, Loughborough & DAS; 3 Mrs N. Richardson, Loughborough & DAS; 4 R. Cleaver, Coventry Pool & AS. First award winners: 1 Mr. & Mrs. Salisbury, Nuneaton AS; 2 D. Callow, Coventry Pool AS; 3 D. M. Hoskins, Leamington & DAS; 4 Mr. & Mrs. Salisbury, Nuneaton AS.

### Positions and Final Placings

	1st Show	2nd Show	3rd Show	4th Show	Total
1 Nuneaton AS	19	36	26	40	121
2 Leamington & DAS	27	21	25	24	97
3 Coventry Pool & AS	18	22	22	27	89
4 Unit '59	30	24	18	16	88
5 Loughborough & DAS	27	16	21	17	81
6 Rugby Fishkeepers	8	17	14	12	51

### Individual placings

1 Mr. & Mrs. Underwood, Unit 59, 24 points; 2 Mr. & Mrs. Salisbury, Nuneaton, 19; 3 J. Booth, Loughborough, 18; 4 S.M.I.N., Nuneaton, 13; 5 Mr. & Mrs. Nesbit, Nuneaton, 11; 6 Mr. & Mrs. Chamberlain, Leamington, 10; 7 D. M. Hoskins, Leamington and D. Callow, Coventry, both 8; 9 R. Cleaver, Coventry and Mr. & Mrs. Cox, Nuneaton, both 6; 11 O. L. Brice, Nuneaton, A. & B. Lane, Rugby, T. Vince, Leamington, J. Lamb, Nuneaton, F. Hurst, Coventry, all 5; 16 T. S. F. N., Coventry and B. Chittenden, Leamington, both 4; 18 G. Howe, Loughborough, B. Fyfe, Leamington, A. Maxfield, Leamington and I. Purdy, Loughborough, all 3; 22 R. Rice, Coventry and Mrs N. Richardson, Loughborough, both 2; 24 Mr. Swynham, Rugby, Mr. & Mrs. Ruie, Rugby and M. Burridge, Leamington, all 1.

# aquarian

## advisory service bulletin No. 10 — Aquarium Literature

Over the last 10 years there has been a tremendous number of books published on aquarium fish and the choice for a beginner must be bewildering. Many of these books are very expensive because they include large colour plates of fish and although these are works of photographic art they are of little practical value to the hobbyist. The following list is a personal choice of books offered for guidance to the beginner or average aquarist.

### ABSOLUTE BEGINNER

"The Guide for Successful Fishkeeping" by Dr. D. M. Ford, obtainable free on request from the Aquarian Advisory Service.  
"Beginner's Guide to Tropical Fish" by Reginald Dutta, ISBN 0-7207-0832-X Pelham Books Limited (1975).  
"Tropical Fish" by Derek McNery, W. G. Foyle Limited (1973)

### LARGER BOOKS

"All About Tropical Fish" by Derek McNery & Geoffrey Gerard, ISBN 0-245-055077-1, George C. Harrap Limited (1971).  
"Naturalist's Guide to Freshwater Aquarium Fish" by J. J. Hoedeman, ISBN 0-8069-3722-X, Oak Tree Press Limited (1974).  
"The Complete Home Aquarium" by Hans J. Mayland, ISBN 0-7063-5179-7, Wardlock Limited (1976).

The Aquarian range of fish foods contain fifty food ingredients including fresh fish, meats and vegetables. There are ten different formulae to cater for all aquarium species.

"Tropical Aquarium Fishes, Freshwater and Marine" by George Cust and Graham Cox, ISBN 0-600-38654-6, Hamlyn Limited (1972).

"Dr. Sterba's Aquarium Handbook" by Gunther Sterba, ISBN 0-87826-861-8, The Pet Library Limited (1973).

"The complete Aquarium Encyclopedia of Tropical Freshwater Fish" by Dr. J. D. Van Ramshorst, ISBN 0-7290-0009-5, Elsevier — Phaidon (1978).

### MARINES AND GOLDFISH

"Marine Aquarium Guide" by Frank De Graaf, ISBN 0-78826-011-0, The Pet Library Limited (1973).

"Marine Aquarium Keeping, The Science, Animals and Art" by Stephen Spooote, ISBN 0-471-81759-7, John Wiley and Sons Incorporated (1973).

"The Goldfish" by George F. Harvey and Jack Hems, ISBN 0-571-08245-9, Faber and Faber (1974).

### TECHNICAL AND OTHERS

"Aquarium Technology" by A. Jenno, ISBN 0-903330-15-6, Barry Shurlock Limited (1976).

"Aquarium Plants" by Dr. Karel Rataj and Thomas J. Horeman, ISBN 0-87666-455-9, TFH Publications Limited (1977).

"Encyclopedia of Live Foods" by Charles O. Masters, ISBN 0-87666-093-6, TFH Publications Limited (1975).

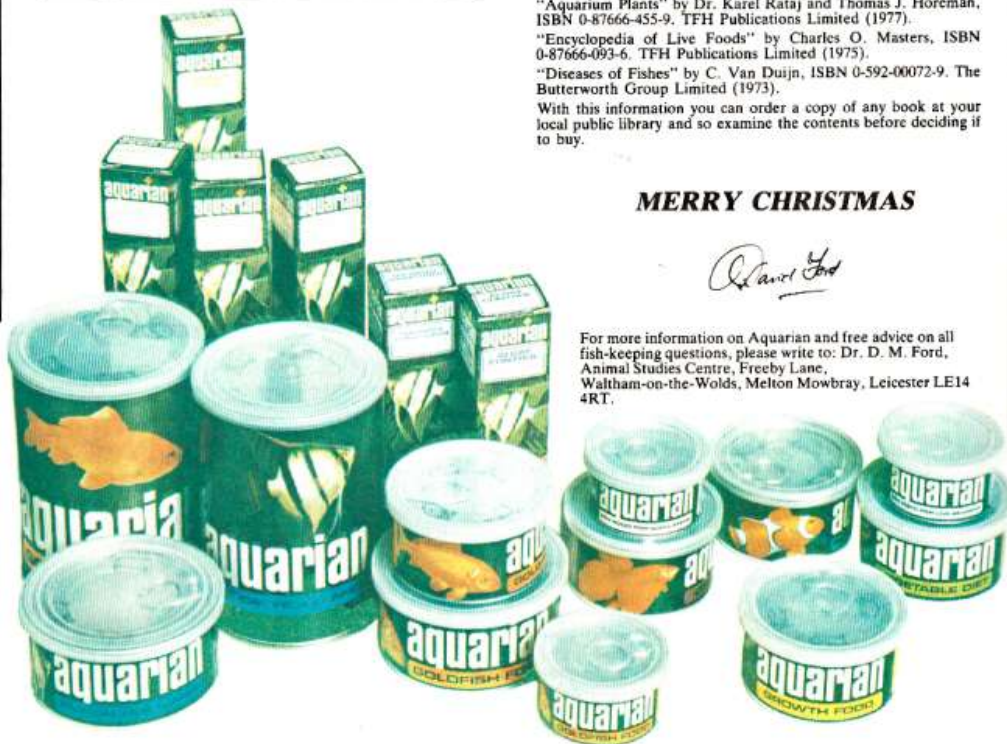
"Diseases of Fishes" by C. Van Duijn, ISBN 0-592-00072-9, The Butterworth Group Limited (1973).

With this information you can order a copy of any book at your local public library and so examine the contents before deciding if to buy.

## MERRY CHRISTMAS

*Dr. D. M. Ford*

For more information on Aquarian and free advice on all fish-keeping questions, please write to: Dr. D. M. Ford, Animal Studies Centre, Freeby Lane, Waltham-on-the-Wolds, Melton Mowbray, Leicester LE14 4RT.



**Aquarian. Because you can't beat fresh food for healthy fish.**

**Aquarian is manufactured and distributed by Thomas's, Pellon Lane, Halifax HX1 5QP**

Write to:

# Letters

Practical Fishkeeping, Bretton Court, Bretton, Peterborough, PE3 8DZ

## ● Hard to believe

AFTER feeding my tank of dwarf cichlids with live daphnia I noticed a strange reaction from a pair of adult golden rams.

They accepted the food for a short time but then appeared to herd about 50 daphnia into a corner, fighting off all attempts by other occupants trying to raid their little 'brood'.

The rams made no attempt to eat more daphnia themselves, acting instead more like excited parents with their first youngsters.

Unfortunately the pair were eventually overpowered and two kribensis made it to the corner where they quickly cleared up every single one.

Even after the 'brood' had been eaten the rams continued to guard the corner almost as if they expected their young to return.

Later feedings had no effect on the tank occupants other than the usual race to clear up the dancing daphnia, in which the rams took an active part.

I wonder if other readers have experienced anything similar. — A. Gray, Leicester.

## ● Snatched from the jaws

WE HAVE just had an unusual occurrence with a mirror carp in our garden pond.

About four years ago I acquired a mirror carp of about three inches long from our local river. It lived happily with goldfish, orfe, roach, perch and two tench.

Since then it has grown to about 10 inches and must weigh over 1lb.



*No good publication is the same without a lively letters page. We want you, the readers to have your say — to tell us of your views and experiences. So come on! Put pen to paper.*

A short while ago the pond got rather low and was topped up on a warm autumn day to the level of the stone surrounds. Suddenly our daughter came rushing in to say the carp was on the grass! It certainly was and to make matters worse our family cat was sitting next to it in considerable anticipation!

The carp had all but dried out and was quite still with grass all over it. There was no sign of any external injuries at all and I don't think the cat was the originator of the problem!

Carefully putting it back in the pond we took it in turns to keep it on an even keel and 'swoosh' water through is open mouth and over its gills.

After about 20 minutes its body started to flex slightly and shortly afterwards it slowly swam away. The next day it was

feeding normally again with the rest of the fish and appears no worse for its ordeal.

I've heard of carp being transported long distances in wet sacks and weeds, but wonder just how long they can survive out of water normally.

Incidentally we have never put eels into our pond, but recently I spotted one of about 12 inches swimming about. — W.R.H., Lincolnshire.

## ● Watch the backswimmer

I READ Frank Orme's 'Coldwater Scene' in the October edition with particular interest when he related that his pond had become the haven of some of the less desirable aquatic insects.

He is obviously well aware of the dangers of having dragonfly larvae in the pond, especially if they are of the Anax and Aeshna species; many a young fish of up to one inch length have been devoured by them. I would like to enlighten him, however, on the potentialities of an insect he calls a water boatman beetle as an equally destructive adversary of small fishes. First and foremost the animal in question is a backswimmer, *Notonecta glauca*; not to be confused with the true water boatmen, *Corixa* species, which swim and rest 'right way up' and spend most of their lives on the bottom of the pond where they feed on decaying animal and vegetable matter.

Although the backswimmer will eat terrestrial insects that have landed on the surface of the water its prime choice of food is of the free swimming kind which it dives upon from its upside down surveillance position just beneath the water surface. With

its large compound eyes it has a good range of vision and woe betide any young fish that happens to be in the vicinity.

The backswimmer, like the water boatman to which it is closely allied, is not a beetle, but an aquatic bug. It possesses no biting mouth parts but has instead a hard, sharp, beaklike proboscis or rostrum which it plunges into the body of its prey, enabling it to suck its juices at will. This beak can provide a very painful 'bite' if the insect is roughly handled though it is not poisonous. Although the backswimmer is a formidable predator, size for size, it frequently finds itself prey of the large water beetles, large fishes and of course the larvae of the dragonfly.

Of all the aquatic insects I have encountered I have found the backswimmer one of the most active out of water. It will readily transfer from pond to pond in search of food. On one occasion I netted some specimens and deliberately released them on land some distance away from the pond. Within a minute or two they were airborne. Yes, Mr Orme can have a few problems with this insect and despite my aversion to any form of pond-life being destroyed — our country ponds are becoming less numerous year by year — my best advice would be to destroy them at every opportunity. The backswimmer is one of our commonest aquatic insects so no real damage can be done. Yes, he could ignore them as he suggests but within reason; their numbers will need to be kept in check for the sake of the many good quality young fishes he obviously produces. V. B. Hunt, Widley, Portsmouth, Hants.

# Diary Dates

## DECEMBER

**Tuesday, December 5, and Tuesday, December 19:** Thanet Aquarist Society meeting at the clubrooms, Thanet Aquarium, Palm Bay, Margate, Kent, 8 p.m. All new members welcome.

**Tuesday, December 19:** North Avon Aquarist Society meeting at The Hut, A38, Patchway, Little Stoke, Bristol, 7.30 p.m. New members welcome.

## JANUARY

**Saturday, January 20:** The Goldfish Society of Great Britain AGM, Conway Hall, Red Lion Square, Holborn, London, 2 p.m.

## APRIL

**Sunday, April 15:** Stockton-on-Tees 14th open show at the Kloria Community Centre, Roseworth Estate, Stockton. Schedules from D Knibbs, 15 Gray Street, Norton, Stockton, Cleveland. Stockton 551009.

**Sunday, April 29:** Half Moon A.S., Billingham Green, Teesside, open show, in the Corporation Hall, West Row, Stockton, Cleveland. Schedules from C W Buck, 22 Danby Grove, Thornaby, Cleveland. Tel: Stockton 65284.

## MAY

**Sunday, May 12:** Tonbridge and District AS fish exhibition, Lambeth Walk, High Street, Tonbridge. Further details from the secretary: Mrs B M Purchard, 6 Alber Road, Tonbridge, Kent, TN10 2SR. Tel: Tonbridge 358225.

PRACTICAL FISHKEEPING



● NANCY RICHARDSON — show champion at Loughborough.

## Nancy takes the honours

LOUGHBOROUGH and District Aquarist Society held their annual furnished aquaria show recently — top honours going to Mrs Nancy Richardson who took first place with some delightful arrangements. Judges at the show, which raised £150 for a local charity, were Mr G. Hayes and Mr G. Salisbury, both of the Midlands Association of Aquarist Societies.

Prizes at the end of the three-day show were presented by Dr David Ford, of the Aquarian Advisory Service, and leading results were as follows: 1 Mrs N. Richardson, 2 G. Howe, 3 I. Purdy, 4 A. Young.

	NAME	FAMILY	TEMP RANGE	COLOUR	MAXIMUM SIZE
	Guppy <i>Poecilia reticulata</i>	Cyprinodontidae	22-24°C	Male many and varied Female drab grey	M. 1½ins F. 2½ins
	Platy <i>Xiphophorus variatus</i>	Cyprinodontidae	20-25°C	Many and varied both sexes	M. 1½ins F. 2½ins
	Swordtail <i>Xiphophorus helleri</i>	Cyprinodontidae	22-25°C	Many and varied both sexes	M. 3ins F. 5ins
	Corydoras <i>Corydoras aeneus</i>	Callichthyidae	18-26°C	Bronze	M. 3ins F. 3ins
	Algae Loach <i>Gyrinocheilus aymonieri</i>	Gyrinocheilidae	22-24°C	Blotched grey brown	10ins but usually much smaller in captivity
	Kribensis <i>Pelmatochromis kribensis</i>	Cichlidae	25-28°C	Varied bluish with red belly blotch	M. 3½ins F. 2½ins
	Zebra Danio <i>Brachydanio rerio</i>	Cyprinidae	20-24°C	Alternate Gold & blue-black stripes	M. 1½ins F. 1½ins
	Cherry Barb <i>Puntius titteya</i>	Cyprinidae	24-26°C	Fawn with silver lustre & red fins	M. 2ins F. 2ins
	Chequer Barb <i>Puntius oligolepis</i>	Cyprinidae	22-26°C	Red-brown yellow belly dark blotches	M. 2ins F. 2ins
	Black Ruby Barb <i>Puntius nigrofasciatus</i>	Cyprinidae	22-26°C	Yellow grey with black barbs and red head	M. 2ins F. 2ins
	Gold Barb <i>Puntius 'schuberti'</i>	Cyprinidae	22-26°C	Gold with black speckles	M. 2ins F. 2ins
	Tiger Barb <i>Puntius tetrazona</i>	Cyprinidae	22-26°C	Red-brown with black bars & red fins	M. 3ins F. 3ins
	Angelfish <i>Pterophyllum scalare</i>	Cichlidae	22-24°C	Silver with black bars	M. 5ins F. 5ins
	Serpae Tetra <i>Hyphessobrycon ornatus</i>	Characidae	22-25°C	Red-brown. Black shoulder blotch	M. 1½ins F. 1½ins
	Black Widow Tetra <i>Gymnocorymbus ternetzi</i>	Characidae	22-24°C	Olive green back silver sides with black rear & bars	M. 2ins F. 2ins
	Cardinal Tetra <i>Cheirodon axelrodi</i>	Characidae	22-26°C	Bright red belly blue back	M. 1½ins F. 1½ins
	Neon Tetra <i>Paracheirondón innesi</i>	Characidae	21-23°C	Silver with blue strip & blood red rear	M. 1½ins F. 1½ins
	Lemon Tetra <i>Hyphessobrycon pulchripinnis</i>	Characidae	23-25°C	Silvery yellow	M. 2ins F. 2ins
	Harlequin Fish <i>Rasbora heteromorpha</i>	Cyprinidae	24-25°C	Silver grey with triangular black blotch on rear half	M. 1½ins F. 1½ins
	Dwarf Gourami <i>Colisa lalia</i>	Anabantidae	23-26°C	Blue-green stripes on pinkish brown body	M. 2ins F. 2ins
	Blue Gourami <i>Trichogaster trichopterus simatranus</i>	Anabantidae	23-26°C	Blue with faint dark bands	M. 5ins F. 5ins
	White Cloud Mountain Minnow <i>Tanichthys albonubes</i>	Cyprinidae	20-22°C	Brown with blue-green stripe. Red tipped fins	M. 1½ins F. 1½ins
	Coolie Loach <i>Acanthopthalmus kuhlii</i>	Cobitidae	23-25°C	Yellow to salmon pink with brown to black bars	M. 3ins F. 3ins
	Black Molly <i>Peocilia velifera</i>	Cyprinodontidae	24-28°C	Black	M. 3ins F. 5ins
	Red Tailed Black Shark <i>Laheo bicolor</i>	Cyprinidae	24-27°C	Black body blood to crimson tail	M. 4ins F. 4ins

Midwater to surface peaceful though males fight among themselves	3	Very easy live bearer	Dried and live food	40p
Bottom-dwelling scavenger peaceful	5	Not easy	Dried and live food	65p
Bottom-dwelling scavenger peaceful. Large adults pugnacious	4	Difficult	Dried, also need algae to browse upon	35p
Territorial, mid-to bottom, fairly peaceful	4	Easy if paired correctly	Dried and live food	75p
Surface shoaler, fast moving, peaceful	4	Very easy	Dried and live food	30p
Midwater shoaler, peaceful	3	Easy	Dried and live food	35p
Midwater shoaler, peaceful	3	Easy	Dried and live food	35p
Midwater shoaler, peaceful	3	Easy	Dried and live food	35p
Midwater shoaler, peaceful	3	Easy	Dried and live food	35p
Midwater shoaler, fairly peaceful	3	Easy	Dried and live food	35p
Midwater, peaceful for a cichlid	6	Fairly easy if paired correctly	Variety important especially live food	45p (young)
Midwater, peaceful shoal fish	3	Fairly easy	Variety important especially live food	35p
Midwater, peaceful shoal fish	3	Easy	Variety important especially live food	30p
Midwater, peaceful shoal fish	3	Not easy	Variety important especially live food	40p
Midwater, peaceful shoal fish	3	Not easy	Variety important especially live food	25p
Peaceful midwater shoaler	3	Difficult, often become spawn bound	Variety important especially live food	35p
Peaceful midwater to surface shoaler	2	Not easy	Variety important especially live food	35p
Surface living, timid	3	Easy, bubble nest builder	Variety important especially live food	70p
Surface living, reasonably peaceful	3	Fairly easy, bubble nest builder	Variety important especially live food	60p
Peaceful, surface, shoaler	3	Very easy	Dried and live food	30p
Secretive, timid. Bottom scavenger	4	Very difficult	Dried and live food and vegetable matter	40p
Peaceful, midwater	3	Very easy Livebearer	Dried and live food and vegetable matter	35p
Territorial, bottom to middle. Timid algae eater	5	Very difficult	Dried and live food plus algae to browse upon	£1

PRACTICAL FISHKEEPING

## 25 to pick from

Species which are ideal residents for your community tank

TROPICAL fish come in all shapes and sizes and in a wide range of colours and habits. And the successful community tank depends very much on the mixture of fishes you introduce.

The most obvious problem is the varying sizes of the different species. It is only natural that any fish will eat any other fish small enough to fit inside its mouth.

So you don't mix fish of four inches or more in length with little specimens like the ever-popular Neon Tetra or Zebra Danio.

And then there are certain fish that are peaceful, while others are compulsive bullies. You can't mix these two types and keep peace in the tank.

Most members of the pugnacious cichlid family are bullies, and best kept among their own kind.

And then there is the problem of the type of water that various species of fish are used to.

Tropical fish come from all five continents. Europe and Australia offer few species, but South America, Asia and Africa provide us with a seemingly endless number of fishes.

Although the water temperatures are very similar, the make up of the water in the various areas can be drastically different.

South America's River Amazon, which gives us many of our most popular fish, contains very soft water. On the other hand, the African lakes that produce many more favourites have hard water.

In Britain, we have water that is almost exactly neutral. So we can adapt fish from either environment to our own water, but would find it hard to mix fish from the two areas. They are just used to the opposite conditions to each other.

Balance the types of fish you choose to balance the appearance of the tank. Choose a few shoaling, surface-living fishes like Neons, Zebras and White Cloud Mountain Minnows.

Add members of the barb and tetra families, or some of the colourful livebearers, which all swim at midwater.

And finish off with some bottom-dwellers, which also happen to be very useful worker fish. Catfish and loaches sift through the debris on the tank gravel, eating food missed by other fish, and often browsing on the algae that can discolour the glass sides of your tank.

In a class of its own

# The Garden Pond

## Covering

SECOND method is to cover part of the surface with some form of plastic or nylon sheeting. For this there are scores of suitable covers — the only precaution needed being to ensure the material is non-toxic.

Materials with painted surfaces are also best avoided.

Basic idea is to place bearers over the pond and then drape a covering over one end of the water surface, securing each side securely and clear of the water. An ideal set up would be to cover part of the pool with a custom built frame, similar in shape and design to a garden cloche. Four main bearers make up the sides with battens across to take the cover.

Remember to construct the frame so that it slopes away from the pool, allowing rain and other material to drain away from the water. Horticultural polythene would make an ideal cover. This first rate material will stand up to extremes of temperature and at the same time its transparent nature allows sunlight into the pond and the fish to be watched.

Remember also that a frame must be constructed strongly enough to take the added weight of several inches of snow.

## Sudden freeze-up

PERHAPS a sudden and severe frost has frozen the pool over before a frame can be made. If this happens all is not lost provided a few simple rules are applied.

First task is to make a hole in the ice and it is at this stage that the beginner can fall into a fatal trap. Unthinkingly he rushes out and attacks the offending ice with a hammer. The results are drastic. Shock waves will run through the water stunning or even killing every fish in the area.

A more gentle and very effective method is to place a pan of boiling water on the ice, allowing the heat to gradually melt through and create a neat hole that will leave the fish without so much as a headache.

## Fish

HAVING covered the entire work required to put the pond in good order let us now consider what happens to the fish.

As water temperature drops a fish's appetite decreases and at about 40 degrees Fahrenheit it ceases altogether as the fish enters a period of semi hibernation.

As this slowing down takes place so food requirements become less and feeding is reduced accordingly. Cut down the feed rate from early autumn, gradually reducing it until finally leaving off completely.

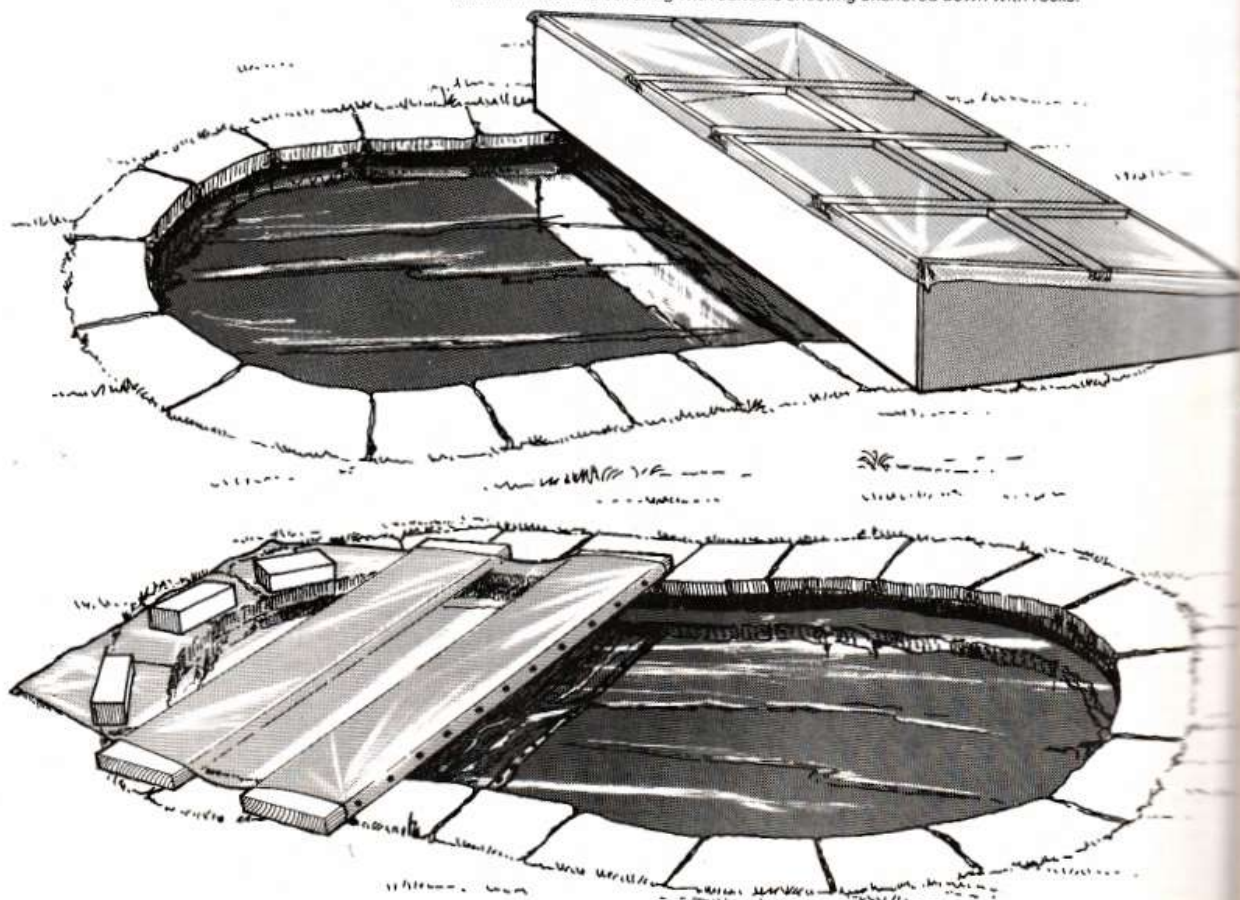
The fish will remain in semi hibernation until the temperature begins to rise in spring. Even if short spells of higher temperatures occur during the winter it is not necessary to feed at this time.

But should a prolonged warm spell occur some small feeds of live food can be given if required. Chopped earthworms are ideal for this purpose.

*A properly constructed frame, strong enough to take the weight of a heavy snow fall will take some time to construct but the effort will be worthwhile and should last for many winters.*

*Build the frame from one inch thick battens and slope it away from the water so that rain, snow and falling rubbish will not drain into the pond. Cover with horticultural polythene to allow sunlight into the pond.*

*A simpler, but equally effective cover can be constructed by laying planks or canes across the water surface and covering with suitable sheeting anchored down with rocks.*



...the pool had taken shape, and lorries had carted away a huge pile of soil from the wreck of the herbaceous border, the reasons for George's labours became apparent. Into their new home went a batch of Japanese koi carp — fish that have since dominated the Peacock's life and brought hundreds of admiring visitors to their Peterborough home.

"I knew nothing about koi when I started up," says George. "Up until 4½ years ago, I kept a few goldfish in a small pond. Then a friend suggested I go to have a look at some coloured carp. That was it."

In fact, that wasn't it at all. George grew tired of walking down the garden every time he wanted to see his fish. So one Christmas Eve, he came home with that familiar pre-occupied look and started digging all over again — nearer the house.

Today, that second koi pond — nearly 30 feet long and walled round with £300 worth of Westmorland rock — supports a shoal of magnificent koi which grow fat on a diet of processed peas, maggots, worms, bran, hard boiled eggs and powdered milk. George has thrown his heart into making the pond a real feature, with floodlighting and cascade.

George's favourite koi is also the biggest in the pond — a silver-scaled beauty he calls Pearl. And though the money side of the hobby doesn't interest him at all, George admits that she's probably worth £250.

"When I first came into the hobby I lost a lot of fish through gill flukes and other diseases," says George. "Now, when I buy fish, I always quarantine them."

Currently his smallest bedroom is given over to just such a quarantine pond, complete with filter. Here, new fish swim around their polythene-walled quarters, watched like a hawk for any sign of potential trouble.

Imelda, George's Italian-born wife, doesn't even mind losing that room . . . but she put her foot down when it was suggested that the outside pond was extended into the living room!

Koi keeping is probably the youngest branch of fishkeeping in Britain, having only really taken off in the past 20 years. Fish are still very expensive — although koi have been bred in this country, most of the really top quality carp still come from Japan. A single female can produce an incredible two to four hundred thousand eggs, most of which will hatch.

Looking after a pond full of koi weighing up to 6lb apiece, and still growing, consumes a lot of hours. Just watching the fish is a full time occupation, and George has solved that problem by always washing and shaving in the kitchen sink, which overlooks the back garden.

He now reckons he's got enough koi for the space available, but that doesn't stop him travelling all over the country, just in case something special crops up.

"People say I'm mad, and I suppose it helps," says George. "But they come and see my fish, go away and start digging their own ponds. That's how infectious the hobby is."

- The pictures show:**
- George with Imelda — a patient wife
  - A worm bed in the garage
  - A quarantine pond in the bedroom



It's a fern-like plant that grows well and is undemanding, branching out to form thick growths.

The next thing is what I call a feature plant — something that will act as the focal point of the tank. For this, I prefer a member of the Spatterdock family, but this isn't always hardy





● Silver Angel




● Zebra Angel

**five faces of an**  
*Angel*

**Words:**  
 Clive Nash

**Pictures:**  
 Clive Nicholls




● **Marbled Angel**

If you talk to a non-aquarist about tropical fish, the chances are that one of the few they can recognise is the Angel Fish.

And it's no wonder. With its unusual triangular body, flowing fins and spiky pectorals, the Angel certainly stands out.

Beautiful, proud and aloof, it is the Queen of the aquarium.

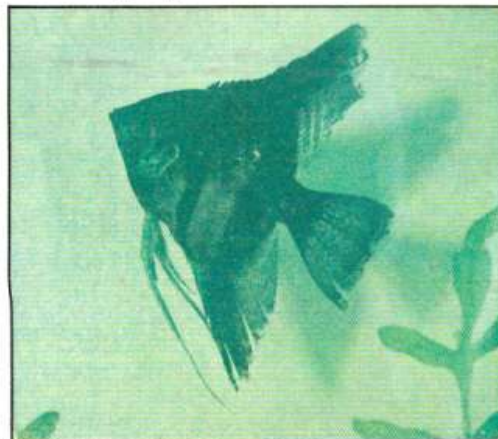
Even though it's a member of the pugnacious cichlid family, the Angel is not too aggressive to share a community tank. A territorial species, it prefers to maintain a clearly defined territory, chasing other fish only when they invade its privacy.

In its feeding, the Angel can be very dainty and even timid.

Rather than join the general scrabble when food is introduced, it remains in the background, gently sipping in the food that drifts past the other fishes.



● **Blushing Angel**



● **Black Angel**

## Back from the dead

This fine example of a Prochilodus won its very first show but almost never made it, showing signs of distress on the way to the final round of the recent Midland Aquarist League at Rugby. Only minutes before judging was due to start the fish, valued at around £30, seemed unlikely to survive and the 12 inch long specimen was almost withdrawn. But strong aeration worked wonders and it recovered to take top honours for Coventry Pool and Aquarium Society member David Callow. Full show report — pages 20 and 21.



Practical  
fishkeeping

## South Park win

**SOUTH** Park Aquatic Study Society beat Isle of Wight in their annual inter-club match. Best fish in show was a Blue Gill Bass.

**Results**  
**Native & Foreign:** 1. Blue Gill Bass, 80 pts. M. Dudley, SPASS, 2. Crucian Carp 78 pts. R. Tim SPASS, 3. Green Tench 76 pts. J. Pollard SPASS, 4. Bitterling 74 pts. S. Stevens, I.O.W. Twintails: 1. Fantail 71 pts. L. Clapp SPASS, 2. Lionhead 70 pts. J. Pollard SPASS, 3. Pearlscale 67 pts. M. Dudley SPASS, 4. Fantail 65 pts. B. McHugh, I.O.W. Single tails: 1. Goldfish 76 pts. B. McHugh, I.O.W., 2. Goldfish 73 pts. G. Herring SPASS, 3. Goldfish 72 pts. B. McHugh I.O.W., 4. Goldfish 71½ pts. G. Herring SPASS.

## Aquarists' meeting

Bristol Aquarists' Society member C. Spence showed a film he had made at their 1978 show when the society met this month. Table Show results were as follows: Bristol Shubunkins '78, 1 and 2 J. Whiting, 3 and 4 V. Cole. Koi, 1, 2 and 3 S. J. Beck, 4 C. Hayes, Labyrinths, 1 G. Price, Livebearers, 1 G. Price, AOV Egglayers, 1 G. Price.

## Tight finish

MID-Sussex Aquarists Society recently staged their annual inter-club event with Tonbridge & Horsham and MSAS.

**Results**  
 Class C (Characins): 1. C. Roffe, Horsham, 2. J. Woodhams, Horsham, 3. & 4. A. Feast, Tonbridge. Class B (Barbs): 1. & 3. P. Cavell, Horsham, 2. J. Bellingham, Tonbridge, 4. W. Stude, Mid-Sussex. Class E (Labyrinths): 1. & 3. Y. Medhurst, Horsham, 2. & 4. D. & E. Pirhard, Tonbridge. Class H (Corydoras): 1. & 2. A. Feast, Tonbridge, 3. K. Groves, Horsham, 4. J. Woodhams, Horsham, Class L (Loaches): 1. & 3. A. Feast, Tonbridge, 2. K. Groves, Horsham, 4. C. Roffe, Horsham. Class T (Livebearers): 1. & 4. W. Slade, Mid-Sussex, 2. & 3. A. Feast, Tonbridge. Tonbridge won the Interclub with 28 points from Horsham with 26 and Mid-Sussex with 6 points.

## Merthyr lecture

A lecture backed by excellent slides on the keeping of barbs and characins was given by Mr C. Turner to Merthyr Aquarist society. Table show for the evening was Class B awards as follows: 1 and 2, P. Willis, 3 and 4 N. Clifford. K.O. Live, 1 P. Willis. K.O. Egg, 1 P. Willis. Judge was Mr C. Davies.

**PLEASE NOTE . . .**  
 Dates on the TetraTest Laborett advertisement coupon on page 2 should read 1st November 1978 to 31st January, 1979 — not '77 to '78.

PRACTICAL FISHKEEPING



## news

Mr P Willis, Merthyr AS press officer, reports that a third open show was held at St. David's Hall. The shows attracted 410 entries from all areas of the aquatic field. Best Fish in Show Award was won by Mr P. Burton with a Cherry barb together with the highest pointed individual award. Best visiting society was Swansea AS. The F.B.A.S. Championship Class T was won by Mr I. Dibble.

## High standard at Trowbridge

THERE was a high standard at the Trowbridge & District Aquatic Society inter-club show.

**Results**  
 Class B (Small Barbs): 1. W. Burton, 2. A. Wing, 3. M. Patrick, 4. A. Wing. Class Ca: 1. R. Gilbert, 2, 3 & 4. A. Wing. Class Cb: 1. & 2. W. Burton. Class C: 1. & 3. P. Grist, 2. Mr. McEhlan. Class Da: 1. J. Bennett, 2. Mr. McEhlan, 3. A. Wing, 4. T. Bucket. Class Db: 1. R. Gilbert, 2. T. Bucket, 3. J. Bennett, 4. M. Patrick. Class Dc: 1, 2, 3 & 4. A. Duffey. Class D: 1. & 3. A. Wing, 2. T. Bucket, 4. R. Gilbert. Class E: 1. & 2. A. Wing, 3. & 4. W. Burton. Class Fa: 1, 2, & 4. A. Wing, 3. W. Burton. Class F: J. New, Class G: 1, 2, 3, & 4. A. Wing. Class H: W. Burton. Class J: M. Patrick. Class K: 1, 2 & 4. A. Wing, 3. R. Patrick. Class L: 1. A. Duffey, 2. R. Patrick, 3. J. New, 4. A. Wing. Class M: 1 & 2. A. Wing, 3. J. Bennett, 4. A. Duffey. Class N: 1 & 4. W. Burton, 2 & 3. A. Wing. Class O: 1. W. Burton, 2 & 3. J. Bennett, 4. Mr. McEhlan. Class P: 1. M. Patrick, 2 & 3. Mr. McEhlan. Class Q: Miss R. Grist. Class R: 1. W. Burton, 2. A. Wing, 3. M. Patrick, 4. J. Bennett. Class S: 1. J. Bennett, 2, 3 & 4. A. Wing. Class T: 1. P. Grist, 2, 3 & 4. A. Duffey. Class Vad: 1. & 2. W. Burton, 3 & 4. A. Wing. Class W: 1. J. New, 2. A. Duffey. Class XBM: 1. J. New, 2. Mr. McEhlan. Class XOT: 1. & 4. J. Bennett, 2. W. Burton, 3. J. New. Class AOV Barbs: 1, 2, 3, & 4. A. Wing.

## Tropicals on sale

THORPE & DAS members were entertained recently to an F.B.A.S. slide/tape show on "Beachcombing for Native Marines", and the evening finished with a large auction of tropical fish.

Results of the monthly table show were as follows: aov egglayers: 1 & 2, Mr G. Balls (celebes rainbow and Australian rainbow); 3, Mr D. Cooper (Butterfly fish), dwarf cichlids: 1, Mr T. Cork (kribensis); 2, Mr K. Appleton (kribensis); 3, Mr P. Sparks (kribensis). Juniors: 1, 2 & 3, Master J. Norton. Meetings are

held on the first Wednesday of each month at 8.00 p.m. at the Canary Public House, Heartsease, Norwich. New members welcome.

## Labeo bicolor wins Best Fish

THE STRETFORD & DAS held their open show at the Buille Hill High School, Salford when the Best Fish in Show was a Labeo bicolor, owned by Mr & Mrs Stevenson of Osram, gaining 79 points.

**Full results**  
**Key to societies:** Blackburn — B; Bridgewater — Br; Darwen — Da; Heywood — He; Independent — In; Leigh — LE; N.G.P.S. — NG; N.W.C.A.S. — NW; Osram — Os; Saint Helena — St; Skelmersdale — Sk; Stretford — St; Wythenshawe — Wy.

Guppies: 1 & 3, Mr D. Conway (Da); 2, Mr Birchenough (St). platies: 1, J. & B. McCarthy (Sa); 2, Mr R. O'Connell (Os); 3, Mr B. W. Carter (Sa). mollies: 1, Mr B. W. Carter; 2, Mr M. Brown (Os); 3, Mr L. Penny (Sa). Aov livebearers: 1, Mr B. W. Carter; 2, J. & B. McCarthy; 3, Mr I. McCarthy (Sk). Swordtails: 1, Mr B. W. Carter; 2, Mr M. Jones (Da); 3, Mr N. Greenhalgh (Os). Cichlids: 1, Mr D. Hornby (Le); 2, Mr & Mrs Wesson (NW); 3, Mr W. J. Brannon (Os). s. Cichlids: 1, Mr B. Wilson (Sk); 2, Mr G. Lawless (Le); 3, Mr I. McCarthy. Angels: 1, Mr & Mrs Stevenson; 2, Mr W. T. Squirell (Wy); 3, Mr & Mrs Wesson. Rift Valley: 1, Mr & Mrs McGinn (B); 2, Mr N. Greenhalgh; 3, Mr D. Hornby. 1. Anabantids: 1, Mr P. Kean (Os); 2, Mr B. Wilson (Sk); 3, Mr B. Davies (St). S. anabantids: 1, Mr E. Jones (Sa); 2, Mr C. Martin (Sk); 3, Mr & Mrs Stevenson. Fishers: 1, Mr B. W. Carter; 2, Mr J. Haley (Da); 3, Mr & Mrs Stevenson. 1. Characins: 1, Mr & Mrs Stevenson; 2, Mr & Mrs Wesson; 3, Mr P. J. Harwood. S. characins: 1, Mr & Mrs Stevenson; 2, Mr B. W. Carter; 3, Mr I. McCarthy. 1. Barbs: 1, T. & J. Selby (Wy); 2, Mr P. Kean; 3, Mr & Mrs Stevenson. s. barbs: 1, Mr J. Dean (Sa); 2, Mr B. W. Carter; 3, Mr & Mrs Stevenson. Rasboras: 1 & 2, Mr B. W. Carter; 3, T. & J. Selby. Danios: 1, Mr S. Auernigg (B); 2, Mr & Mrs Stevenson; 3, Mr M. Brown (Os). Minnows: 1, Mr J. Haley (Da); 2, Mr G. Lawless. Aov tropical: 1, Mr J. McGinn; 2 & 3, Mr I. Brown. Labeos & sharks: 1, Mr & Mrs Stevenson; 2, Mr & Mrs Dawson; 3, Mr D. Hornby (Le). Flying foxes: 1, Mr R. O'Connell (Os); 2, Mr L. Gibson (St); 3, Mr & Mrs Stevenson. Corydoras: 1, Mr J. Haley; 2, Mr B. W. Carter; 3, Mr I. McCarthy. Botias & loaches: 1, T. & J. Selby; 2, Mr I. McCarthy; 3, Mr L. Penny (Sa). Aov catfish: 1, Mr E. Jones; 2, J. & B. McCarthy; 3, T. & J. Selby. Pairs egglayers: 1, Mr I. McCarthy; 2, Mr K. Brand; 3, Mr B. W. Carter. Pairs livebearers: 1 & 3, J. & B. McCarthy; 2, Mr F. S. A. Hopwood (B). Breeders egglayers 1-5: 1, Mr I. Brown (St); 2, Mr F. S. A. Hopwood. Breeders egglayers 6-10: 1, Mr F. Summers (Sk); 2, Mr E. Jones (Sa); 3, Mr B. Wilson. Breeders egglayers 11-15: 1, Mr F. Summers. Breeders livebearers hard: 1 & 2, G. & C. Berry (B). Breeders livebearers easy: 1, Mr B. W. Carter; 2 & 3, J. & B. McCarthy. Juniors: 1, Mr W. T. Squirell; 2, Mr D. Selby; 3, Mr J. McGinn. Egglaying toothcarps: 1 & 2, Mr E. Jones; 3, Mr F. S. A. Hopwood. Ladies: Ms. M. Brown (Os); 2, Ms. J. Penny (Os); 3, Ms. B. McCarthy (Sa). Goldfish single tails: 1, 2 & 3, Mr P. Lane (NG). Goldfish twin tails: 1 & 3, Mr P. Lane; 2, Mr D. Robert (IN). Aov coldwater: 1, Mr W. J. Brannon (Os); 2, Mr E. Jones; 3, Mr I. Brown. Mini jars: 1, 2 & 3, Mr & Mrs Stevenson.

## next month



**HYGIENE:**  
 So important to health with Bill Ramsden

**CICHLIDS:**  
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**Fish Breeding secrets with Don Martin**

**Building a garden pond**

**More about plants with David Shields**



**Beating disease by Dr David Ford**



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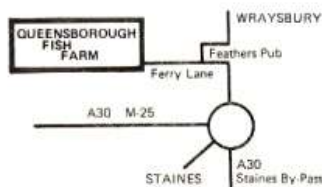
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### THE ECOLOGY OF FISHES P.999

by G. V. Nikolsky

352 pages; 5½ x 8"; Soft cover;  
64 full-colour photos, 17 black and white photos; 96 line  
illustrations; 72 charts and tables.  
ISBN 0-87666-505-9  
£8.50 Publication Date 12th Nov. 1978.

*The Ecology of Fishes* is a newly-revised and expanded edition that investigates every aspect of the mode of life of fishes. Countless aquarium hobbyists have sought a book that will tell them all about fishes; in this book they will find the answers to their questions. The book is indispensable for aquarium fish dealers and is recommended as well for naturalists and zoology students.

The book is highly illustrated with 64 full-colour photos, plus almost 200 black and white illustrations and charts. Readers will find this to be a very interesting subject and they will be impressed by the massive amount of information that this book contains. Aquarium hobbyists who want to fully understand the biological processes of their fish will find this a highly useful and valuable addition to their library.

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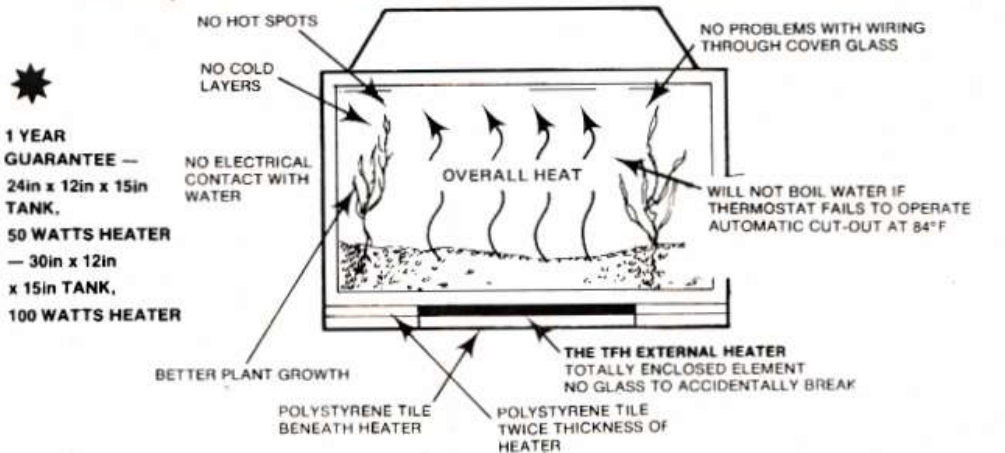
by Peter Giwojna

128 pages; 5½ x 8"; Soft cover  
72 full-colour photographs, many black and white  
photographs  
ISBN 0-87666-471-0  
£2.50 Publication Date 12th Nov. 1978.

Aquarium hobbyists will be delighted by this colourful new book. Marine hermit crabs are strikingly beautiful and interesting creatures that will entertain observers for hours. This book presents a highly informative guide to the maintaining of healthy marine hermit crabs. It will appeal to both beginning and advanced hobbyists. The full-colour photos have been designed not only to be instructive but to show the many colourful varieties of marine hermit crabs. Written in a style that grabs the reader's attention through the obvious competence of its author and its fascinating anecdotal charm, this good book will sell rapidly.

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**NEW**

# BRISTLE NOSE

.....and how a ham roll helped overcome a sticky problem with Harlequins



**DON MARTIN** has been seeing eye to eye with fish ever since he became the first police frogman in the Norwich City force. The work involved recovery of stolen property and a good many more unsavoury duties, but was not without its lighter moments. Instead of today's sophisticated radio equipment linking the diver and his colleagues on the bank, bricks would be taken along to the river bank, and thrown in when it was considered time for Don to surface.

Although Don had been keen on tropical fish since the mid-forties, it was not until 1968, when he retired from the force with the rank of sergeant, that he could expand his tropical fishkeeping into a business. He now has 120 tanks housed in two sheds at his Norwich home, and supplies shops, wholesalers and private buyers. He will breed only those species which will thrive in a community tank, but that leaves him with a tremendous field to choose from.

Don admits that science has its part to play in the breeding of tropicals but it has been the thinking out of problems as they crop up that has gained him his reputation. He was the first to spawn the South American bristle-nose catfish *Ancistrus Lineolatus*, and in this, the first of his series, he describes how that hurdle, and others, was overcome.

MY obsession with tropical fish began in 1946. I had two tanks in the house, in which I bred black mollies, but the usual ultimatum came when I wanted to expand the hobby... so I built an outside fish house capable of supporting 20 tanks.

In those days, fish which we now take for granted and buy for shillings cost pounds. Neon tetras (*Paracheirodon innesi*) fetched two guineas each. These were all wild fish, caught from the tributaries of the Upper Amazon and shipped over to this country. This was before the days of plastic bags, and casualties ran high — for every thousand fish to leave South America, perhaps only 200 would be alive at the end of the long sea voyage.

The plastic bag, which arrived in the mid-50s, revolutionised the fishkeeping hobby. Airstrips were built near the collection sites, so that neons, packed a thousand to the bag and kept alive and healthy with sealed-in oxygen, could be flown across the world in a matter of hours.

It is still the case, as it was then, that no planes fly direct from South America to Britain. Instead, the fish would go via Lufthansa to Frankfurt in Germany, where they would transfer to a BOAC flight to London.

Air-freight charges have a direct bearing on the cost of fish. A box capable of holding 500 neons will take only 50 silver sharks — which is why, if economy is important, buying small fish to grow on makes such good sense.

Anyhow, back in the forties, with police constables' wages only £4 a week and a single neon tetra costing half that, you can understand why I spent hours choosing my fish and studying reference books, trying to create perfect conditions for them. Despite all this care, I had frequent casualties.

In fact, it took me 15 years before I was spawning neons regularly. The secret was old rainwater, kept in a butt until fallen leaves brought it to the required acidity. This duplicated the naturally acid water of the Amazon

tributaries, and all that was now needed was a suitable spawning medium. Coconut fibre filled the bill so well that I still use it today.

Harlequins (*Rasbora heteromorpha*) were another problem fish in those early days. I had heard that some success had been claimed by German breeders, using plastic plants as a spawning medium. So when I acquired 20 fish some ten years ago, I placed a likely-looking pair into a breeding tank filled four inches deep with aged tap water and 'planted' the foliage from a plastic rose.

The following morning, the fish were going through the motions of spawning, turning upside down under the leaves, but although I watched them for two hours, I could see no eggs. Just to be sure I hadn't overlooked them, I left the tank intact for a fortnight, but no fry appeared.

I emptied the tank, refilled it with the same



**This incredible shot shows a brood of Bristle Nose Catfish. Don Martin has developed a system which means the fish spawn on average once every five weeks.**

PRACTICAL FISHKEEPING

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**The Bristle Nose Catfish — a remarkable species which make extremely efficient scavengers.**

aged tap water and introduced another pair of Harlequins. This time I watched the spawning carefully. Instead of sticking to the underside of the leaf as they should have done, the eggs were falling through the water and being snapped up by the parents. What I had to do was find some way of isolating them as soon as they were released and fertilised. Of course at that time there were no devices on the market that would do this, and my first experiment, 'planting' the plastic rose into a piece of perforated metal so that the eggs would fall through, ended in rust-tinged water and failure.

Then, purely by chance, I hit on the solution. My wife offered me a ham roll packed in fine plastic mesh of just the right gauge. I took a shallow glass dish, stretched the mesh over the top and held it in place with a rubber band, pushed the plastic plant into the top so that there was only an inch or so between the foliage and the mesh, and then submerged the entire setup in the breeding tank. When the next spawning took place I watched hundreds of eggs fall through the mesh and I thought I was home and dry. Unfortunately, the eggs soon mildewed — the water conditions to suit the parent fish and the eggs were not one and the same.

I experimented and luck was with me. I put some aquarium water through a portable water softener and kept it aside in a separate tank. The next time the parent Harlequins spawned, I waited till the eggs had dropped through the mesh, then removed the parents and siphoned the eggs into the softened water. These hatched, and I reared 180 fry.

This breeding method may have worked, but it was fiddly. Luckily, I was soon working with Cardinal tetras (*Lamprocheirodon axelrodi*) which indirectly led me to a better breeding technique for Harlequins.

Cardinals, like neons, require acid water. I used rainwater which had had pieces of oak bark left floating in it for a week. Of my four pairs of Cardinals, two decided to spawn and two didn't, so purely by way of experiment, I introduced a pair of Harlequins to the oak bark water in the spare tanks. They spawned two days later, I removed the parents and 170 fry survived.

Since then, I have learned that Harlequin eggs will stick on the spawning medium if the water has a pH of 6.5 (°DH7) and under these conditions, the parent fish will spawn on top of, as well as underneath, the leaves.

You can read all the books, but very often it's sheer luck combined with intuition that



**Don Martin goes on a tour of inspection among his many tanks.**



**Close up of the Bristle Nose — emphasising just why this particular catfish has that name.**

makes the difference between failure and success. This was certainly the case when I bred the South American bristle nose catfish (*Ancistrus lineolatus*).

First, a word about these remarkable fish, which are now often wrongly sold as Plecostomus. They do the same efficient scavenging job as 'Plecs' but although they belong to the same family (Loricariidae) there is one handy difference — they are easy to sex, as the adult male has a mass of long bristles on the head. When they first arrived in Britain, the males and females were thought to be separate species, and many initial attempts at spawning never got off the ground for that very reason.

When I got my first pair, I experimented with water temperatures ranging from 68 up to 82°F. I tried changing a portion of the tank water, but all to no avail. I had had the fish some months, in aged tap water at 80°, when I decided to supplement the algae growth in the tank and give the fish a feast. So I took out four gallons of water and topped up the 30-gallon tank with Norwich tap water, which has a pH of around 7.4, adding at the same time a good dose of Aquarian plant food — which has the effect of triggering the algae.

That night, the Bristle Nose cats spawned. The amber coloured eggs were laid beneath a rock and guarded by the male. In due course they hatched and since then I have spawned the original parents eleven times — an average of once every five weeks. Numbers have ranged from 202 down to 86, but virtually all the young survive on a diet of mashed garden peas and grow on rapidly.

I have always followed the same procedure of spawning, changing some of the water and adding the plant food. Once, eager to find out just what it was about the stuff that had such an effect on the parent fish, a friend of mine wrote to the manufacturers, only to be told that plant food had no aphrodisiac qualities. I put this to the test by leaving it out the next time I changed a portion of the parent fishes' water, and for two months there were no spawnings. Fish, like human beings, know what they want, it would seem, even though it is not always clear why they want it.

**NEXT MONTH: Breeding Rams and Corydoras : DON MARTIN shows you how.**



OVER 14,000 people went through the turnstiles at Belle Vue, Manchester, for this year's British Aquarists' Festival. "But that wasn't a record attendance by any means," said show organiser Cliff Walker.

It is, however, one of the most successful events in other ways. All the main manufacturers and a whole host of dealers packed the main hall at Belle Vue with the greatest selection of fish, plants and equipment ever massed under a single roof.

"All the stands did a roaring trade, and many have already approached me for extra space next year," said Cliff, who organised the event on behalf of the Federation of Northern Aquarium Societies.

"People seem to have been saving all year to buy the latest equipment and they went wild."

The number of aquarist societies attending the show was the same as normal, though there was a substantial increase in the number of fish entered for the various classes. In fact 28 societies represented a total entry of 700.

"Strangely, we didn't have a single society entry from the Midlands," said Cliff. "We had the majority from the north of England, of course, but we also had several visitors from Scotland and the South."

The increase in entries for the fish and tableaux classes could have been due to the rise in prize money offered this year, and extra variety was added by the inclusion of a reptile section.

But the main successes at the show were enjoyed by the trade stands. Trade was very brisk at the Interpet stand. So brisk, in fact, that managing director Neville Carrington is convinced that Britain is about to enter a new boom in fishkeeping.

"All the signs are pointing to a real upsurge of interest," he said. "People seemed to have more money than usual to spend on a wide variety of equipment."

The Dorking, Surrey, firm showed a full range of their products, from fry food to

# No records-but roaring trade

## 14,000 visitors flock to Belle Vue



Cliff Walker — Delighted with the response to this year's show.



filtration units.

"People seemed especially interested in our CV sub-gravel filters and our heating equipment," said Mr Carrington.

"We were hoping to have several new products ready for unveiling at the show, but they will now be launched in the near future."

The aquarists' "Mecca" was how King British technical director Gordon Holmes described Belle Vue. "It's a great social gathering, and for many people the only chance to see such a wide variety of fish and equipment — and there are usually a few bargains to be had," he said.

"We treat this festival as our shop window for the year, reaching thousands of customers from all over the country in a single day."

King British, who are based in Bradford, Yorks, displayed their entire range of tanks and equipment, together with a wide variety of fish, plants, reptiles and amphibians.

Britain's biggest filter medium manufacturers, Crystal Clear, also had a good show. "But our participation is in an advisory capacity rather than for sales," explained owner Bob Tomlinson.

"We like to meet fishkeepers and help them solve their filtration problems, rather than use the show to sell our products."

Bob also sells worm cultures for fish food. "We are having a special temperature-controlled room built to develop that side of the business still further," he said. "There is a huge demand for many types of worm, especially as old favourites like tubifex become scarcer."

People interested in the more special fish headed straight for the Middlesex-based Aquatic Nurseries' stand, and the fish that drew the crowds were scarce Malawi and Tanganyikan cichlids, and some lovely Koi carp.

"It was the best Belle Vue show we have been at yet," said managing director Malcolm Hardy. "Trade was good, even for the more expensive fish that we deal in, and we ran out of bogwood very quickly."

Bogwood, used for tank decoration, is one of the company's specialist lines. "We could have done with twice as much," said Mr Hardy. "Demand was so high."

Their stand also had a full library of the fishkeeping books available, several new Japanese fish foods, and a full range of fish disease medications.

"We also had a big demand for British-grown plants, rather than imported specimens," said Mr Hardy.



Sheffield-based Sheaf Valley A.S. drew a lot of attention with their Record Player entry in the Tableaux Section. Full story over-page.



# Christmas Gifts

A few ideas for the late shopper

by Cliff Harrison



## How to get the correct chemistry

Although the vast majority of fishes will live perfectly happily in tapwater, once it has stood for a few hours to remove the dissolved gases, and tolerate the chemical changes that result from the presence of gravel, rocks, plants and the fish themselves within the aquarium, there are instances when this "hit or miss" approach just will not do.

When trying to breed the so-called "difficult" species for instance, or even when just trying to keep alive some of the rarer and more expensive imports, such as certain new "killies". At these times, knowing the exact chemical composition of the water being provided for the fish is quite essential for any serious aquarist, and the TetraTest Laborett provides a reliable method of measuring four major variables: the pH, nitrite level, general hardness and carbonate hardness. The outfit is particularly easy to use, even by a novice, and suggestions are given on how to rectify unfavourable conditions. As a seasonal bonus, TetraMin are including a special voucher in their current advertisement entitling readers to a saving of £1 off the TetraTest Laborett's normal price of £9.90.

## So neat and inexpensive



If you are searching for an inexpensive stocking-filler, how about what must be the neatest aquarium thermometer on the market — the Es-Es "Dumpy". This bi-metallic model measures just 1" in diameter, yet the figures can be clearly and accurately read over its full range of 40°-110°F. The Dumpy is highly resistant to accidental damage, from fish or humans, attaches firmly to the glass of the aquarium, and costs 95p.

The "Surge Filter" is a relative newcomer to the hobby, combining the well-established advantages of biological filtration with a very compact body size (about 8" tall). In use, the filter is placed directly onto the bottom of the aquarium, and the gravel piled up around it to a depth of at least 4".

Thus all that is seen is the remaining few inches of filter tube above the gravel, which can easily be camouflaged with small pieces of rockwork or plants. The "Es-Es" Surge Filter costs £1.75, is virtually maintenance-free, and is ideal for most low-to-medium filtration situations, such as community aquaria, breeding and quarantine tanks, and especially heavily-planted displays since root disturbance is minimal.

## For the fishkeeper who has everything

For the fishkeeper who has everything, how about the ultimate in air-pumps — the Wisa 1000. It has enough power to supply a typical fish house, and is constructed in the manner we have come to expect of West German products. Although the mechanics of this pump could be described as being of traditional vibrating-arm design, it really has nothing in common with models produced by any other manufacturer, and bears little similarity to the three smaller models in the Wisa range.

There are two massive diaphragms and valve chambers, powered by a single coil and vibrator arm. The air is double-filtered on entry to the pump, and the output can be adjusted over a wide range to minimise noise and wear when the full performance is not required. Everything is beautifully engineered, and even at a price of £99.00 (excluding VAT) the hobbyist is unlikely to be disappointed.

## Air pumps: one too many a good thing

No matter how many air pumps an aquarist may have, a spare is always appreciated if only to be on hand for an occasional emergency. The Armitages 'Pixie' air pump is an interesting new design, British all-through, it will admirably suit the long-term needs of many aquarists. It manages to combine a useful output, up to three or four airstones, and a low noise level, within its tiny casing. Routine servicing and replacements are made simple by its novel style of construction, with the various components sliding out once the cover is removed. The 'Pixie' air pump costs £3.79, inc V.A.T.

## The Sicce F100 Power Filter

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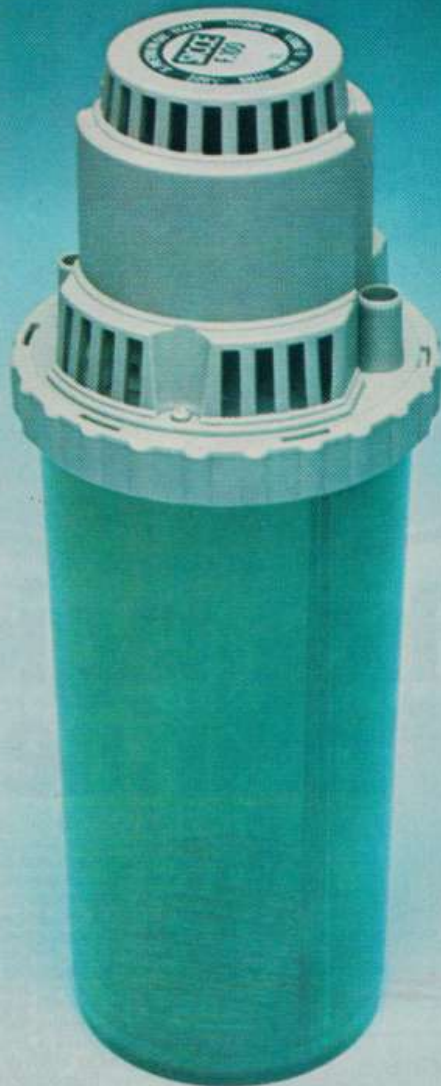
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# Power to the smaller tank



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From the makers of the Sicce F.200 Power Filter, now comes the smaller F.100 Power Filter. Specially designed for the medium sized aquarium of up to 100 litres.

The F.100 combines quiet and cool running, and by virtue of efficient design, the pump and filter are combined in one easily removable unit, thus simplifying maintenance and cleaning.

Suitable for both fresh and salt water with a capacity of 150 litres per hour, the F.100 is a step forward in design and versatility at an attractive low price.

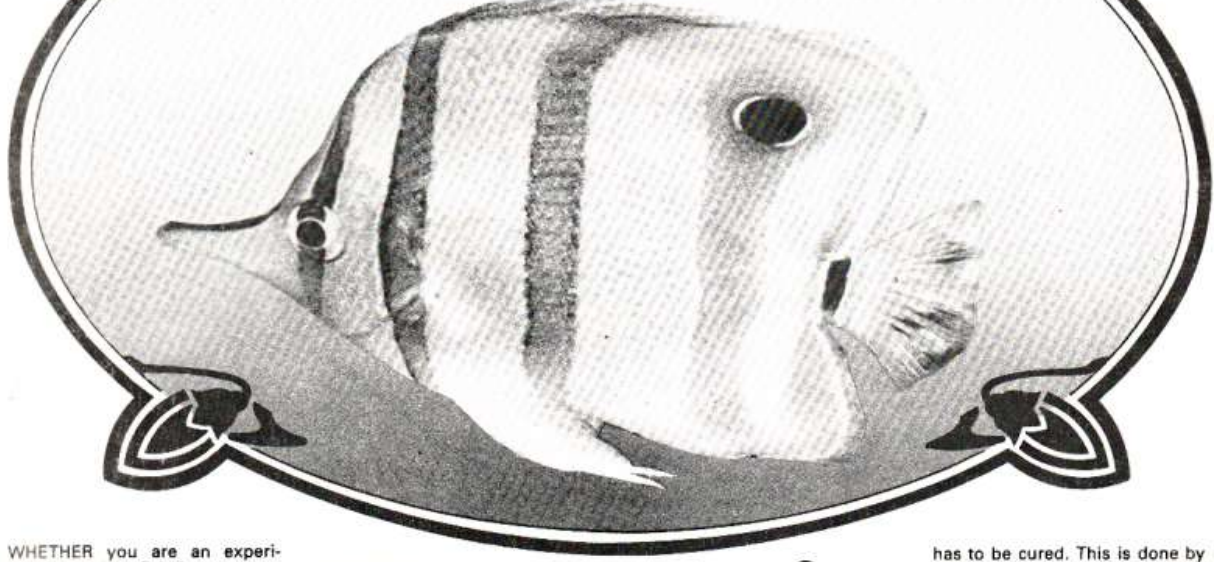
The retail price is £26.95 plus VAT.

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 Peterama

Marine tropicals are the most beautiful of fish. But many people dread keeping them. Here we look at some of the reasons why their fears may be unfounded.

● Below: Copper Band Butterfly, *Chelmon Rostratus*



WHETHER you are an experienced tropical fish keeper or a complete novice to the world of aquariums, it's almost certain that one particular branch of the hobby will fascinate you — tropical marines.

You just can't ignore the beauty of the vividly coloured coral fishes — which leave cold-water and tropical freshwater species in the shade.

For most people, television has brought the hectic life of the sea into our homes. But, more and more, people are starting to create their own coral reef in miniature — right in their own living room.

Unfortunately, many more people only look and regret that they can't set up a tropical marine tank. If only they realised how

## The magic of marines

easy it has become now.

But old beliefs and prejudices die hard. Saltwater aquaria were hard in the past, but science has taken a lot of the problems out of this side of the hobby.

Synthetic seawater, biological filtration, easy to use testing kits, and a whole host of other

aids all put tropical marines within easy reach of anyone.

Even youngsters and absolute beginners in fishkeeping have taken up marines successfully. Most aquarists will know someone who has started a marine set-up and failed — but the only reason can be their own ignorance of the modern advances.

Let us start with the basics and see where they might have gone wrong, and where you can go right. The most obvious difference between freshwater fish and marines is the water in which they live. Once upon a time, people relied on the sea as the only source, making regular trips to the seaside to collect large quantities of water. This had several major drawbacks.

First of all, sea water used straight from the sea undergoes massive and complex biochemical changes. Bacteria and microscopic life like plankton flourish and fade in cycles completely unsuitable for the limited confines of a domestic fish tank.

To overcome the massive build-up of bacteria, sea water

has to be cured. This is done by storing the water in non-toxic containers for as long as six months at a temperature of 40-50 degrees Fahrenheit (5-10 degrees Centigrade).

Debris accumulates at the bottom of the containers and the cured water is siphoned out for use. Sounds a bit much, doesn't it. Well don't worry, all you have to do nowadays is to go to your local fish dealer and buy one of the synthetic salt mixes available. It contains all the necessary salts and chemicals to successfully imitate real salt water. Like all good recipes, the instructions are on the packet and easy to follow. In fact, most modern marine aquarists have been brought up on synthetic sea water. Apart from the time saved, there are none of the disease-producing organisms found in the real thing.

Aeration is tremendously important in the marine aquarium, far more so than in freshwater, so your air pump is not a piece of equipment to skimp on. You don't have to spend a fortune. Just buy the best you can afford. For instance, a pump costing £8 should give a better performance than one bought for £3.

The reason that aeration is so important is that the oxygen requirements of the marine fishes' coral reef environment is as high as 250 times that of freshwater fish.

They can't put up with as much carbon dioxide, either — and that brings us on to filtration. Early

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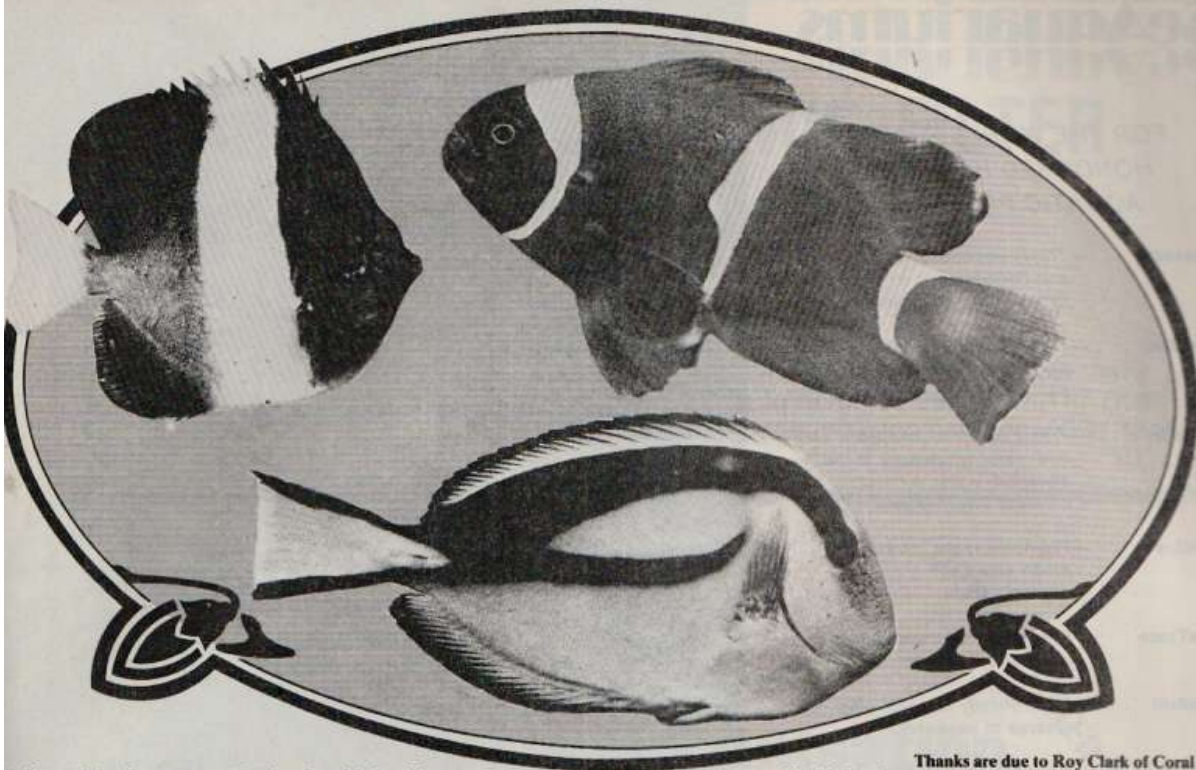
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● Above left: *Zoster Butterfly*, *Hemitaenichthys Zoster*  
 ● Above right: *Maroon Clown*, *Premnas Biaculeatus*  
 ● Below centre: *Regal Tang*, *Paracanthurus Theutis*

Thanks are due to Roy Clark of Coral World, Peterborough for his help with the pictures.

aquarists relied on syphoning out excess food and waste products, which both produce increased nitrite levels in the water — and nitrites kill fish. But that was very time-consuming and by no means as efficient as needed.

To combat the nitrite levels, early marine enthusiasts used to introduce hardy fish or invertebrates into their tanks. Bacteria grew on the aquarium gravel which broke down waste products preventing a nitrite build up. This, again, was too inefficient for the home aquarium as it took several months to establish.

Modern aquarists can buy ready-made cultures of the necessary bacteria, which establish themselves in a matter of weeks. These are added to the tank after a suitable under-gravel filter has been fitted. And the filter should cover the whole bottom of the tank to be as effective as possible.

Air is introduced into the under-gravel filter — which should never be turned off — and the air and water circulation draw waste products into the gravel where the bacteria culture is waiting to break it down. This is called a biological filter, just one more of the modern breakthroughs that have made keeping marine fish so much easier.

Another useful scientific instrument is the hydrometer, which measures the specific gravity, or

"density" of a liquid. Obviously, salt water fish are used to the "density" of the sea, and you have to duplicate that.

The synthetic salt water additives are measured fairly accurately, but a hydrometer allows you to double check. Marine aquarists also have to acquaint themselves with the pH factor of their water — in other words, the acidity or alkalinity of the water.

Sea fish require a higher pH value than freshwater species, meaning that their water must be slightly alkaline. And the pH factor is far more vital, so it needs to be checked at least weekly.

In the old days, often, the only sign of a problem in a marine tank was the death of fish. Not enough people know how to make the necessary tests, but nowadays simple-to-use kits are available to test both pH and nitrite levels.

We also have the great advantage of all glass tanks, made possible with the new frame rubber sealants developed. With no metal frame, there is no rusting and hence no pollution from the frame.

And another great advantage today is the ease of availability of a vast range of fish, invertebrates and decorative corals. Fish can be very expensive, but there are many easy species that will cost only a few pounds each.

## SeAquariums

29 Stambol Gardens Road,  
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Dear Sir,

I am writing to you on behalf of my father whose hobby is Tropical Fish. He has also had three terrapins for the last three years, all thriving well. They are fed on fresh beef, prawns and lettuce and are now 4 inches long. We kept them in a 24" x 12" tank containing 4" of water and a petrified wood block, there is an overhead "Triton" 20 watt lamp and an air filter in the water. The terrapins are kept in 75°C constantly. The only problem we have with them is a problem of sloughing of the skin, they become dried and blistered like our skin would 2 months. They are very active but we are still very concerned in the condition and wonder if you could advise us to what treatment would be suitable.

Yours faithfully,  
 Suzanne Cavell (Miss)

Dear Miss Cavell,

I received your letter concerning your father's terrapins this morning. The condition which you describe, i.e. eye disease, is not at all uncommon in captive terrapins, and is frequently found simultaneously with a "soft-shell" condition.

The most common cause of the former condition is a general avitaminosis syndrome, whilst the "soft-shell" state is due to calcium deficiency.

You will remedy both ailments by feeding live earth-worms soaked in "SEAVITA" solution. "SEAVITA" is a broad-spectrum vitamin supplement which, in addition to containing all the special vitamins needed by fishes, amphibians and reptiles, is also very rich in calcium pantothenate.

"SEAVITA" is readily available from most aquatic shops. I would advise you not to accept imitation products.

Yours sincerely,  
 Graham F. Cox

Dear Miss Cox,

I would like to thank you very much for replying to my letter concerning my father's terrapins.

I am pleased to tell you that we tried "SEAVITA" and that both terrapins have improved immensely.

Thanking you again,  
 Yours sincerely,  
 Suzanne Cavell

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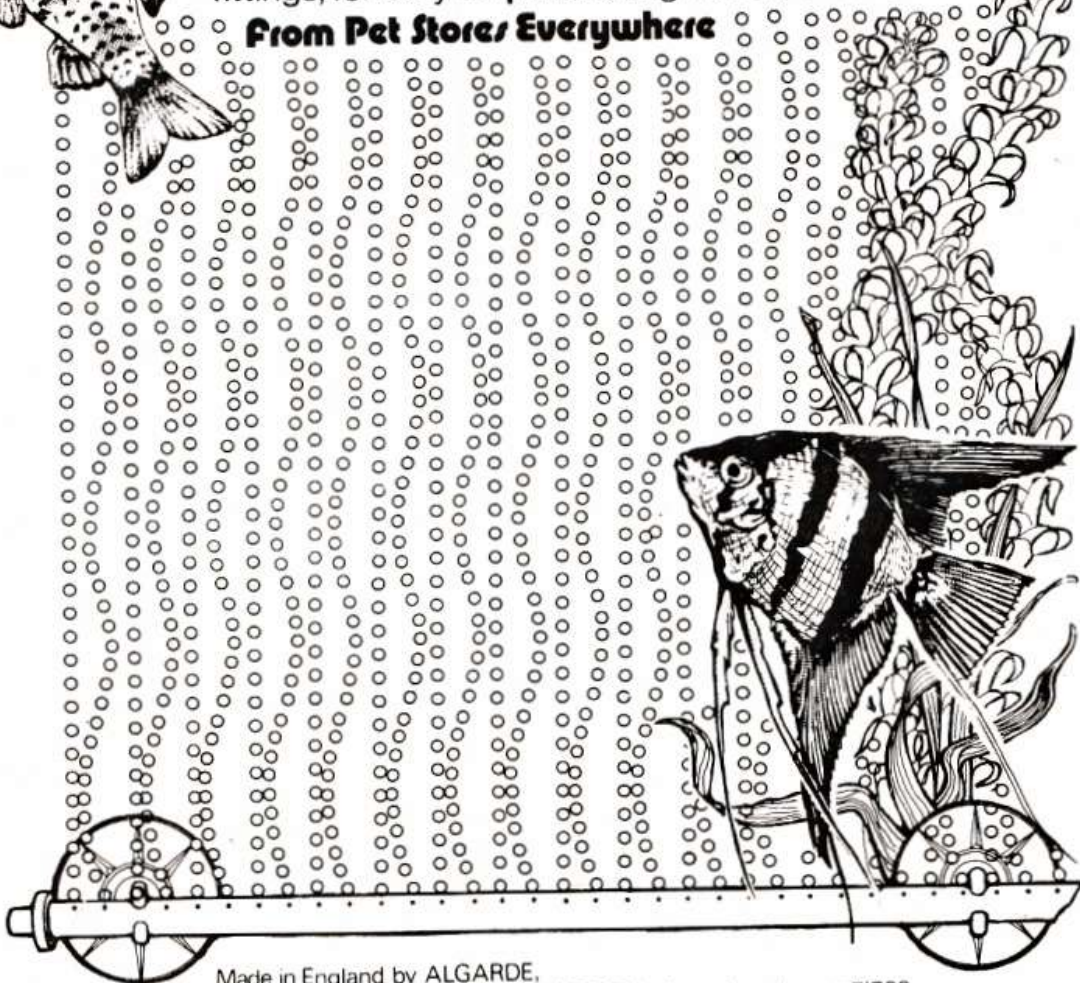


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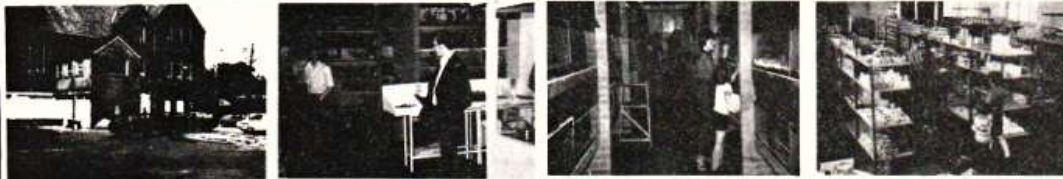
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TRADE ENQUIRIES INVITED

# SeAquariums 26

Dear Mr Cox,

I thought it was about time I wrote to thank you personally for the enjoyment your Synthetica sea salt has given me — and my fish. My 120 gallon marine tank has been flourishing for over a year now and I can honestly say I have never looked back on the day I first visited your Heathrow premises.

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Once again thank you for an excellent product, and should you ever be in the Cambridge area please drop in and see for yourself how good Synthetica is doing in Hardwick.

Yours sincerely,  
David Gooch  
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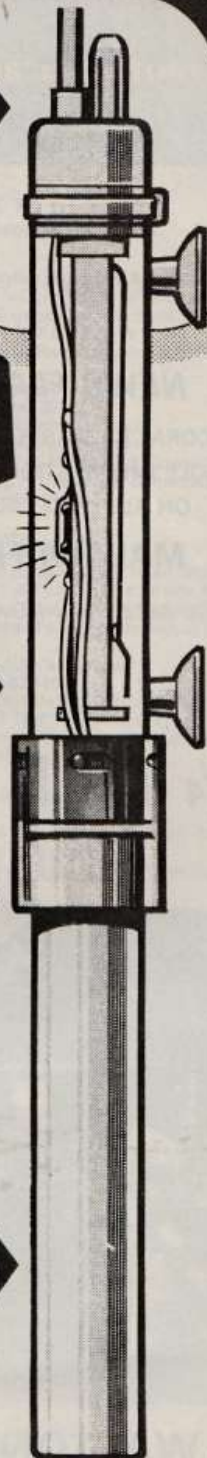
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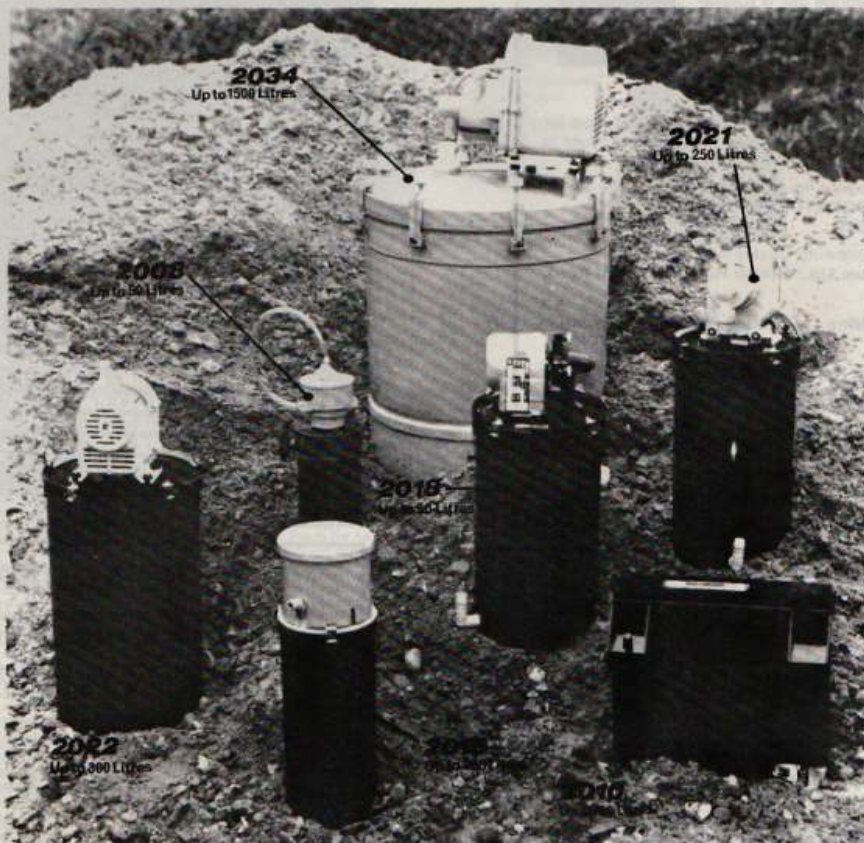




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## Se Aquariums

*Dears Sirs,*

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*However, I note that Golden Orfe do not tolerate "STERAZIN" very well and for that reason I have never introduced any of this species to my pond but the reason I am writing is to ask you whether Koi Carp are at risk with "STERAZIN" "P" as I have recently introduced a pair of these expensive fish and before I add the next application to my pond I would be pleased to have your comments.*

*Yours faithfully,*

**MR C. J. EASTER.**

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