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Magnificent Marines

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Filtering Ponds

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A major clean up for the PRACTICAL FISHKEEPING marine tank—a picture sequence which is a must for marine keepers.

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COVER PICTURE: The majestic Long Nose Butterfly star of the PRACTICAL FISHKEEPING marine aquarium. Picture by Clive Nicholls.

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Editor: Norman Wright

Technical Writer: Clift Harrison

Art Editor: Dave Stirling

Designer: Carolyn Harbour

Advertising: Gerry Belonger, 60 Church

Crescent, London, N20. Tel: 01-368 8630.

Advertising Copy: Maureen Trowsdale,

EMAP National Publications, Bretton Court,

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Publicity Manager: Peter Ward

Classified Advertising: Beryl Smith,

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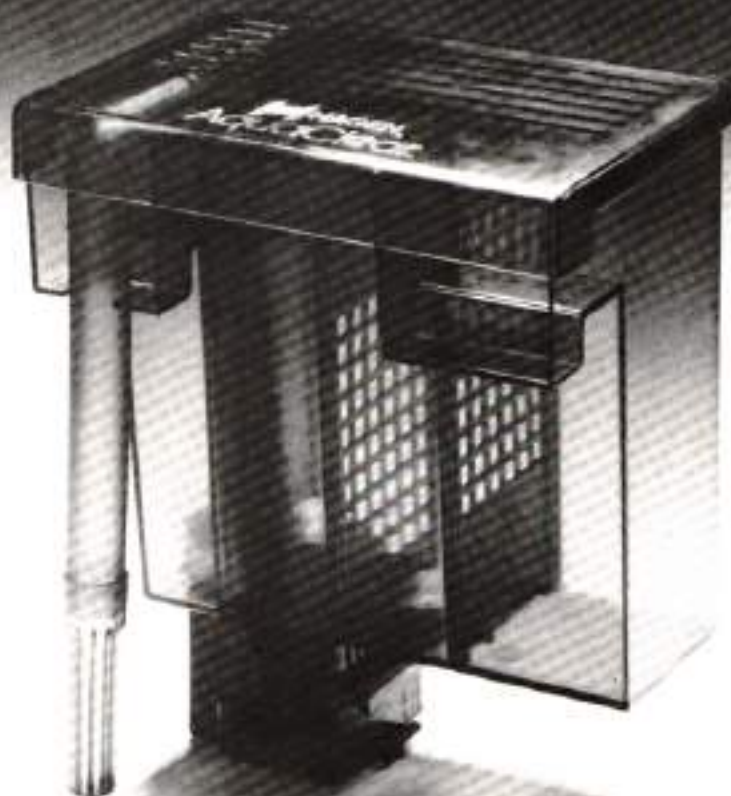
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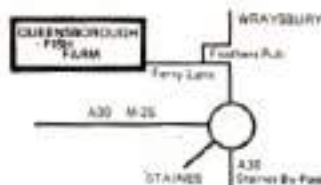
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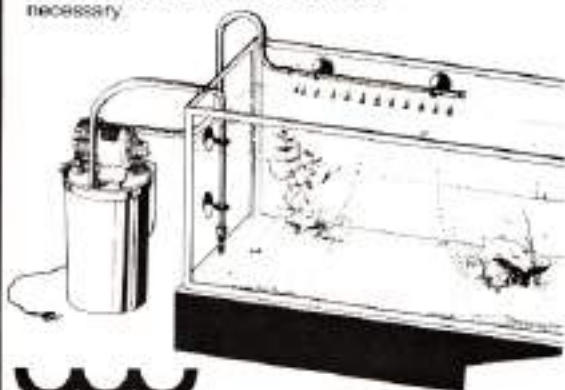
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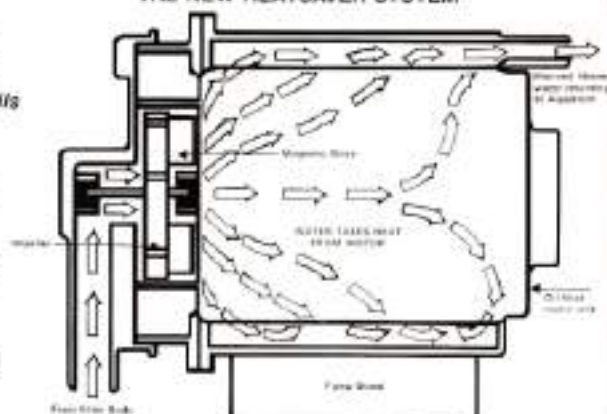
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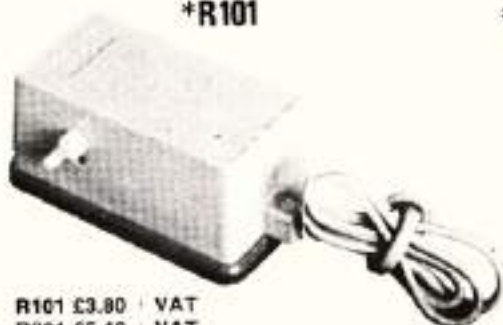
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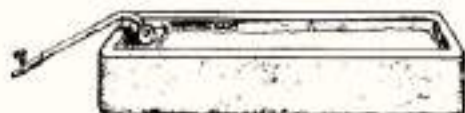


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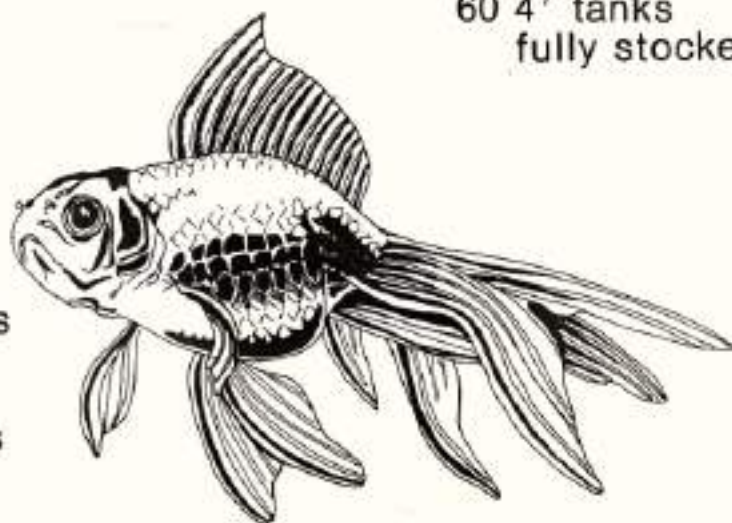
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Matchless Marines

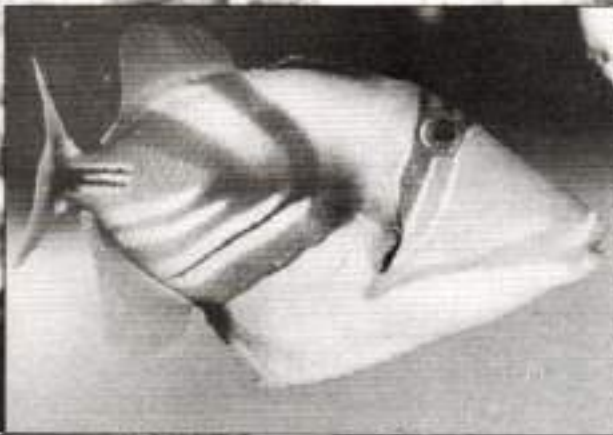
Popular species to brighten your aquarium



A remarkable colour transformation takes place as the Emperor Angel grows into adulthood. Our two pictures show that dramatic change. The young Emperor is dark blue and white in circular patterns. It certainly looks nothing like the adult fish which has a yellow and dark blue head, vivid lighter blue and yellow horizontal body stripes and light and dark blue striped finnage. In fact the Emperor in both stages of development is probably the most spectacular of the marine Angels. Their range is through most of the world's coral seas.



THE Picasso Trigger is marked just like an abstract painting — giving its name. It comes from the tropical Indian, Pacific and African waters. And like most triggers it is aggressive. It would certainly bite a finger if it gets the chance.



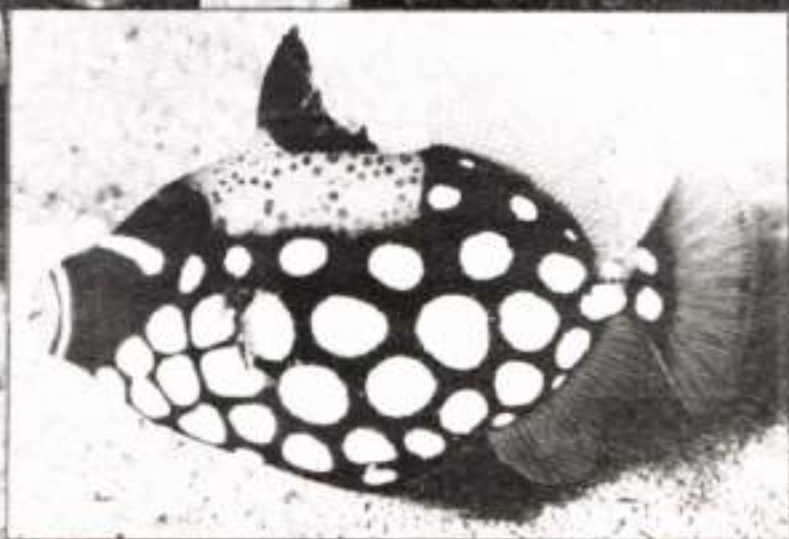


ABOVE: Here is a really popular aquarium fish — the Powder Blue Surgeon. It is a wide spread species and easy to obtain. And it is well worth its popularity. Its body is a beautiful subtle powder blue with black and yellow fin markings plus a superb black, beak-like head. This is one of the most hardy of aquarium machines.



LEFT: An attractive member of the Butterfly Fish family is the Saddleback Butterfly — a delicate copper colour with subtle markings. He is found in most coral seas.

BELOW: One of the most spectacular fish you can get for the marine aquarium is the Clown Trigger (*Ballistoides niger*). Basically black with white to light blue spots he also features yellow, rusty red and orange. A speciality of Hawaii, the fish is scarce in other parts of the Indian and Pacific Oceans. Like most Triggerfish the Clown Trigger is aggressive, you can see this specimen is ready to attack. The black razor sharp "trigger" at the top of his head is raised and ready for action.





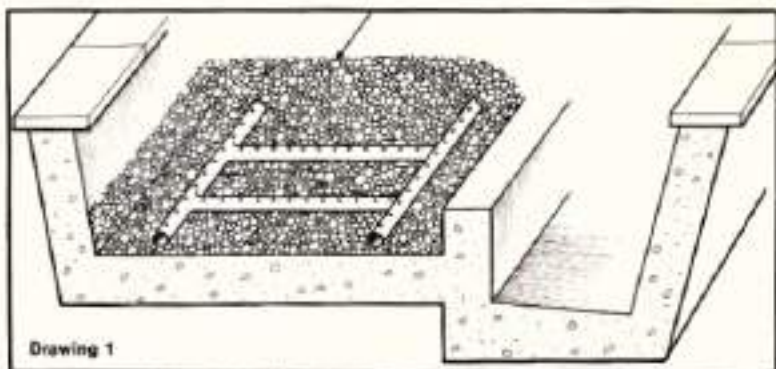
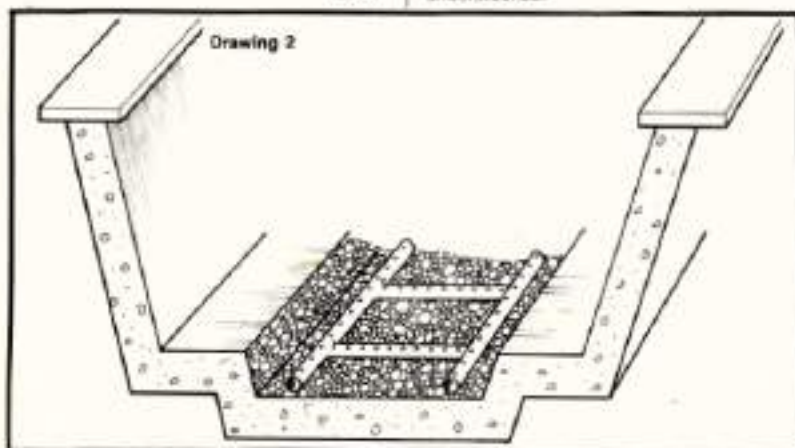
ROGER Cleaver and Peter Bull are well qualified to write about pondkeeping for *PRACTICAL FISHKEEPING* readers each month.

Both are experts on the subject with Roger specialising in fish and Peter being a pond plant specialist.

Both men come from Coventry, W. Midlands, and both are managers of aquarist shops.

Roger is chairman of the growing Midland Koi Society.

Below: Here is another concrete pond — this time with the undergravel filter in the deepest section. This way all sediment will be drawn into it.



Drawing 1

This undergravel filter is placed in the shallow part of the pond allowing the fish to hide during maintenance.

Pond filters

The way to keep fish perfectly by Roger Cleaver and Peter Bull

FOR years it has been accepted that filtration is essential for maintaining the correct water conditions in tropical freshwater and marine aquaria. But few people realise the same rule applies to pools and garden ponds!

The thought is that coldwater fish can tolerate such a wide variety of water conditions and survive for a long time that filtration is unnecessary.

And while it is true that they can survive in appalling conditions, coldwater species are happier, much healthier and stronger if water conditions are maintained with the same care the tropical fishkeeper shows.

For coldwater fish kept in tanks this is quite simple. Just use the same type of filtration equipment as for the tropical tank.

However, filtering a pond is quite a different matter. And this month we hope we can help you by explaining our favourite filtering methods and how to construct a filter.

The first question to ask yourself is: Do I really need a pond filter?

The answer is no, if you can maintain a balanced natural pond which is kept well understocked.

Problems with ponds occur basically because, naturally, fishkeepers are fond of seeing a great number of fish swimming round.

Most fishkeepers want a superb display of fish, and many can't resist buying a new fish if they see a nice specimen. Therefore it is pretty safe to say that the great majority of ponds would benefit from some form of filtration.

The natural balance of a pond is very delicate and situations of overstocking can easily tilt that balance.

Filtration will help to set the conditions on an even keel.

Koi pools should **ALWAYS** be filtered. A very rare exception would be in an exceptionally large pool which is well understocked. Koi tend to tolerate changes in water conditions less favourably than goldfish or other coldwater species.

Before we get into the business of explaining the types of filters and how to install them, let's take a quick look at how filters work.

Basically there are three ways filtration is achieved: mechanical, biological and chemical.

Mechanical filtration is probably the simplest. Here a filter medium is used to trap particles of suspended matter as the water is passed through it.

Biological methods work by breaking down the suspended solids by bacterial action. This converts harmful waste matter such as uneaten food and excreta into less harmful waste in the form of nitrates which plants can absorb.

In a chemical filter the solids are converted by means of a chemical reaction within the filter medium.

Often filter systems incorporate two or all of these three methods. For example an aquarium box filter, when both carbon and filter wool are used, applies both mechanical and chemical filtration.

A simple undergravel filter uses biological and mechanical filtration.

Normally two general arrangements are used for filtering pools—internal undergravel

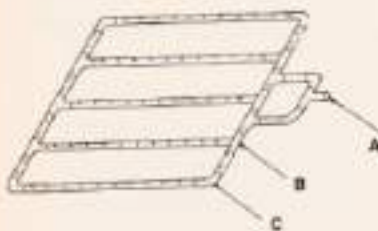
affairs and external box filters. The externals can be of all types. You can make your own or buy power filters or even versions that float on the pool surface.

But in most cases the principles are the same. Below we have listed the advantages and disadvantages of both main types of filters.

ADVANTAGES

Internal undergravel: Compact, needs very little space to construct.

External types: Can be switched off without bacteria breaking down (if left off for long periods then breakdown will take place) allowing treatments to be used, chemical filtration mediums can be used.



Drawing 3

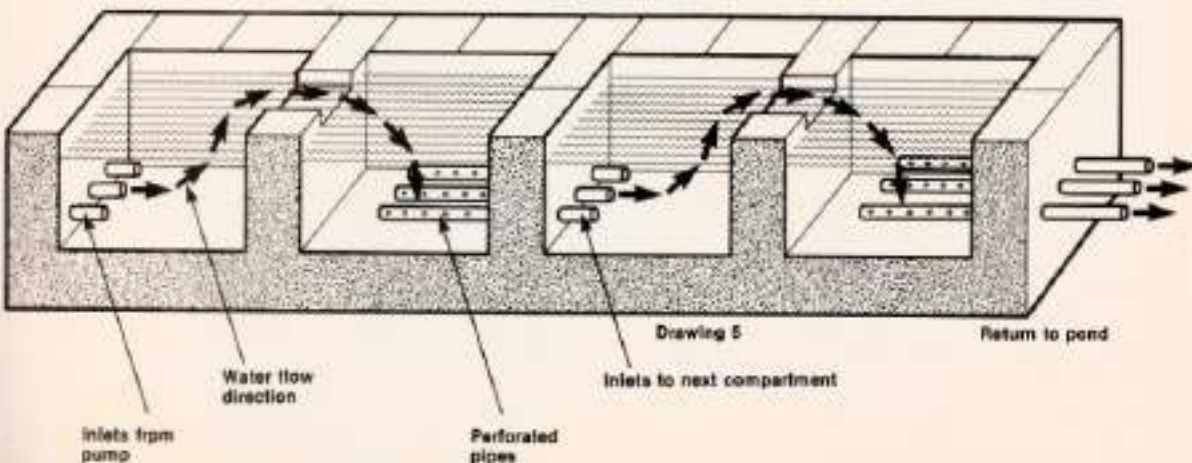
A: Connect to pump inlet

B: Tee

C: 90 degree bend

The construction of a filter. Use rigid plastic tubing with holes drilled at one inch intervals. Use tee joints and 90 degree bend sections to join it up.

Below: A multi-compartment external filter. Leave the first compartment empty to settle large particles. The other can be filled with varying grades of gravel.



Drawing 5

Return to pond

DISADVANTAGES

Internal undergravel: Cannot be switched off without problems. Treatments added to water are often neutralised, or they kill off bacteria. Chemical filtration is difficult to install.

External types: Cost more to build. Require space. Need large pumps to run.

Our sketches illustrate different filter systems and the first two show undergravel filtration.

Undergravels have to be constructed at the time the pond is built as they are an integral part.

Drawing One shows a version of the undergravel which is not in the deepest part of the pond.

This allows the fish to remain in the deeper part of the pool while maintenance work is carried out on the filter.

But if you do adopt this method you will have to make arrangements to siphon debris from the deeper section by separate means.

In **Drawing Two** the pond has an undergravel filter in the deepest part which allows all the sediment to be drawn down into the gravel.

The efficiency of any undergravel filter depends, however, on the framework of pipes which are placed beneath the gravel.

This construction is shown in **Drawing Three**. It should cover the whole of the bottom of the filter bed allowing for an even distribution of "pull" through the gravel.

In our experience rigid plastic tubing has proven to be the best material to construct this framework with.

It is easy to cut out and drill. And, by using the bends and tee joints available from any Builder's Merchants, they fit together with ease.

The drawing is self-explanatory, but we will just go over it again.

Use 1/2 or one inch rigid plastic tubing with 90 degree bends at the corners and tee joints to connect the cross pipes. The holes should be at least 3/16 inch diameter drilled at one inch intervals.

At this point we should mention pumps. Again they basically come under two headings — Surface and Submersible.

There are no real pros or cons here. But you must make sure that the pump you choose is capable of drawing enough water through the whole filter bed to make the thing work.

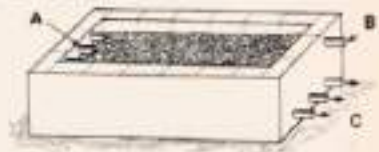
A simple guide is to buy a pump capable of moving the total volume of water in the

pond in about three to four hours. Therefore the water is being drawn through the filter every three or four hours.

The water being drawn through the filter by the pump has to be returned to the pond. This is best achieved by a series of cascades down a waterfall.

If this is not practicable use a series of outlets or a sprinkler bar constructed of a length of plastic tubing with holes drilled at one inch intervals. Direct the water so that it cascades directly onto the pool surface.

Another method is by using a large fountain. But care must be taken to ensure that at all times, even in strong winds, the waterspray will fall into the pond not all over the garden!



Drawing 4

A: Inlets from pump

B: Overflow pipe

C: Water returns to pond

This is difficult to ensure so a fountain is best installed as an optional extra to the other two more reliable methods.

If provision is made during the fitting of the filter pipework, the fountain can be turned on for effect when required.

External filters work on a similar principle to the undergravels in that the water is passed through a filter medium.

In the case of an internal filter, the water is drawn through the medium, in an external filter the water is allowed to run through the medium and then back into the pond.

Drawing Four shows a simple external filter — a construction usually built of bricks and sealed with a waterproof paint.

It looks like a large trough which is filled with gravel. The water is pumped into the filter through the inlets at the top of the trough.

The outlets which return the water to the pond are at the bottom of the filter at the end. So the water simply percolates through the gravel back to the pond.



Dr David Ford became a man in a suitcase during part of his work in developing the Aquarian range of fish feeds.

He was sponsored by his firm to travel the world to see most of the important public aquaria. It sounds a dream job for a keen aquarist!

Dr Ford has therefore seen a huge number of exotic fish and methods of keeping them.

He starts a new series this month taking PRACTICAL FISHKEEPING readers on an amazing world tour.

First stop is the beautiful Pacific islands of Hawaii.

In August Dr Ford continues East with the destination of Japan. Join him on the tour next month.

Exotic Hawaii

Dr David Ford begins his tour of the world's aquaria



Idyllic scenery with palm trees and the blue Pacific — the travel brochure view from Waikiki Aquarium.

PALM trees swaying gently in the breeze, the Pacific Ocean crashing on a superb beach ... there can be few more idyllic settings for an aquarium!

But although the surroundings are magnificent, the contents of Hawaii's Waikiki Aquarium are even more exotic.

Most marine aquarists, especially members of the British Marine Aquarists Association, will know of Waikiki Aquarium, Honolulu, Hawaii.

This island is much larger than all the other seven combined, and boasts the world's largest single mountain, the Mauna Loa—31,000 feet from ocean floor base to its summit.

The smallest island, Nihoa, is privately-owned, and you can't visit it!

The others are Kauai, the Garden Isle, Molokai, the Friendly Isle, Lanai, the Pineapple Isle, Kahoolawe (used by the military for target practice), Maui, the Valley Isle, and Oahu, home of the capital city, Honolulu.

Oahu is only about 40 miles across its widest point. The southern coast line has a large lagoon. Yes! there is West Loch, Middle Loch and East Loch—which includes the famous Pearl Harbor.

Just a few miles along the coast is Honolulu and then the holiday area of Waikiki Beach, only a 10 minute drive from the international airport.

The Waikiki Aquarium is based on the north end of the beach and is built out into the ocean. An ocean that is a constant 79°F and pollution-free. The average daily temperatures of the area have a high of 88°F and a low of 71°F, but over two inches of rain falls each month.

However, these are sudden showers that quickly pass.

Walking along Waikiki Beach road takes



One of the educational displays that makes Waikiki as such a useful aquarium.

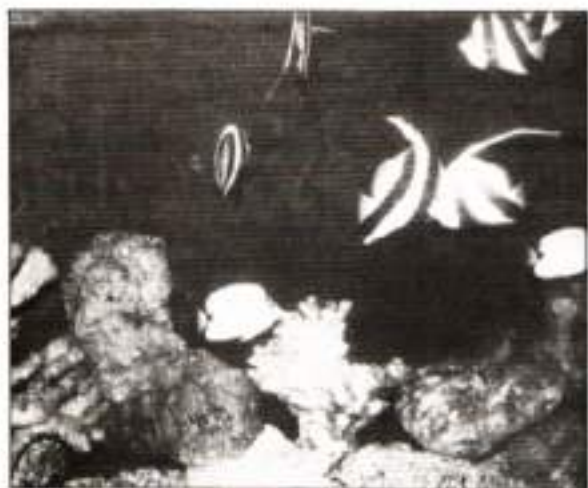
you past trinket shops, coffee shops, MacDonald's Hamburger joints and skyscraper hotels by the dozen.

Then a pleasant green area of Kapiolani park where tourists see jogging and playing tennis, archery and baseball, around the Waikiki Aquarium.

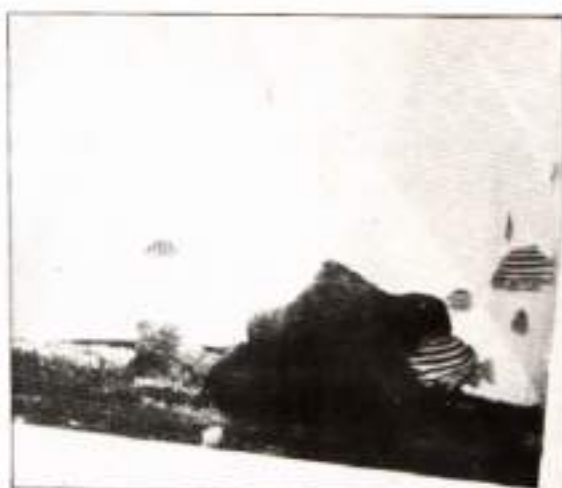
The Aquarium is quite small but has many exotic fish species on show. It was founded in 1903 as a public service and research centre. Open from 10 a.m. to 5 p.m., seven days a week, the Aquarium closes on most of the national holidays, which reflects the working nature of this centre of fish keeping and study.

The Aquarium has close contacts with the University of Hawaii and runs classes on Hawaiian Fishes, Marine Algae, Sea-shore life, etc.

Some of these courses include field trips around the islands to study marine life and ecology, with a Biologist and six students making up one expedition.



A beautifully natural display in one of the aquarium's coral reef tanks.



Creating the effect of the sun streaming through the coral reef waters. A combination of painted back scenery and clever lighting provide the dappled look.

The Aquarium does not collect its money from entrance fees which are a nominal 25 cents (about 12 pence) and under 16's free. However you can pay more if you wish.

The main cash flow is from "friends" of Waikiki Aquarium, sponsors whose names appear in the Roll of Honour.

These are engraved plaques mounted on the wall at the entrance to the indoor aquaria. "Friends" also include individuals who pay membership donations to support the educational programmes of the Aquarium.

As a Friend, members receive a bi-monthly newsletter, 10% discount at the Aquarium's bookshop and free admission. Friends who have special knowledge of the fishes offer guided tours of the Aquarium especially for public and private school parties.

The Seals section includes the Hawaiian Monk Seal, which is the only such species in captivity in the world.

The display aquaria contain all the beautiful Hawaiian marine fish and the local freshwater species, too. Of course, many of these freshwater fish are introduced species.

The marine fish are the most stunning exhibits and include all the Hawaiian species. Examples are the Gomphosus spp such as *Gomphosus coeruleus* (Hawaiian Bird Fish), *Gomphosus nigricolor* (Bird Fish), and *Gomphosus varius* (Aki-olo).

The bizarre, or beautiful, according to your tastes, Cowfishes are native to Hawaii, such as *Osteocottus formosus*.

The incredibly ugly Frog Fish are on show, e.g. *Antennarius commersoni*, *A. bigibbus*, *A. dromus* and *A. mummifer*.

The beautiful Butterfly and Angel fishes abound in Hawaiian waters and are on show, such as the *Centropyge* and *Chaetodon* spp. The famous Longnosed Butterfly fish (*Foerchinger longirostris*) originates from Hawaii, and so do many of the hardy Damselfishes, such as *Discyodus erianus*.

Hawaii is also the home of the Trigger fish (Balistidae). A well known example is *Balistapus aculeatus* or, as the locals call it, Huma-Humu-Naku-Naku-A-Puaa, which is Hawaiian for "needle fish with snout of a pig".



Friends of Waikiki keep the Aquarium running. Their names are on these impressive boards in the entrance hall.

But the most famous of all Hawaiian fishes on display at the Waikiki Aquarium is the Hawaiian Clown Trigger, *Balistoides conspicillum*.

Great emphasis is placed on education and most of the tanks include well presented details of the occupant's life history. Changing displays are used to explain the ecology of the island's animals and plants.

The freshwater tanks use the island's drinking water supply, which is so pure it is unchlorinated. The marine tanks use sea water pumped straight from the sea. This sea water is returned to the sea but legislation demands that the outflow must be mechanically and biologically filtered so the returned water is as pure as possible, and a public inspector visits the Aquarium regularly to check that outflow filters are operating.



Pure water cascades through exotic undergrowth from the Hawaii mountains. This absolutely pure water is used in the fresh water tanks.



If you have an aquatic problem the best, quickest and most effective way to get expert advice is by writing to the PRACTICAL FISHKEEPING Aquatic Queries service.

On hand to help you are Dr. David Ford of Aquatrain—one of the most knowledgeable aquarists in the country. David will be answering freshwater queries and some marine problems.

Our marine expert is Graham Cox—managing director of the Middlesex firm SeQuantums.

All you have to do is write to Aquatic Queries, EMAP, Practical Fishkeeping, Brettton Court, Berton, Peterborough PE3 8DZ.

State your problem. Enclose black and white head and shoulders picture of yourself, if you have one. Include a stamped addressed envelope if you want a personal reply.

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TO MY NEWSAGENT

Name _____
Address _____

AQUATIC QUERIES

Research by Dr. David Ford

Breeding Lemon Tetras



Lemon Tetras — not difficult to spawn in correct conditions.

In my community tank I have a small shoal of Lemon Tetras (*Hyphessobrycon pulchripinnis*) which I would like to breed. How can I sex the fish and what requirements are needed to get them to breed?—Andrew Bulley (15), Marlborough, Wilts.

The Lemon Tetra is an easy fish to breed despite the fact that females may become egg bound, as reported in several publications.

All you need are several females to each male. There are no obvious sex differences except that the females become fuller bodied.

So isolate the shoal the feed well on live foods in soft, acid water at 80F, and spawnings should occur.

Like all *Hyphessobrycon* species, some fine-leaved plants are needed to catch the eggs.

Siamese Shark needs companion

I HAVE bought a fish called *Pangasius Sutchi*—Siamese Shark. I got it into the tank and it looked very happy. I wanted to find information on it, and I looked all through my books, but no one has information or illustrations on this fish.

The fish is long and slender with two pairs of barbels. It has a dark blue top with silver in the middle and another broad blue line and a silver underneath.

It has a dull black fork in the tail. I would be thankful for any information on this fish. Philip Pettitt, (13) Luton, Beds.

Pangasius Sutchi is a peaceful fish from the Malay Peninsula, however it will swallow fishes small enough to get in its mouth.

It is not critical about water chemistry and will eat live foods but can be weaned onto chunky food and Carnivorous Flake, and can grow to six inches.

It is lively and if other fish of the same species are present, they will shoal, usually in one corner with never ending circles up and down the glass sides.

It has been reported that single species may become nervous and even throw fits. Damaging collisions with the aquarium sides or rocks, if this problem develops get another one or two of the species.

Blanket problem

OUR garden pond is plastic lined. We dug it last summer and the Oris and Goldfish survived the winter well. The plants also look in good condition.

But our problem is Blanketweed. I am afraid the fish will get tangled up in it. So I took out the plants and washed them thoroughly and removed as much of the weed as possible before replacing them.

Unfortunately the pond does not get a lot of shade and I am hopeful that once the lilies and plants get more established the Blanketweed will be kept to a minimum.

On the other hand, I have spoken to other pond owners who say they have none.

Am I doing something wrong? Any suggestions would be greatly appreciated.—Mrs B. Baker, Southport, Merseyside.

The weed will not harm your fish, but it will prevent you viewing them. Collect it by rotating a roughened stick of wood in the pond, it should spin and collect just like condylfloss.

Surface plants will give the shade you need to prevent the weed growing—in time.

There is nothing wrong with your pond, it is just maturing.



Blanketweed — remove this filamentous algae by twisting a notched stick.

MAKE SURE OF YOUR REGULAR COPY

All about the super Chromides



Orange Chromides—beautiful aquarium fish.

I HAVE successfully raised Orange, and what I know as Golden Chromides. Being a great lover of this particular species I would like to know the correct name for the Golden Chromide.

I also have what I bought as a Silver Chromide. On looking at books I have I am wondering whether these are Green Chromides. I wonder if you could advise?—D. Peart, Bury St Edmunds Suffolk.

You have two different species of the genus *Etoplus*. Both are Cichlids from the brackish

waters of India and Sri Lanka, where they are a food fish.

Etoplus maculatus is called Orange or Golden Chromide and has been bred in the aquarium. They use a flat stone for depositing eggs and are good parents.

Etoplus suralensis is called the Banded Chromide, Silver Chromide or Green Chromide. This will not breed until it reaches full size—well over a foot. So no records of it reaching such a size and breeding in aquaria exist.

Colour changing Zebra Cichlid

I HAVE a *Tilapia Mariae* of about six inches in length. I would like to know if these fish usually change colour like mine? The one I have keeps on changing its beautiful colours during the course of the day.

At one stage it is a bright yellow with six dark spots and a diagonal black line through its eye. The next moment it changes to a dull greyish colour with pronounced dark vertical lines.

I would also like to know where I might be able to get a male of this species? I have seen none since I bought this one. I presume it is a female as it has not got a red throat.

Are these fish mouth-brooders?—Michael Higgins,

Carbridge, Northumberland.

The photograph you sent with your query shows a typical specimen of Tiger or Zebra Cichlid (*Tilapia mariae*).

The colour changes you note are typical of the fish nearing maturity because the juvenile and adult forms have very different colours and marking. It is not a mouthbrooder, but lays eggs on rocks and is a prolific breeder.

To find a local breeder or supplier who can offer you a male, I suggest you contact the British Cichlid Association, 18 Kings Drive, Bishopston, Bristol BS7 8JH—send an s.a.e.



Zebra Cichlid—not a mouthbrooder but a typical Cichlid egglayer.

Preventing disease in my tank.



Blue Tetras—lost in a fungus attack. Sterilisation will prevent it.

PRACTICAL FISHKEEPING

I AM a novice at keeping tropical fish and have been interested for just over one year. I have two tanks 24" x 15" x 12" and have had no trouble until two weeks ago when fungus was introduced into one of the tanks, possibly by new plants I bought from a local pet shop.

I unfortunately lost most of the fish in the tank before the disease was checked. I have transferred the remaining fish into one tank after having isolated them in a small hospital tank for three weeks and everything seems OK.

I therefore would like to know how to sterilise all the equipment for further use? Once before I used potassium permanganate, but ruined most of my accessories.

Whether I left them in the solution too long, or perhaps it was too strong, I don't know. So I would be grateful for information on this query.—K. Day, Lancaster.

Potassium permanganate is a good sterilising agent, but it must be flushed away after a few hours soaking. The chemical can precipitate a black compound— from the Manganese part of the chemical— which will stain the equipment.

If you do not wish to use the chemical again, any of the household disinfectants will suffice, such as Dettol. But most contain detergents, which are deadly to fish. So everything must be flushed with clean water until all traces of the detergent are removed.



Can I treat old roots?

I HAVE seen treated pieces of wood on sale for use as decoration in the tropical freshwater aquarium. However as these seem fairly expensive, I would like to know if there is any way of treating and preparing various types of wood, bark and roots myself?

I would also like your opinion on the use of scavengers such as freshwater shrimps or crabs and their behaviour towards the fish in a large community tank, and vice versa? — Steve Lawrence, Cambridge.

The petrified wood is best because it is heavy, decorative and inert. Fresh wood has two problems, it can go rotten, and is so buoyant it is difficult to hold down. You could try coating the bark or branch with an epoxy resin to give an impervious coating, and glue it to a slate with a silicone-sealer to anchor it down. Roots can be used but boil them first to sterilise and dissolve away any soluble material.

It is possible to have freshwater shrimps and crabs in the community tank. Community fish are chosen to be non-aggressive, the crabs have their own defence and the shrimps can move at tremendous speed.

However, I do not approve of the principle of using "scavengers" — you should not have surplus food in the aquarium, and so-called "scavengers" need a proper diet too.

AQUATIC QUERIES

Research by Dr David Fort

The Black Spot!

I HAVE just experienced a recent outbreak of Ichthyophonus and black spot. Could you supply any information on this disease?

Also, I have been trying to obtain information on the family Mormyridae, the Elephant Trunk fish in particular.

Can this fish only be kept in a species tank or just on its own? Mark Jackman, St. Albans, Herts.

I note you had an outbreak of Ichthyophonus disease, but wonder how you knew, because it requires microscopic examination of internal organs to identify this disease. There is no effective cure.

Black Spot (Diplostomiasis) are cysts due to the larval stage of a Trematoda parasitic worm. This worm has a complex life cycle involving the Heron and snails and so does not occur in the aquarium.

There are about 100 members of the Mormyridae, all in small lakes or pools in Africa, hidden under logs and rocks. They are sensitive fish needing the quiet privacy and darkness of their natural habitat. Hence a special aquarium is really required for them — it is not that they need to be kept isolated from other species, it is just that the normal aquarium of fish is too bright, open and active for them.

They are true bottom feeding scavengers using their trunk to find worms and insects in the mud.

Long living Gouramies.



Croaking Gourami — a shorter life.

CAN you tell me anything about the *Osphronemus goramy* and its life span? Do different fish have different life spans? For instance I have a tank of different species of Gouramies. Some have been in there for two years and some less. How long can I expect to have them? — Mrs D. Blackburn, Beawick, Manchester.

Osphronemus goramy is the Gourami — a food fish that originates from the Great Sunda Islands. It was introduced into many tropical areas for its food value.

In their wild state they grow to two feet and are therefore unsuitable for aquaria other than

large public ones.

There are few records of its life span because it is eaten, not studied! But some aquarium-zoos claim to have kept specimens for many years.

The usual aquarium Gouramies have a shorter life and the actual number of years depends on factors such as temperature, water quality, aquarium size, nutrition and so on.

All these factors are controlled by you and therefore cannot be quantified.

However, on average, community aquarium fish live for three years. But with good husbandry this can be extended by several years.

Keeping Hatchet Fish



Marbled Hatchet Fish — superb specimen.

PLEASE could you provide some information about *Gasteropelecus levis* and *Carnegiella strigata*? — Graham Fisher, Leeds, Yorks.

Gasteropelecus levis is the Silver Hatchet Fish. It originates from the sluggish streams and still waters of the lower Amazon. Hence they do not do well in aquaria with disturbed water surfaces via aeration, filtration, etc.

They are timid fish and not ideal for the average community tank. There are no records of aquarium breeding.

Carnegiella strigata is the Marbled Hatchet Fish. It belongs to the same family as the Silver Hatchet Fish — *Gasteropelecidae*. So similar conditions apply. The Marbled Hatchet Fish is a great jumper, so covers must be used during tank maintenance.

Where does this 'Cat' come from?

COULD you please give me some information on a Catfish? fish? It was purchased as a One-Spot Catfish about one and a quarter inches, it is now six inches long.

Body colour is a dark bluish-grey with white belly. It has four barbels on lower jaw which are short ones, and two short and two long ones, about three quarters of the body length, on upper jaw.

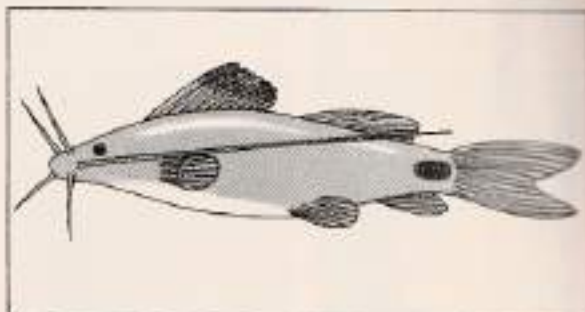
It has a dark spot at the base of the caudal peduncle. It is nocturnal and hides in a rock cave but comes out at night. It is also a peaceful fish and does not bother any small fish.

Some Aquarists say it is a *Mystus*, some *Synodontis* and

some a *Pimelodella* family. I would be grateful if you could identify this fish. — S. Jackson, Brockworth, Glos.

Your diagram is an exact reproduction of an *Pimelodella* spp., but I do not recognise the colour pattern to positively identify the species.

There are so many species of the Catfish family, it requires specialist knowledge to identify individual fish and we suggest you send details with s.a.e. to the Catfish Association of Great Britain Secretary, Mr D.D. Sands, 12a Moorland Road, Hamel Hempstead, Herts.



Mr Jackson's sketch of his mystery Catfish.

Smaller Whiptails in a tank.

I HAVE a male Whiptail Catfish (*Loricaria filamentosa*) in a community tank. He is a peaceful fish, very healthy, but has grown little since I purchased him some 18 months ago. I understand that this fish normally grows to 10 inches. Is that right?

I have seen mentioned the use of tree roots in the aquarium. Books suggest "caring the roots well" but they never seem to say how. Can you suggest a method?

I have a pair of Rams in a 24 inch tank on their own. I have spawned the pair but the fry were gone within three days. At the second attempt the parents were removed, but the fry only lasted 10 days. On the third attempt the water was reduced to six inches with the parents left in. The fry were all gone in three weeks. Any ideas? — David Weldon, Callington, Cornwall.

Loricaria filamentosa will grow to 10 inches in the wild, but aquarium specimens, are always much smaller.

Tree roots can be used for

decoration and a "cure" is effected by boiling to sterilise and dissolve any soluble materials. The best wood, however, is the petrified type from peat bogs.

It's best because it sinks and does not disintegrate with passing time.

Rams (*Apistogramma ramirezi*) are well known egg and fry eaters and commercial breeders have used the following methods:

Use aged, slightly acid water at 80 to 85 F. Fish should be at least two inches in size and fed live foods only. The tank should have only a few small stones.

When the eggs are laid on one of these stones it is removed and placed in an outside box type filter under the return flow tube.

This replicates the egg fanning action of the female and the down-flow arrangement means only clean water passes over the eggs.

When hatched, after about 72 hours, tip the fry back into the tank—remove the parents first—and feed infusoria, brine shrimp nauplii, etc.

Overnight Neon deaths.



Marbled Sailfin Molly — decorating could kill.

I HAVE a tropical aquarium 30x12x15. It is partly stocked at the moment with two Black Mollies, four Guppies, four Platies, and six Neon Tetras.

The tank is well planted and heated to 75°F. I use a Hykro box filter, Rena 10t pump and a Petcraft heater/thermostat.

The tank is in a room that we are at the moment decorating. We have to leave the tank in the room because it is too heavy to lift up a step and out of the room.

The problem is that four of the six Neons have just suddenly died overnight.

The bodies had lost their eyes and colour and were floating on the surface of the water.

I immediately removed the dead fish when I saw them and wondered whether the decorating had anything to do with the deaths, but the tank was covered with a drip tray, hood and a sheet to keep paint off.

The tank is lit with two 25 watt bulbs, twelve hours a day.

Could you suggest a reason for the deaths and, if possible, recommend a cure if the others suffer? — S. Goodrich, Sonning Common, Reading, Berks.

Sorry to hear of the fish deaths, but you are quite right to suspect the redecoration. Decorating, especially painting, gloss and emulsion gives off fumes that get into the tank where they dissolve and slowly concentrate in the water.

I note you only have a 30 inch tank which is small enough to move to another room - but it must be emptied first of course.

If readers have a tank too large to move, sheet it over with polythene and sellotape and attach a long plastic tube to the aerator and or filter and place the airpump in another room, or even outside — run the tube through the letterbox!



Ram — how to spawn them.

TROPICAL freshwater, marine or coldwater ... It doesn't matter what your interest is in the aquatic hobby there's something for YOU in the August issue of PRACTICAL FISHKEEPING.

So make a date now with your top aquarist's magazine. It is in your newsagent or aquarist shop on the first of every month.

And the safest way of making sure you don't miss out is to place a regular order with your newsagent — the form is on Page 24 — or take out a subscription for £7 a year. We will then send you 12 issues by post — the form for this is on Page 47.

Just to whet your appetite for the bumper August issue here is just a selection of what's lined up. See you next month ...

Fishkeeping French style



Norman Wright has been to France to see how the continentalists keep their fish. The verdict is in style. Some of their tank set ups are almost too magnificent to describe. They are plant fanatics and they also like unusual aquaria like this champagne glass-shaped bowl complete with Black Moor. Find out more next month.

Tank Maintenance



We will be back working on the PRACTICAL FISHKEEPING tropical aquarium in August covering a water change and a thorough tank clean-up.



Charming characins

Another superb colour poster on popular species for the aquarium.

Beating Disease



The fight against disease goes on with our new series which started in this magazine. Next month we will be looking at the New Technology set-up in Kent where Andrew Stagg and Ken Digby work and research on fish diseases and how to treat them. We will also be reviewing a disease diagnosis kit.

Perfect Planting

Don't miss the next part in David Shield's superb plant and tank design series next month. David will be covering the perfect planting of a coldwater tank.

Aquarist's World Tour



Dr David Ford will be jetting off to his next destination in PRACTICAL FISHKEEPING'S armchair tour of the world's biggest and most attractive public aquaria. August sees David in Japan showing you round a truly amazing world of fishkeeping at its most luxurious.

Landscaping your Pond



Pool experts Roger Cleaver and Peter Bull have been guiding the care of your pond fish and plants all summer. Now they turn their attentions to the pool surrounds and how to make it match up to your fish and plants. They will also be telling you the jobs for August to keep the pool in condition and how to start feeding your fish up for the Autumn and Winter.

What's new

Technical writer Cliff Harrison tests the new equipment and brings you his opinion after

Make The Most of Guppies



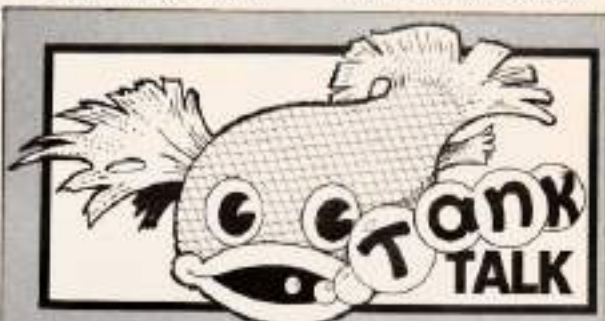
putting it through vigorous trials.

Guppies are the easiest fish to breed. But how do you use selective breeding techniques to get the best possible results. Nick Fletcher finds out next month.

What's Going On

PRACTICAL FISHKEEPING keeps you informed of news and events in the aquatic world PLUS a super preview of the big Yorkshire Aquarists Festival.

Don't miss a great magazine order your August issue Now.



Editor Norman Wright's look at the fishkeeping world

BRINE shrimps can be a problem for fishkeepers who either want the newly hatched creatures for feeding newly hatched fry or as adults for a useful live food source.

As anyone who has tried hatching them will know it isn't the easiest of tasks.

Many aquarists will have perfected a method that works fairly well. But I am willing to bet that more have given it up or got a poor hatching rate.

Out of a tube of a million eggs the hatching rate is usually low — it's even lower if you do not hatch all the eggs in one tube at the time it is first opened.

They just don't seem to keep well.

Then there is the time they take to hatch — up to a couple of days. And this makes difficult to time the arrival of the shrimps with the arrival of fry.

Final snag is separating the shrimps from their eggshells. This is essential as if fry try to eat the eggshells they can be choked.

That's why it was nice to see a new development in its early

stages this month which could remove all these problems for good.

The product isn't on the market yet. But it is only a short way off. And I shall have some pictures next month to show exactly how the development works.

It is as simple as this. Brine shrimps have been developed without eggshells.

And that means they hatch quicker — in about 15 hours; they have no harmful shells; and the hatch rate is drastically improved.

As a bonus the shrimps do not have to use up valuable energy on breaking through the shell into the world and therefore are much more nutritious to the fry.

It looks like the eggs will come in tubes of jelly like substance. You will be able to squeeze them out until you have sufficient and then keep the rest without the deterioration of the shelled eggs.

Anyway that's the claim of the manufacturers. As soon as we get a sample our technical expert Cliff Harrison will try them out and bring his verdict.

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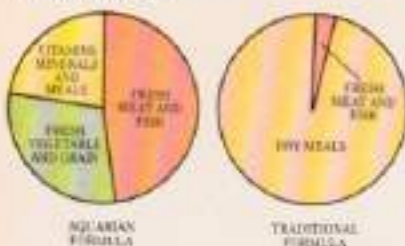
Dr David Ford is a specialist in fish nutrition and head of the Research Team at the Aquarlab of the Animal Studies Centre, Melton Mowbray. His team of Veterinary Surgeons, Biologists, Nutritionists and Technicians, using the facilities of the Centre, which is Europe's largest Pet Care Study Unit, have completed more than five years of research and trials into modern fish food. The result of their labour has been Aquarian fish food, made in the highest quality control conditions and developed as the perfect food for all fish.

Dr Ford himself is a Chartered Chemist and Food Scientist who has been keeping fish now for over 35 years. He answers some common questions raised about Aquarian.

WHY ARE FRESH INGREDIENTS BETTER FOR MY FISH?

The fresh ingredients in every container of Aquarian tropical fish food have all the vital elements of vitamins, proteins and amino acids to make your fish bigger, brighter and more full bodied. The majority of the world's fish foods simply cannot match the quality Aquarian provides in these areas due to the fact that they are cereal or meal based. Fish prefer the Aquarian freshness because it's closest to the food they would choose in the wild. And as there are dangers of infection in indiscriminately feeding fresh food, feeding Aquarian is the safest way to give fish a more natural diet. Because of all this, Aquarian can truly be said to be the best approach to flaked fish food.

HAVEN'T ALL FISH FOODS FRESH INGREDIENTS?



No! In fact, the conclusive evidence of many years testing proves that most of the world's brands of fish foods are, in fact, not fresh based at all. They're either cereal or meat and fish meal or

some such substitute. None of them have the food value or taste that fish find so enjoyable in Aquarian.

HOW CAN IT BE A FRESH FOOD IF IT'S A DRY FLAKE?

Because the great and unnecessary bulk of fresh food, as far as fish are concerned, is water, we simply cook it off. In a gentle simmering action we turn fresh ingredients into easy to feed flakes which have equal nutritional value to raw food and an appetising attractiveness to all fish. You can sense the freshness of Aquarian the second you lift the lid and it's a freshness your fish will eagerly recognise.

WON'T THAT FRESH CONTENT DECOMPOSE FAST?

Immediately after cooking the food for Aquarian, we seal it in its airtight container and to keep it fresh throughout its use we supply a replaceable secure lid.

The drums and plastic pots that ordinary fish foods are in are not satisfactory for the fresh content of Aquarian and indicate just how dry and unattractive they are.

WHY IS IT IN FLAKE FORM?

When it comes to feeding different types of fish and matching their very different feeding habits, flakes are ideal. They float for surface feeders, suspend for middle feeders and sink down intact for bottom feeders. With Aquarian, we've made the flakes large enough to attract big fish and yet delicate enough for the smaller species to nibble happily away at.

CAN I REALLY FEED ALL TROPICAL FISH ON AQUARIAN?

The short answer is yes. That's at the Animal Studies Centre have shown that even the live feeding Piranha will not only accept Aquarian as an exclusive diet, but will actually thrive upon it! Aquarian's fresh food flavour is the favourite for every species kept in the modern aquarium.

MY FISH ARE O.K. AS THEY ARE. SO WHY SHOULD I CHANGE?

The reasons for changing to Aquarian will become very clear after a remarkably short time. Your fish will be fuller bodied, more colourful, lustreous and lively. The higher quality protein Aquarian gives means a more balanced diet than be offered by meal and cereal based foods with excess of lower quality proteins that lead to fat polluting residues. Aquarian is a food that is more easily digested and creates less waste product cloud the water. Not only will your fish look better from feeding Aquarian - you'll be able to see the difference!



"The fresh flaked f



WHY ARE THERE SO MANY DIFFERENT COLOURS?

The colours of flakes in a container of Aquarian tropical fish food identify the eight formulae, each a type of food in itself, that are balanced for a perfect diet. Because different fish have different tastes, no single food could hope to satisfy. Aquarian gives you the opportunity to keep all your fish happy. That's from carnivores, right through the feeding spectrum, to the most fussy herbivores.

IT SOUNDS EXPENSIVE STUFF - IS IT?
Because Aquarian contains fresh ingredients, scientifically researched for a nutritionally balanced

diet, and because it's been found by professional breeders and top enthusiasts alike to be the one food all fish thrive upon, you might expect it to be very expensive indeed. In fact, Aquarian is no more expensive than other fish foods and that's a fact.

DO AQUARIAN ONLY MAKE TROPICAL FISH FOOD?

Certainly not! There are 13 different varieties of food, ranging from Gold Fish and Guppy foods to Fry foods and colour enhancing foods. Plus there are seven ailment remedies and water treatments. So you can see, Aquarian really are the specialists in everything for the fishkeeper.

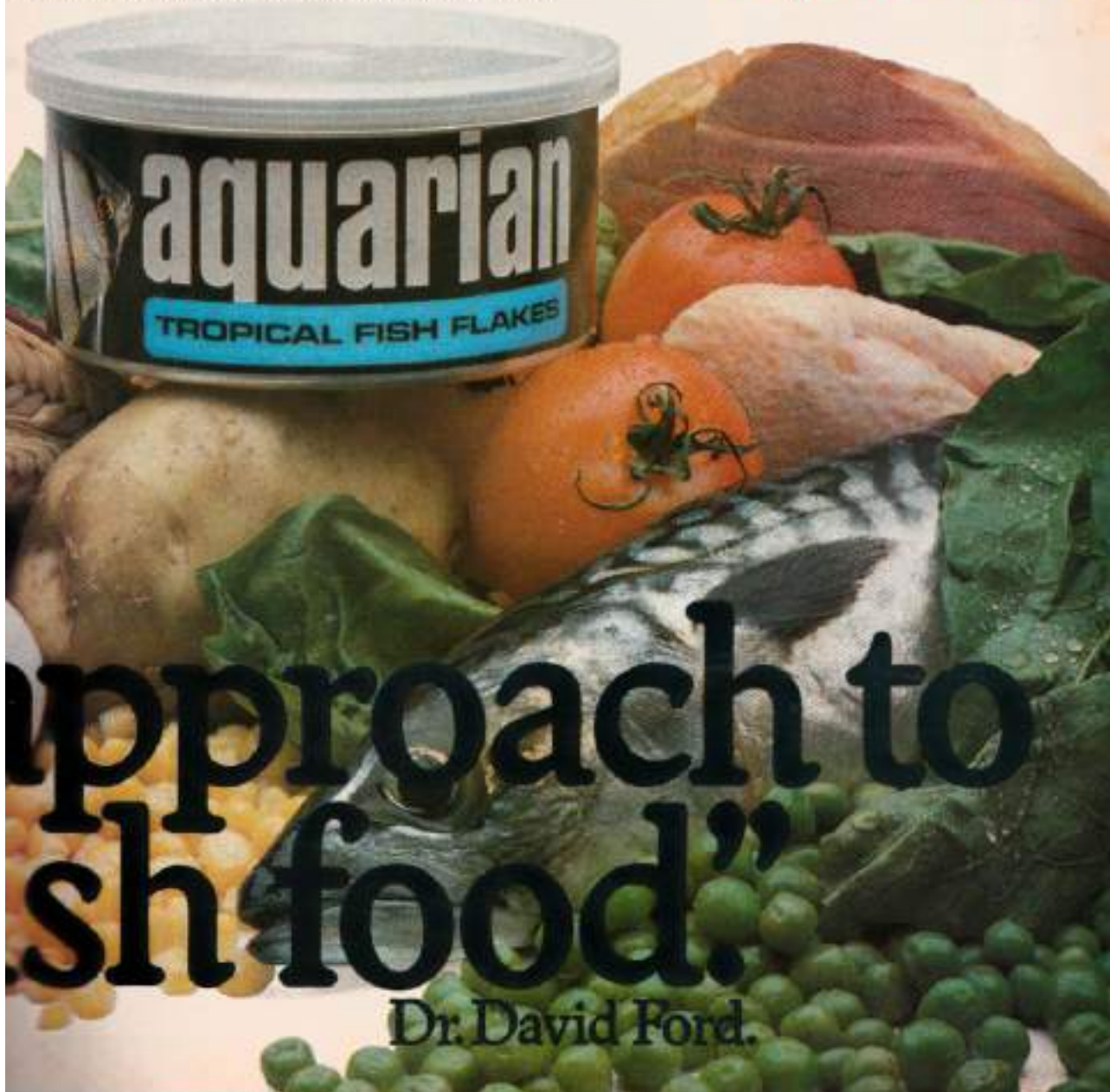
IF I'VE ANY MORE QUESTIONS, CAN I CONTACT YOU?

Yes. Whatever questions or problems you have you can ask my personal advice free. I would be interested in any matters you raise, so write to me:-

Dr. D.M. FORD
at the Animal Studies Centre,
Frooby Lane, Waltham on the Wolds,
Melton Mowbray,
Leicestershire LE14 4RT.

And meanwhile, I wish you successful and enjoyable fishkeeping.

aquarian





Beating disease

NOTHING is more heart-breaking to the fishkeeper than when he sees his prized fish suffering from any kind of disease.

The immediate thought is to buy as many cures as possible and use them until the fish are better.

But all too often the fish are stressed by the drugs that they simply die.

In our new series "Beating Disease" we have recruited the knowledge of two scientists who are fish disease experts. They will be trying to show you how to recognise different diseases so that you can use the right cures and prevent trouble returning.



Andrew Stagg and Ken Digby (pictured) are both highly qualified to write about fish diseases.

They both work in the laboratories of New Technology Ltd at the Aquaculture Centre, Hadlow, Kent.

Both are involved in research and development on New Technology's range of fishkeeping products — many of which are tests and cures for diseases.

They also operate a pathology service which diagnoses diseases in both aquarium fish and fish from commercial farms — which is the other side of New Technology's business.

Both are highly qualified scientists academically. But being based at a laboratory attached to an aquarists shop they meet fishkeepers and understand their problems.

The fight against disease

How to recognise fungus infection
By Andrew Stagg and Ken Digby



A tank of healthy tropical fish. But fungus could be heartbreaking.

ONE of the most frequently mistaken concepts of diagnosing fish diseases is being able to recognise their cause without recourse to laboratory examination.

Since most of the proprietary treatments available today are active against a wide range of disease-causing organisms it is often possible to successfully treat a disease whether or not its cause has been diagnosed correctly.

However, failure of a fish to respond to treatment often leads the aquarist to try different cures, thus stressing the fish further and causing even greater problems.

A lot of the anxiety suffered by aquarists in trying to save a favourite fish can be avoided by correct and rapid diagnosis of the condition.

Aquarists often bring fish to our laboratories which they say have fungal infections. We have found that, in many cases, the real cause of the problem is not fungal at all. Our laboratory examinations of fishes first described as having fungal infections have revealed five distinct conditions: —

- Genuine fungal infection
- Lymphocytic virus infection
- Cotton Mouth Disease
- Fin rot
- Excessive mucous production

Genuine fungal infections usually appear as grey-white patches on the skin of the fish. When examined in the water, these patches have a cotton-wool-like appearance.

In the early stages the patches are circular and grow across the surface of the skin by radial extension of the circle. Sometimes the fungus will grow over the eyes of the fish and could be mistakenly diagnosed as cloudiness due to bacterial infection.

The fungal growth can be removed from the skin fairly easily and examination, under a low power microscope or culture on a com-

mercially available disease diagnosis kit, will confirm the presence of fungus.

Lymphocystis disease appears on the skin and fins of both marine and freshwater fish as small, white, apparently fluffy nodules which, on visual examination, appear very like heavy growths of fungus.

These nodules are in fact hard tumours and quite difficult to scrape off the fish. There is no treatment for this condition and very often it goes away due to the fishes' immune response against the virus.

There is evidence, however, to suggest that the virus remains in the fish and could cause recurring outbreaks of the disease.

Infection of the mouth region of the fish by the bacteria *Flexibacter columnaris* produces a grey-white growth which has given the disease its name — Cotton Mouth Disease or Mouth Fungus.

The growth generally occurs on the head and fins of the fish although the gills and sides of the body may be affected. This condition may be distinguished visibly by the presence, in older infections, of ulceration around the patches of growth.

Also, the presence of orange or yellow colouration produced by the causative bacteria may help in diagnosis.

The bacteria may be grown on an artificial media where they give a yellow or orange coloured growth or they may be seen under a micro scope of moderate power where they appear as relatively large, straight rods piled together in the characteristic columns which give them their name.

The whitish edges of fraying fins in cases of bacterial fin rot may also be mistakenly identified as fungal growths. This loss of pigment is simply due to the death of the fin tissue which will subsequently fall off. Confirmation of this can be obtained by microscopic examination or culture of the frayed fin.

In cases of advanced fin rot, however, where the condition of the fish has deteriorated, it is possible that a true fungal infection will most probably occur on the skin of the fish at the base of the fins.

All fishes are covered by a layer of mucus which serves to protect them from adverse conditions in their environment. This mucous layer, in a healthy fish, is very thin and, therefore, invisible.

When the skin of the fish is irritated, by parasites, for example, the amount of mucus secreted will increase in an attempt to throw off whatever is causing the irritation.

In severe cases the amount of mucus on the skin is so great that the skin appears to be covered in a grey sheen which is often taken to be fungus. One characteristic of this fungus-like symptom is that the grey sheen covers the whole of the body of the fish including the eyes.

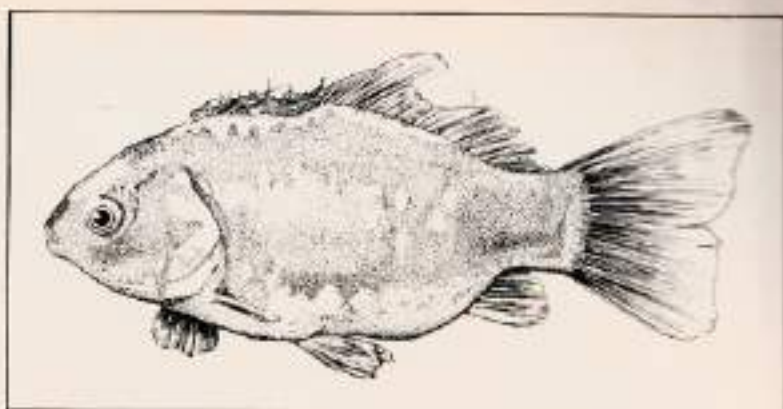
Parasites are most often responsible for this condition. The more common skin parasites are the protozoans: Ichthyobodo (Costia), Chilodonella and Trichodina and the platyhelminth, Gyrodactylus, all of which can readily be seen under a low power microscope in scrapings of skin and mucus.

Parasitic infections become of greatest importance in cases of overcrowding and where the water conditions are bad. Bad water conditions alone can also induce the fish to produce excess mucus and this must be taken into account when deciding whether or not a parasitic infection is present, if no microscope is available.

The condition of the aquarium water should be regularly monitored using good quality commercially available test kits.

In cases where the water is suspected in relation to a disease condition, parameters such as ammonia and nitrite should be monitored as well as the routine pH temperature and hardness (salinity, alkali reserve etc. for marines).

Thus we have shown that conditions which could be described by different observers as



A Goldfish suffering from fungus disease and fin rot. But is it fungus?

"fungal infections" can actually be caused by representatives of all the major groups of disease causing organisms. In some of these cases there is no available treatment and in others the best treatment could simply be to pay more attention to the fishes' environment.

In all cases a sound knowledge of the true cause of the illness is essential if effective treatment is to be obtained.

We have suggested one or two ways of supplementing observations with simple tests which are today available to all aquarists.

It is possible to actually culture bacterial and fungal organisms from diseased fish and, by obtaining positive or negative results, go some way to indicating whether or not a fish is suffering from a bacterial or a parasitic infection.

All of the skin parasites mentioned above will be visible under a simple microscope with a magnification of 100x and suitable microscopes are available at reasonable prices although the quality of the optics may not be good enough to show bacteria which

require a somewhat higher magnification.

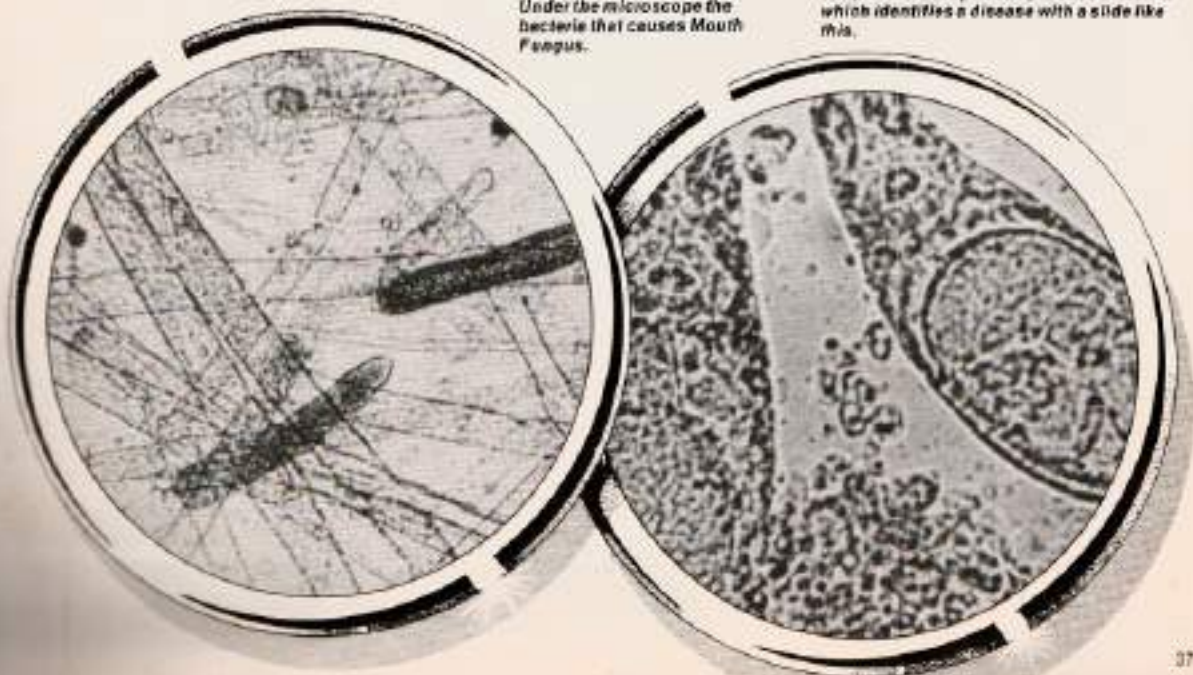
Enthusiastic aquarists keep, in their homes, a small chemical laboratory for testing the quality of their aquarium water. Being able to accurately diagnose disease if and when it occurs is only a small and logical extension of this.

Here is a summary of steps to be taken in diagnosing "fungus-like" complaints: -

- 1 - Observe symptoms on fish with reference to above comments.
- 2 - Test water having particular regard to the requirements of individual species.
- 3 - If possible, carry out examination of material scraped from the affected parts of the fish under a microscope at 100x magnification.
- 4 - In addition to 3 attempt to culture the bacteria or fungus using a commercially available kit.
- 5 - Where the results of culture are negative and no microscopic examination has been carried out, a parasitic infection should strongly be suspected and relevant treatment given.

Simple microscopes can produce evidence which identifies a disease with a slide like this.

Under the microscope the bacteria that causes Mouth Fungus.



THERE are few stranger fish than the Lionhead Cichlid (*Pseudocrenilabrus pinnatus*) from the Congo in Africa. The bushy lump on its head makes it an aquatic oddity.



Flying the Flag

The Cichlids are on parade

LIKE its South American counterpart the Ram this superb African fish, Thomas's Dwarf Cichlid has a coat of many iridescent colours. Golds, yellows, electric blues and rust all feature. The fish is found in much of Northern Africa. It is relatively easy to breed and makes a fairly peaceful tank inhabitant.





A superb example of the South American Cichlid is this pair of *Herotilapia multispinosa*, sometimes known as the Golden Cichlid. It is a subtle golden yellow with exquisite black blotch markings with just the hint of barring.



Practical
fishkeeping

A pair of *Aphyosemion lyjoe*.



IN this country the phrase 'raining cats and dogs' is well known; in other parts of the world, they have a saying 'raining fish'.

Imagine a pond, seamed daily by a tropical sun until all the water has evaporated, leaving its fish population to flap and suffocate in the mud. Soon that mud becomes hard-baked, and it seems impossible that any living thing could survive in it.

But then the rainy season comes—and within hours, dry creeks, riverbeds and ponds are filled to overflowing by the torrent. Now comes the miracle. Almost immediately, these seemingly lifeless waters are filled with rainbow-hued fish, tiny at first but growing at an astonishing rate. No wonder the natives imagine that these fish have fallen from the heavens with the rain... no other explanation seems possible to them.

The fish are egg-laying loach carps, popularly known as Killies, or Killifish. They are close cousins to some of the most popular aquarium occupants, the livebearers, and are to be found in every continent except Australia. There are well over 400 species, with new ones being discovered every year, and some are not even strictly tropical. The nearest to home is the Spanish Killie (*Aphanius iberus*).

Most Killies are simplicity itself to breed; they are smallish fish, so they will not

Raining fish!

Nick Fletcher looks at Killifish—the species that “appear from the heavens”

outgrow their tank; they are not difficult to feed or maintain healthy. Yet for such a widespread family, Killifish have not found widespread popularity. The species most commonly on sale in this country is the American Flag Fish (*Jordanella floridae*) which co-incidentally resembles its live-bearing relation to the platy more than it does other Killies.

Why the reluctance to keep these fish, except by specialist societies? The main point against them is their aversion to light. In the wild, they inhabit waters with plenty of surface cover in the form of plants and debris, which cuts down the sun's penetration. Put them into a typical community tank, which is well lit to display the fish to the full, and Killies will panic, dashing themselves against the glass.

Again, Killies do not enjoy one another's

company except for the serious purpose of breeding. The males tend to fight one another, and some species extend their hostility to anything in the tank smaller than they.

Finally, many Killifish live only one year in the wild, and even in tank conditions do not survive past the age of two or thereabouts—an upsetting notion for anyone regarding their fish as pets.

Having said that, it is impossible to ignore the fascinating way Killies reproduce, and very tempting to simulate the extraordinary natural conditions that accompany spawning, incubation and hatching of the eggs.

Killifish can be broadly divided into annual and perennial species, rather like flowers in the garden. The annuals are by far the most interesting, and it is these that have given rise to the legend of the showers of fish. These Killies inhabit areas of climatic extreme, where a period of drought is followed by heavy rain which floods and revitalises a barren landscape.

The fish need to grow to sexual maturity and spawn in the few brief months between when the rains fall and when the fast drop of moisture evaporates. The eggs are buried in the mud at the bottom of pools, and a tough membrane keeps the spark of life from being burned out when the water disappears. For months the eggs lie dormant, and only when the rains return do the young fish emerge to begin the cycle again.

The parental Killifish, known as egg tangers, do not live in areas where their home waters dry up, and instead of burying their eggs in the bottom debris—or substrate, as it is known—they lay them on the roots of floating or surface-reaching plants. A third group spawns on, but not in, the substrate.

Breeding the annual Killies depends on achieving the correct water balance. It should really be soft and acid, to match conditions met in the wild, with a pH of between 6 and 7. Soft water may be as near as your tap if you live in an area with a catchment area that



A typical example of the Killifish with spotted markings.

drains through peat, but if you live in the south or east of the country you will need to make other arrangements. You can put domestic water through a water softener, collect rainwater—which is naturally soft—in inert containers made of plastic, but not metal, or buy distilled water in bulk and mix it four parts to one with aged aquarium water.

To acidify the water, peat is used, but be careful not to use garden peat with chemical additives. The brand sold as Irish Moss Peat is ideal. A quantity of this peat should be boiled in soft water for ten minutes, allowed to cool and then squeezed well. It should then be placed in the breeding tank previously filled to a depth of no more than six inches with the softened water. At first the peat will float, but as it absorbs water it will gradually sink to the bottom, and the ideal is to achieve a layer an inch or more deep into which the parent fish can lay the eggs.

The size of the breeding tank is not critical, and Killies will spawn in very cramped quarters—even large pickle jars have been successful. Temperature should be kept at around 75°F, the tank should be well shaded, and since Killies are good jumpers, kept covered with a sheet of glass. No plants are needed for the annual spawners, although some floating duckweed is useful to keep light levels down.

To condition your fish up, live food is essential. If you can get them, mosquito larvae are good. This conditioning can take place in the breeding tank, and as soon as the male is ready he will begin to chase his females. Three Killifish per tank, comprising a male and two females, is the best number, since a ratio of one to one can lead to the female being over-egged.

After a vigorous chase, the male will swim close to his chosen female and the pair will suddenly make a nose dive into the peat, emerging again when an egg has been laid. The eggs are deposited singly at intervals, and so it is best to wait a couple of weeks before taking the next step, which is to simulate the drying up of the breeding pond. Meanwhile, the eggs that have been laid will be in no danger from the parents.

After the fortnight is up, remove the parent fish to another tank, drain off the water and place the peat, containing the eggs, into



Plumed Lyretail—another member of the *Aphyosemion* family.

small plastic containers. Soft margarine tubs are ideal. The lids should be left off until the peat feels just damp, then the containers can be sealed, labelled with the species of Killie that have spawned and the date at which the eggs were removed, then left to stand at a constant temperature of 70°F for between three to four months.

After this time, the peat can be placed in a tank which is topped up with the same soft water that was used for spawning, and the fry will hatch from the tough-membraned eggs within a matter of hours.

The youngsters should be kept in subdued light and fed immediately on brine shrimp nauplii, rotifers, small daphnia and other live food. Not surprisingly in fish that can be mature in as little as twelve weeks, their growth is very rapid indeed, and if you wish to maintain good-sized breeding stock it is vital not to overcrowd the young.

The egg hanging Killies require exactly the same type of water, conditioning and breeding tank as the annuals, but because

the eggs are not buried in the substrate, the fish will need something to stimulate the roots of plants, which are the spawning medium in the wild.

Natural plants like water wisteria can be used, but a better alternative is a spawning mop made from nylon wool, previously well boiled to make it chemically inert. The wool is wound round the fingers for a few turns and then one end of the small skein so formed is pushed into a bored wine bottle cork. The other end is snipped off so that you are left with a woolen tassel buoyed up at one end.

The male Killie will again court one female at a time and eggs will once more be laid singly, at intervals over a period of a week. At the end of this time there will be anything from one to three hundred eggs adhering to the mop, which can be taken out and put in a container of water kept at a constant 75°F. If you are short on spawning mops, the eggs can be picked off in the fingers and put directly into the jar. Their tough outer membranes will prevent damage.

The eggs will begin to hatch in a couple of weeks, and the fish will emerge over a seven day period to correspond with the time-lapse between when the first and last eggs were laid. The young fish can be started off immediately on live food.

The third group of Killies, which lay their eggs directly on the peat at the bottom of the spawning tank, seem to represent an intermediate stage of evolution. The eggs do not need to be dried out, but take up to two months to hatch.

It would be impractical to give a comprehensive list of Killifish species available, but among the more popular egg-buriers are the following: Blue Gularis (*Aphyosemion sjostedti*) which is an African fish from the Cameroon and southern Nigeria; all the *Nothobranchius* species, from Tanzania, Zanzibar, Kenya and Mozambique; the Blue Lyretail Panchax (*Rafiohia liberica*) which comes, predictably, from Liberia; and the Argentine Pearlfish (*Cynolebias bellotti*) which is a particularly beautiful but aggressive South American species.

Egg-hangers are the more common type of Killie and include the Cloan Killie (*Epiplatys annulatus*) from Nigeria; the Green Panchax from the Malagasy Republic (*Fachypanchax playfari*); and the Lampeye (*Aplochilichthys macrophthalmus*) from the Nigerian rain forests, which is a species quite often sold by aquarists' shops.

As in all large families, there are members which do not conform to the general pattern of behaviour, and the most striking of these among the Killifish is the American Flag. These attractive fish spawn in a depression in soft plant material on the tank bottom, and the male guards the eggs just as a cichlid parent would.

For hobbyists wishing to take up the keeping and breeding of Killifish, there are frequently tempting advertisements offering the dried eggs of the annual species, and from their wording it would appear to be a simple case of 'add water'. It would be interesting to hear from readers what sort of success rate they have achieved from eggs sent through the post.

Finally, no article on Killifish would be complete without the address of the British Killifish Association. Readers wishing to know more about these fascinating fish should send a stamped, addressed envelope to: B. P. Brown, 173 Parr Lane, Sully BL9 6JN.



The courtship ritual of the *Greenethere Nothobranchius*—an African Killifish.

Tank Maintenance

A major clean-up for the Practical Fishkeeping Marine Aquarium

by Norman Wright and Clive Nicholls



Step 1.
FIRST step is to mix up your new sea water two days before you plan to do the major clean.

Mix up the salt following the instructions on the packet. We mixed ten gallons—seen here in two five gallon containers. They are white plastic brewing containers.

The water must be fiercely aerated to remove the chlorine for the whole two days.



Step 3.
NOW adjust the temperature of the new water to match the temperature of your tank. You should do this shortly before adding the new water after you have completed the clean. Use boiled water to up the temperature.



Step 2.
SHORTLY before starting the clean add the trace elements to your new water. Simply squeeze in the elements. The aeration will mix it thoroughly.



Step 4.
NEXT check the specific gravity with the hydrometer. If it is outside the limits shown on a special marine aquarists version of the instrument, adjust it by either adding more salt or more boiled water. You will need to switch off aeration to avoid disturbing the instrument.

IF you saw last month's issue you will know that we have added to the PRACTICAL FISHKEEPING aquaria by setting up a tropical freshwater tank. But this month we are concentrating on our original marine set-up.

It's time for a good clean-up and water change in the aquarium. We decided to add some more sand to the filter bed, remove all the unwanted algae and generally tidy up the whole system.

Don't worry about stirring up the sand and adding more. During a hurricane a coral sea would be stirred up far more, so the fish shouldn't be harmed.

In fact ours all took it quite well. The Regal Tang was stressed and skulked in a corner, but he recovered well. The Picasso Trigger Fish responded with aggression but calmed down after the water change was completed.



Step 5.
Cleaning can now start. Begin by removing the hood and cover glass. Switch off lighting and the heater/thermostat to avoid risk of electrical accidents.



Step 6.
TAKE this opportunity of thoroughly washing and cleaning the cover glass. It will probably have dried food, algae and evaporated salt on it. If you use detergent make sure all traces of it are washed off the glass under the tap.



Step 7 and 8
REMOVE as much algae as possible from the top corners of the tank, airlines, heaters etc. Then thoroughly clean the glass inside with the aid of an algae magnet and an algae scraper.



Step 12.
FINAL hoovering of the humus can be done with the siphon when you remove the old water ready for the water change. Keep the end of the siphon tube over the filter bed and take up all the muck to waste.



Step 9.
NEXT remove all rocks and corals and internal filters. They can be returned fairly quickly, so keep them handy. You can stand them on a plastic sheet.



Step 11.
USING an air pump powered vacuum cleaner like this gently remove the settled humus and algae from the filter bed. The cleaner is best for larger particles.



Step 13.
WE decided to add some more oolitic coral sand to improve the depth of the filter bed and make the tank more attractive. In fact we used an extra 10 lb. Do not wash the sand as it will then grow bacteria more quickly. Simply tip it in gently into the area you want building up.



Step 10.
 It's now time for that tropical storm! Use the algae scraper to stir up the oolitic sand on the top of your filter bed. The result will be a cloud of grayish sea humus and debris. Let this settle onto the surface of the bed.



NOW all you have to do is siphon the new water into the tank. Check the temperature is right just before doing so. Then you can replace the decorations, cover glass and hood and switch the heater and lighting back on. The final touch is to give the outside glass a good clean. Your tank will be slightly cloudy at this stage. But after a few hours the water will be crystal clear and the whole thing will look in great shape.

ODDBALLS

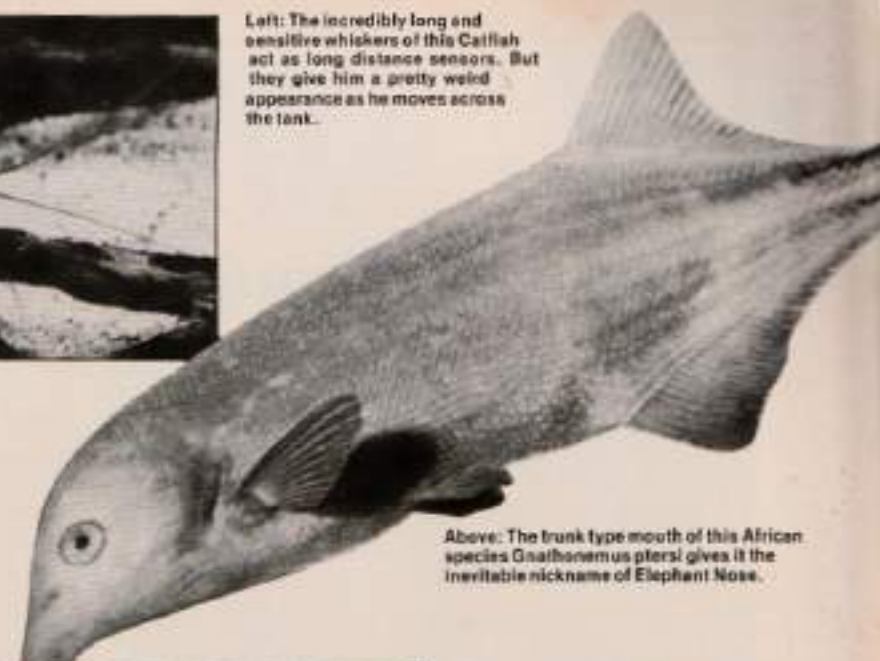
There's no shortage of unusual characters in the world of fish





Left: Ugly and cumbersome is the only way to describe this unusual marine fish—the Molly Miller Blenny (*Blennius cristatus*). The fish is mottled and barred and looks a fearsome creature. It even likes to climb out of the water! And that must resemble a horror film. This Blenny is found all round the coasts of the Southern United States and South America. It can be kept in aquaria.

Left: The incredibly long and sensitive whiskers of this Catfish act as long distance sensors. But they give him a pretty weird appearance as he moves across the tank.



Above: The trunk type mouth of this African species *Gnathopomus pteris* gives it the inevitable nickname of Elephant Nose.



Left: the translucent body of this see-through fish gives it a ghostly appearance and its name of Glass Catfish (*Kryptopterus bicirchis*). It comes from all over South East Asia. It's definitely the invisible fish!

Below left: Truly one of the most unusual looking of all aquarium fish is the Butterfly Fish (*Pantodon buchholzi*). Its ventral fins are wing like and its caudals flow like pennants. The fish is African and uses its fins to leap fairly high out of the water to catch insects.

Below: The Four eye or Anaplecs. This really is an oddball. He swims near the surface and his eyes are split into two. So he can keep an eye on all situations.



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Full details of the holiday will be announced later.

Shows held after June 1 1979 are eligible. And to stage a Top Tank class the organising society must be members of the following federations.

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Filters



Motor unit (left) and impeller.

It's not just expert fishkeepers who recognise the benefits of motorised power filters.

Attributes such as low noise-level, high flow-rate and unquestioned effectiveness would be appreciated just as greatly by newcomers to the hobby too, but unfortunately the high cost of power filters when compared with their air-operated counterparts has been a serious deterrent in the past.

Much of that price difference has now been whittled away with the arrival in this country of the Hagen AquaClear Power Filter, which costs just £14.18* exclusive of VAT.

The AquaClear has several novel features, and it is the simplicity of its design rather than any obvious economising on quality that has kept its price so low. That simplicity of design is likely, in turn, to result in a long, trouble-free working life, but more of that later.

First, a description of the filter's operation: it is an outside-fitting design that clips securely over the top frame of the aquarium.

Unlike most other clip-on filters, the AquaClear does not employ a syphon to transfer the water from the aquarium into the filter box. Instead the impeller actually sucks the water into the filter, and after passing through the various purifying media it returns to the aquarium by gravity, via a miniature "waterfall".



The AquaClear Power Filter complete.

Provided the filter is set up vertically by means of the adjuster provided, there is no way that water can overflow or leak out. The U-shaped water-tube is held securely in place, and has a strainer device to prevent small fish being sucked in. A neat all-enveloping lid reduces evaporation and prevents ingress of dirt etc.

The motor unit clips directly onto the bottom of the filter box, and uniquely has no moving parts to wear or produce noise: instead, it incorporates an electrical coil, not unlike that found in a small air pump, but which has a hollow centre.

Into this hollow fits a tube that protrudes from the bottom of the filter box, which holds the impeller. This impeller is the only moving part in the whole filter, being driven by the coil's magnetic impulses, and since it runs in water it is both lubricated and noise-dampened.

Filter Media

There are three tapered separator plates to form compartments as required, each plate having a different arrangement of perforations. The filter is designed to work with the standard Hagen filter cartridges—foam and charcoal—but it can also be used with a loose filling of polymer wool: in fact I feel this would give superior results, though obviously the cartridges are more convenient to change.

Whatever the medium chosen, ensure that the plates are used in the correct sequence: a little thought will avoid mistakes here, but



The magnetically driven impeller.



On File

Equipment reviews by technical writer
Cliff Harrison

the plate with 4 "windows" will normally be used nearest the impeller, whilst the one without holes at the wider end will be located nearest to the outlet. When polymer fleece is being used, the central plate can be dispensed with.

Performance

My own tests produced a throughput of around 80 gallons/hour, but this figure will depend very much on the water level in the aquarium and how promptly the filter medium is replaced or cleaned whenever necessary: this latter point is especially important since a clogged filter medium will soon restrict the gravity return of water to the aquarium. The biggest advantage of this filter is that it is completely self-starting—merely ¾ fill the filter box with water, switch on, and wait for about 30 seconds for the impeller to remove the air from the water-tube.

There are many different types of power filter on the market today, each having its own particular advantages and limitations, and the AquaClear is naturally no exception: first, it cannot be used on aquaria with frames wider than 7 7/8 inch, nor can it be used in aquaria where the water level is more than about 2 1/2 in below the top frame.

Remember too that the box rises about 1 1/4 in above the tank, so the tank cover (if fitted) must be cut to accommodate it. If you should find the filter anything other than near-silent in operation (once the air bubbles have been exhausted from the water tube), there are two minor remedies you might try.

First, to cure a slight "hum" from the motor, place a thin strip of foam rubber on the top surface of the aquarium frame for the filter to sit on. Second, if there is a faint rattle from the impeller, shave off a thin strip of plastic from the underside of each of the vanes, nearest to the drum-shaped magnet: this will prevent it fouling on minor moulding marks in the plastic impeller housing, and performance will not be affected.

The Hagen AquaClear certainly represents an exciting new development in power filtration, in more than price alone, and has much to offer both enthusiast and novice alike: its simplicity of operation must surely appeal to all sections of the market, albeit for quite different reasons. Like earlier Hagen products, it has obviously been designed by someone with a first-hand knowledge of how filters really are used, and the self-starting arrangement is just one of its many practical features. It is distributed by **Petereams Ltd**, Belton Estate, Waterhouse Lane, Chelmsford, Essex.

Books

Book reviews by Norman Wright

Domino Pocket Poster Guide to Aquarium Fishes, Fontana Paperback, 85p.

THIS is a colourful wall poster featuring more than 200 popular tropical freshwater and coldwater species.

Each fish is featured in a colour drawing with a note about its origin and husbandry in the aquarium.

As a wall poster the publication is very nicely done. It will certainly be popular with youngsters and schools and for club headquarters.

It does come folded into a booklet shape in a plastic wallet and as well as the illustrations it has a small section on keeping, breeding and feeding.

This isn't really comprehensive enough to stand as a pocket guide. As a poster however it succeeds well.



Aquarium Plants by Niels Jacobsen, Blandford Press, £3.95.

A COMPANION guide to the publisher's **Aquarium Fishes in Colour**, this is primarily an identification book.

It describes and illustrates in colour more than 300 aquatic plants—a good cross section of those encountered in the aquarium.

It is a handy little book, well printed and with superb colour illustrations.

Although it doesn't cover so many species as some of the more expensive aquarium plant volumes, it is a more than adequate selection for all but the most plant crazy of aquarists.

In other words it is ideal for the ordinary fishkeeper who wants a reference book of plants.

The author includes a lot of information about the different species. He is a research botanist in Denmark and has travelled extensively to research and catalogue aquatic plants.

PRACTICAL FISHKEEPING



Wildwoods Book of Ponds and Aquariums, Wildwood Water Gardens Ltd, 50p.

THIS is partly a catalogue for the famous Wildwoods Water Garden Centre at Enfield in Middlesex, but is much more than that.

It is more a guide to the whole range of fishkeeping from the pond through to the marine aquarium.

Richly illustrated with colour and black and white pictures and drawings, it is a very thorough guide to equipment, plants and fish available, and how to use and keep them properly.

Wildwoods are so obviously fish enthusiasts. That certainly comes over in the way they describe their own pleasures at keeping both pond and aquarium fish.

The book is devoted to explaining how these pleasures can most easily be achieved.

Descriptions and illustrations of equipment—ponds, liners, pumps, lighting, aquariums, filters and accessories—are interspersed with tips on how to choose them and use them and maintain them.

Throughout, practical advice keeps pace with the lists of equipment, plants and fish. The maintenance of pumps is described, and pond planting techniques, and there is a particularly useful step-by-step feature on spring-cleaning the pond and what to do with the fish in the meantime.

Anyone contemplating the keeping of tropical marines will find the pages devoted to setting up, maturing and stocking a marine aquarium extremely valuable.

Altogether Wildwoods' very readable book amply justifies the claim that newcomers to either water gardening or indoor fishkeeping will find in it enough information and encouragement to start them on their new venture. Even old hands could find it very useful too.

Wildwoods Book of Ponds and Aquariums, priced at 60p (by post 75p) is obtainable from Wildwoods Water Gardens Limited, Theobalds Park Road, Enfield, Middx. EN2 9BW.

Price lists (one for Gardens Ponds, Plants and Fish; and one for Aquariums, Accessories and Plants) are free on request.

Pools

FLEXIBLE liners have become increasingly popular in recent years, and no material is tougher than butyl rubber—it is widely used to create reservoirs and lakes, and its life expectancy is comparable with virtually any material.

However, I have heard that it is possible for a cat's claws to create minute punctures in the material as the animal scrambles out,—not a common occurrence, admittedly, but one which could not be foreseen.

Normal household adhesives cannot be used to repair butyl rubber liners, which is why **Butyl Products Ltd.** have come to the rescue with their complete repair kit: this comprises sheeting to make the patches, and Pressure Contact Tape to fix it in place.

The area to be repaired must first be cleaned, dried, wiped over with a non-residue type of cleaning fluid, and dried again. The actual repair then takes just a few moments.

I have tried this tape, and found it extremely effective: it can also be used to join the sheets of butyl together for an unusual shape or size of liner—such as for a stream between two ponds, perhaps,—but only where there is little strain on the joint.

The repair kit comes in two sizes costing £9.00 (standard), £14.00 (large), including VAT and carriage, from Butyl Products Ltd., Radford Crescent, Billeney, Essex. (tel: Billeney 53281).

POLYTHENE and similar lightweight plastic sheeting is not normally regarded as suitable for creating semi-transparent ponds, since it is too fragile a material and is eventually affected by sunlight.

However, it is very useful for constructing temporary ponds to accommodate breeding pairs of fish, and subsequently their young when space is at a premium. Realizing how easily the material can be punctured, and a large sheet consequently rendered useless, Akwa have introduced their new Plastic Pool Patches for an instant repair.

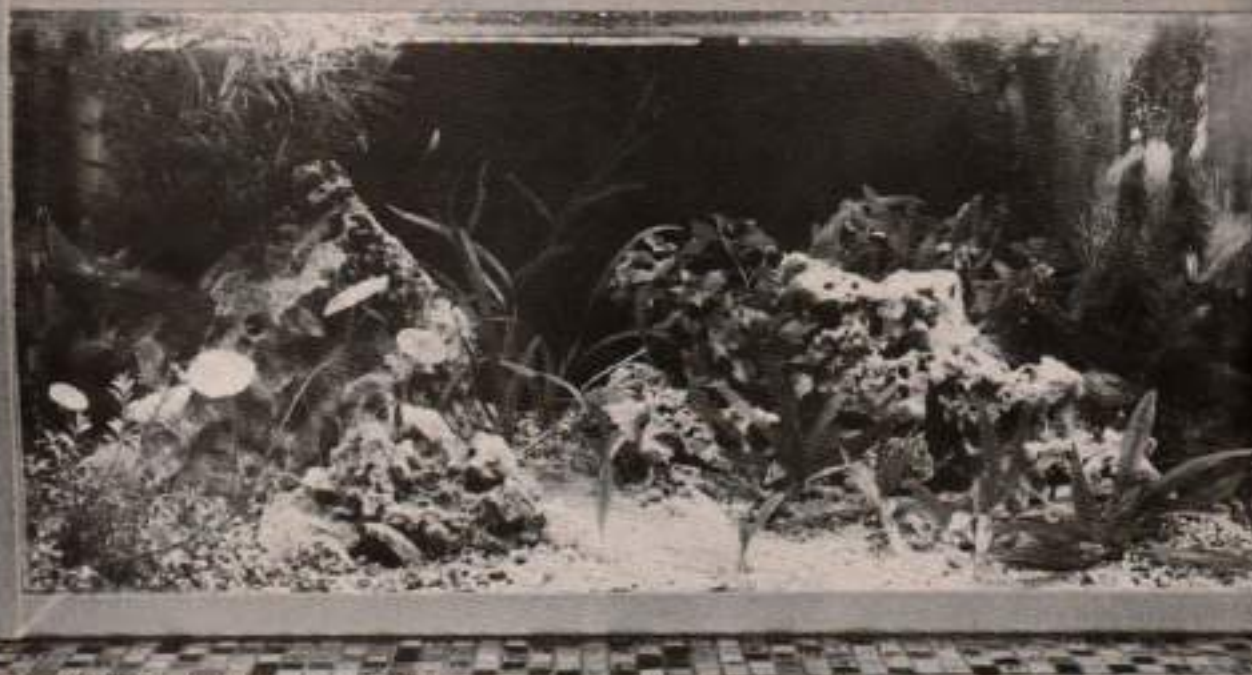
It is claimed that these will even work underwater, though naturally the area around the leak must be clean and free of algae etc.

If you are planning to install a new pool this summer, perhaps you have already given some thought to the problems (and work) involved in bailing out the water whenever a clean-up is necessary.

No matter what material you construct your pool in, you can fit it with the new **Koi Pool Main Drain**, from **Fillapac**. This is fitted at the lowest point of your pool, and allows the water to rapidly drain away (into a suitably prepared sub-strate beneath the pool) without becoming blocked by dead leaves etc.

The secret lies in its large, double-sided grille which is located just above the floor of the pool. Although aimed specifically at the Koi-keeping section of the market, as its name suggests, this product is equally suitable for all types of pond that are to be cleaned out on a fairly regular basis.

Further details from the Fillapac Company Ltd., Fryers Works, Abercromby Avenue, High Wycombe, Bucks. (tel: High Wycombe 40483).



The finished tank. I think the soft greens and the light rocks are perfect for brightly coloured fish.



Perfect Planting

Join David Shields for the next few months in his new series we have called *Perfect Planting*.

It is the ideal way to describe David's articles, for he is a plant perfectionist and his expert advice can help you to display plants and fish to their best.

Each month David will show you how he matches up various species of fish to the plants available and makes both look beautiful.

David is well qualified for this task. He is a leading show winner in furnished aquaria sections and his selection of plants grown at his Halifax, Yorks, home is tremendous.

David (39) is a sales manager and he is a leading member of Halifax A.S. He has been a fishkeeper for more than 20 years.

Plants and platies

David Shields designs a display tank

IMAGINE a shoal of a dozen or more Wagtail Platies, their bright colours blending with light rocks and the soft greens of nicely arranged plants...

That's what I pictured in my mind when I designed the tank for this month's article. What I wanted was a display that would show off bright fish AND the soft green popular aquatic plants.

And really it is one of the simplest of tasks. The fish are the popular varieties—the livebearers and some of the Tetras. And the soft plants are the ones readily available to fishkeepers—Myriophyllum, Hygrophilla, Pygmy Chain Sword.

As far as design is concerned it is just a case of choosing some attractive rockwork, working out where to put the plants and choosing the fish.

It really is a combination of fish and plants that can't fail to make an attractive display tank for your home or for a show.

As I said, I designed and set up a tank with this combination in mind, with the idea of giving you a few tips to start off your own design.

What is important is that you create a display that you enjoy looking at. You may

not think mine is your cup of tea, so just use my ideas as a basis for your own individually laid out aquarium.

As usual I have started with a basic two foot tank—the size we have to furnish for a show. But you can use the ideas on a bigger scale for a bigger tank.

So, let me explain my use of rocks, plants and gravel and the fish I think would look perfect with them...

Let's begin with the gravel. I have used standard aquarium gravel which I felt would blend well with the very light coloured rocks I planned to use.

The gravel was well washed and banked steeply up at the back corners as you will see from the pictures.

There is little gravel at the front and it is also shallow at the middle of the back glass.

To add depth and effect I have sprinkled a layer of sand through the centre channel between the high rocks and spreading out across the front of the display.

This is a favourite method of mine to give a tank a little extra highlight. You only need a light covering of sand for the right look.

Next to the rocks. Whenever I go my eyes are drawn to rocks, wood, bark or roots.

Anything that might one day end up in a display attracts me like a lamb to the slaughter.

I am willing to pay what many aquarists would regard as a ridiculous price for the right rocks.

But these were free. I must confess I removed them at dead of night from a Spanish garden!

We were on holiday on the Costa Brava at the time. I couldn't believe my eyes when I looked over this wall into a garden and my eyes fell on a rockery full of magnificent textured craggy stones.

I just had to take some home and staged a midnight foray armed with a sack.

They fit in perfectly with this arrangement because they are light colour with crags, holes and subtle textures.

I arranged the bigger rocks high on the gravel at the two back corners with two smaller pieces creating a stepped effect in front of the two main lumps.

This gives an avenue for the fish and plants of places for the plants to show nicely between the rocks.

As far as choice of plants is concerned I have kept it simple. All my choices are easily available.

Staple plants for the back and sides are the delicate *Hydrophilla polysperma*, *Myrophillum aquilia* and *musarti* plus the bigger Amazon Chain Sword plants.

As you know Chain Swords send out runners and tiny new plants grow at intervals. In fact if you do not control these by pinching off the new plants which are unwanted the whole tank will be covered in six or seven weeks.

The runners just snake backwards and forwards. They just turn round when they hit the glass!

But as you can see from the picture I have created a pleasing effect down the sandy avenue by allowing some small Chain Swords to grow.

Then at the right hand front corner there are some slightly bigger specimens. The larger plants are at the back.

Other display plants are the beautiful *Ludwigia arcuata* at the left hand front corner and *Hydrocotyle vulgaris*—the European Pennywort.

Pennywort is very delicate. Each plant looks like an umbrella suspended on a tiny thread.

I placed these between the two rocks so their light green would be suspended against the sandy coloured high rocks.

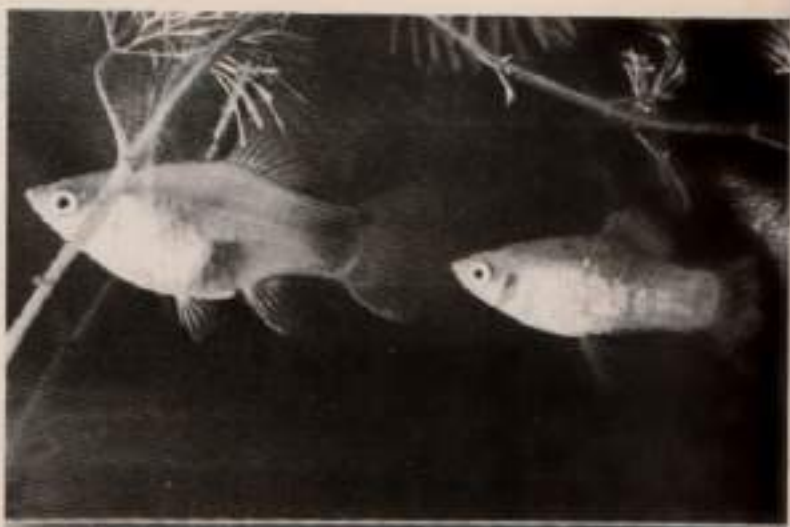
Again these will send out runners and spread. It is just a case of allowing the ones you want to grow and removing the rest.

Anyway, the main picture will show you how I planted the tank exactly. But again I must stress that this is only my personal preference—not something that has to be followed strictly.

This sort of set up will certainly need a lot of light. I would suggest two 60 Watt bulbs for eight to ten hours a day.

The plants are the type which will need this amount of light to look good.

Filtration is also essential—but not undergravel in my opinion.



Platies—for my money a shoal of 12 to 15 of these fish is the best compliment to my design.

On this one I would suggest an outside filter not necessarily running all the time. But when the fish are installed it will certainly be necessary.

Now to the fish. As I said earlier my favourite would be a shoal of Platies. But other livebearers would look very good.

Swordtails for instance would fit in just like the Wagtails. Guppies again would be just right.

Black Widow Tetras are another species that comes to mind.

And both Black Line Tetras and Black Neon Tetras would be very suitable.

You could even stock Penguins. But I think a good sized shoal of 12 or 15 would be best—whatever species you choose.

This is a set up for a bright fish and I am certain that whichever you decide to keep will complement this tank and make a worthy display.



Ludwigia arcuata—this is positioned in the left front corner of the display.



Right: Beautiful specimens of Pennywort
—like umbrellas suspended in the water.
They give a very attractive display between the two rocks.

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news

Booming Koi in Brum

The British Koi Keepers' Society held their national annual meeting at the Botanical Gardens in Birmingham.

This new venue proved very popular as the meeting was very well attended.

First on the agenda, before the more serious matters of the day began, was a slide show and informative talk by the chairman, **Roland Seal**, on the names of the various colours and patterns given to Koi.

Later it was reported that the society now has 852 members and is the largest specialist fish society in the country.

It is envisaged that the society could be 1,000 strong by next year.

The subscription charges will remain unchanged, £8 single membership, £8.50 married couple.

Two 12 inch Koi, a Yamato-nishiki and a Shiro Utsuri, were specially purchased in Japan for the occasion and were won by Tony Gibbons (Wessex section) and Keith Dean (Norwich Section).

The Honorary Life Members are Hilda and Eric Allen. Honorary members, Mr L. E. Perkins and Mr Norman Wright.

The committee is: Chairman/Editor, **Roland Seal**; assistant/editor, **Bill Fowler**; treasurer/membership secretary, **Malcolm Waunsley**; general secretary, **Ron Hodgson**; public relations officer, **Mrs Gill Minchin**.

All membership details can be obtained from M. Waunsley, 165 Woodside Road, Amersham, Bucks, HP6 6NR.

Plant life in Sussex

The Mid-Sussex AS heard from the Sussex Nature Trust, who gave an interesting talk and slide show on plant life.

The monthly "50 club" prizes were won by **Chris Crobin**, **Tony Short** and **Yvonne Perin**.

The table show results were as follows:

Rasboras, 1 & 2 P. Levine; 3 B. Saitto; 4 L. Pinney. **Labyrinths**, 1 P. Levine; 2 L. Pinney; 3 P. Levine; 4 E. & T. Teater, best junior, I. Gullon. **Danios**, 1 L. Pinney; 2 J. Birch; 3 L. Pinney; 4 J. Maddocks. Best junior, G. Yule.

Meeting are held at Ockley Lodge, Keymer on the second Thursday of each month. Further details from the secretary, J. Birch, 11a Sandrocks Way, Haywards Heath (Tel: H. Heath 50585).



New faces

The Bexleyheath and District Aquarist Society are pleased to announce their newly elected officials:

Chairman, **R. Liddiard**; deputy chairman, **M. Balcombe**; secretary, **D. Goodwin**, 145b Broadway, Bexleyheath, Kent; treasurer, **M. Martin**, show secretary, **N. M. Ravee**; assistant show secretary, **R. Yeeles**; P.R.O., **D. W. Barnett**; librarian, **R. Mitchell**; committee, **G. Greenhall**, **E. Dixon**.

The society meet every other Thursday at 9 p.m. at the Committee Rooms, A.B.C. Cine Bowl, Broadway, Bexleyheath, Kent.

Ranchu changes

The committee of the Ichiban Ranchu Society now consists of the following new members:

Show secretary, **Gary Lewis**; lay member, **Sue Lewis**; lay member, **Frank Hilton**.

Any details of Open Shows etc. can be obtained from Gary Lewis, 91 Bourne Avenue, Hayes, Middlesex. (Tel: 01 573 1770.)

Merseysiders

The Hoylake Aquarist Society held a highly successful auction of surplus equipment, fish and plants.

Meetings of the Society are held on the second and fourth Tuesdays of the month, starting at 8 pm in the Coach and Horses Hotel, Moreton, Merseyside. New members and visitors are always welcome.

Valley Kings!

The Merthyr Aquarist Society gained a useful victory against Aberffery A.S. in the Heads of the Valley League.

This win puts Merthyr in the final against Port Talbot A.S.

Results of Merthyr's table show: 1 **N. Cuffard**; 2 **P. Willis**; 3 **E. Morgan**.

Entertainment for the evening was a well prepared quiz by R. Morgan.

Catfish expert

King's Lynn Aquarist Society now meet on the second Thursday of each month at the Victoria public house, Like Road, Kings Lynn. Meetings start at 7.45 p.m.

Members were joined by friends from Norwich and Yarmouth to hear a talk on Catfish by **Terry Cruikshank**, show secretary of the British Catfish Society.

Derek Lambourne, Chairman of the Society, also assisted by explaining the slides which illustrated the talk.

Members were fascinated by the variety of shape and colour and size of catfish, and can now view these fish in a new light.

The club's own bench show for catfish was well supported by 21 fish, with results as follows:

Corydoras, 1 **R. Brown**; 2 **J. and B. Towler**, A.O.V. Catfish; 1 **B. Wright**; 2 **C. Simper**; 3 **C. Simper**; 4 **G. Osler**.

Super show

KETTERING A.S. held its annual Open Show at McKinney Theatre. The 351 fish entries were up on last year.

Over 500 people attended, which is also encouraging as new members are usually gained.

RESULTS: B: 1 A & M Crew; 2 A & M Crew; 3 A & M Crew; 4 B. Cruikshank; CC: 1 T. A. Cruikshank; 2 J. P. Parther; 3 M & B Cole; 4 P. M. Lambert; D: 1 M. Lewis; 2 M. Lewis; 3 L. Goodale; 4 R. Sherrin; DA: 1 R. Elliot; 2 R. Dyer; 3 A & M Crew; 4 A. Adamson.

DB: 1 M & B Cole; 2 R. Elliot; 3 T. & F. Parther; 4 R. Elliot; DC: 1 N. Campbell; 2 N. Campbell; 3 M & Mrs Underwood; 4 H. Helderston; E: 1 G. Guller; 2 T. & F. Parther; 3 W. Aston; 4 J. Sawright; EA: 1 A. Adamson; 2 P. O'Brien; 3 W. & Mrs Underwood; 4 P. O'Brien; F: 1 W. Aston; 2 A. M. Cole; 3 T. & F. Parther; 4 T. & F. Parther.

G: P. M. Lambert; 2 C. Burton; 3 J. Sawright; 4 J. Short; W: T. A. Cruikshank; 2 T. A. Cruikshank; 3 L. R. Clouse; 4 S. A. J. Short; 2 I. E. Davies; 3 C. Burton; 4 Mr & Mrs Underwood; 4 R. Smith; R: 1 R. Elliot; 2 R. Elliot; 3 A. & M. Cole; 4 P. O'Brien; L: 1 L. Goodale; 2 R. Elliot; 3 P. Hand; 4 W. Aston; W: 1 R. Wilson; 2 T. A. Cruikshank; 3 D. Hopkins; 4 E. Davies; H: 1 R. Wilson; 2 D. Cruikshank; 3 W. Aston; 4 R. Wilson.

Practical Fishkeeping Club Service



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DIARY DATES

S 1 8 15 22 29
M 2 9 16 23 30
T 3 10 17 24 31
W 4 11 18 25
T 5 12 19 26
F 6 13 20 27
S 7 14 21 28



Fish & Cod

MAKE sure your society's meeting or show is in the PRACTICAL FISHKEEPING Diary Dates. All you have to do is write and tell us about your events and cash in on the publicity we will give to them. Simply write to Diary Dates, Practical Fishkeeping, Bretton Court, Bretton, Peterborough. We will do the rest. Make sure you give the date, the details of the event and the full name of your society. Include addresses or telephone numbers where necessary.

JULY

Sunday, July 1: King's Lynn A.S. First Open Show at the City Exchange, Tussell Market Place, King's Lynn, Norfolk. Schedules from B. Towler, 38 Russell Close, King's Lynn.

SUNDAY, July 1: Sherwood Aquarist Society Open Show. Details: Mr. M. Holmwood, 5 Weaver Court, Forest Town, Mansfield, Notts.

Saturday, July 7: Nallies D.A.S. Open Show at the Community Centre, Clarence, Schedules from Show Secretary Mr. P. Hillard, 2 Woodland Road, Nallies, Bristol, Avon. Tel: Nallies 5996.

Saturday, July 8: Lytham Aquarist Society Annual Open Show at Lytham Baths, Dunsoppe Terrace, Lytham, Lancs. Schedules from show secretary, Peter Hunt, 3 Wyndere Grove, Preston, Lancs. (Tel: Preston 631922.)

Sunday, July 8: Nemo's Tropical Fish Club's Annual Open Show, Hanson School, Herring Road, Syle, Gateshead. Further details from Mr. P. Giddis, 47 South Street, Durham, Gateshead.

Saturday and Sunday, July 14/15: Haverford & Becontree A.S. Open Show (Dagenham Town Show), Central Park, Dagenham, Essex. Schedules, Gerry 3501046, 35 Cornhill Way, Elm Park, Haverford, Essex.

Sunday, July 15: Scarborough A.S. Open Show, Gladstone Road Junior School, Wooler Road, Scarborough. Schedules (March) from J. F. Richardson, 5 Red Barn, Pickering, N. Yorks. YO19 6JG. (Tel: Pickering 73964.)

Sunday, July 15: The Sandpans Aquarist Society, 9th Open Show at Meads Comprehensive School, Meads Cop Road, Southport. Schedules from Bernie Baldwin, 10 Olive Grove, Southport, Merseyside.

Saturday, July 21: The Goldfish Society of Great Britain, general meeting at Cony Hall, Red Lion Square, Holborn, London.

SATURDAY/SUNDAY, July 22/23: Harlow A.S. Open Show in conjunction with Harlow Town Show. Details from Show Secretary, D. Hayward, 1 Windmill Woodway, Aylsholme Roadway, Dunstow, Essex. Tel: Writtle 24278.

Sunday, July 23: Runcorn Aquarist Society Open Show, 51 Edward Street, Church Hall, Ivy Street, Runcorn, Cheshire. Benching 12.30 to 2 p.m.

AUGUST

Saturday, August 4: Northern Goldfish & Pondkeepers Society hold their 3rd Combined Fish Show at The Sports Centre, Silverwell Street, Bolton, Lancs. Schedules from Brian Rowland, 4 Wharf Road, Hale, Cheshire. (Tel: 091 980 5001.)

Saturday, August 4: Northern Goldfish & Pondkeepers Society Aquarist Show at The Sports Centre, Silverwell Street, Bolton. Details: Mr. W. Lord, 48 Hoggall Road, Bromley Cross, Bolton. Tel: Bolton 58100. A great day for the family.

SUNDAY, August 5: Otham and District Aquarist Society Open Show at Werneth Park, Otham. F.N.A.S. Rules. Benching 12 to 2 p.m. Trophies for all 1500 winners plus prizes for 1, 2 & 3, 21 trophies and 10 goldfisher classes. Schedules from P. Harris, 21 Haddon Road, Eccles, Tel: 061-707-1306 or J.A. Chadwick, 5 Bonville Close, Chadwell, Otham, Tel: 061-652-6227.

SUNDAY, August 5: British Koi Keepers' Society East Anglian section Open Show at Wessley Fish Farm, Dile, Norfolk. Details: G. L. Wright, 47 Latham Close, Backwell, Norfolk. Tel: 0493-68234.

Sunday, August 5: Otham & District Society Open Show at Werneth Park, Werneth, Otham. Benching 12 noon to 2 p.m. Best judges 15 shillings to cover 20 tropical classes and 10 goldfisher classes. Schedules from Mr. P. Harris, 21 Haddon Road, Eccles. Tel: 061 707 1306.

Sunday, August 19: Southern East London A.S. Open Show at 140 Greenwich High Road, SE 15. Details: Mrs. Jeffrey, 297 Bathurst Road, SE13.

SUNDAY, August 19: Longridge and District A.S. Open Show at the Civic Hall, Wilkes Park Lane, Longridge, Nr. Preston, Lancs. Schedules from Mr. A. Lyell, 52 Haxton Street, Ashton, Preston, Lancs.

Saturday, August 25, 26 and 27: Leamington and District A.S. Exhibition and Show at the Royal Pump Rooms, Leamington Spa. Details from M. Burridge, Flat 1, 36 Warwick New Road, Leamington Spa, Warks.

Sunday, August 26: Long Eaton Aquarist Society Open Show at Gregory's White Garden, Tolos. Details: R. West, 137 Longcroft Road, Long Eaton, Notts.

Monday, August 27: Farnfield and District A.S. Second Open Show, at the Town Hall, Keats Road, Farnfield, Notts. Schedules from G. Stacey, 8 Highfield Road, Farnfield.

Monday, August 27: Yorkshire Koi Festival, at Rosewood House, near Leeds. Commencing 2 p.m. Show schedule. Trade stand information etc. from Brian Barr, 20 Oakwood Road East, Rotherham.

Monday 27th August-Tuesday 28th August: G1 Yarmouth & Dist. A. S. Exhibition '79. Tropical & Coldwater Fish Plus Society Tables. Moorhill Village Hall (in A14 between G1 Yarmouth and Lowestoft).

SEPTEMBER

Saturday, September 8: Central Green Aquarist Society Open Show. Contact Peter Hill, 1 Hartford Street, London E1 (Tel: 01 520 8911 Ext. 1633 for details.)

Saturday, September 8: Bristol A.S. Jubilee Open Coldwater Show, St Andrew Church Hall, Stratford Road, Wotton, Bristol 5. Schedules from Mr. W. G. Ham, 20 Inghel Road, Bristol. 0514-9610. (Tel: 075 778224.)

SATURDAY, September 8: Kingston and District Aquarist Society Open Show at Raynes Park Methodist Church Hall, Worsle Road, Raynes Park, London. SW20. Details from D. Mackay, 12 Victoria Road, Twickenham.

SUNDAY, September 9: Coventry Pool and Aquarium Society, Open Show, St Christopher's School, Alcester, Coventry. Details from Show Secretary, R. A. Grew, 45 Lynton Road, Warwick. Tel: Warwick 40228.

Sunday, September 9: Wellingborough & Don Aquarist Society Show at the Victoria School, Hill Road, Wellingborough. Details from Show Secretary, Mr. M. Cole, 26 Salisbury Street, Kettering.

Sunday, September 9: Longbridge and District A.S. Open Show at the Civic Hall, Wilkes Park Lane, Longridge, Nr. Preston, Lancs. (15 minutes from M6 and M62.)

Sunday, September 9: Middlebrough A.S. Open Show at James Finlayson Hall, 500a Trade Works, grand auction competitions. Details from S. Cook, 19 Nether Street, Middlebrough.

Sunday, September 9: Bridgewater A.S. Open Show at St George's Community Centre, Barton Way, Little Hulton, Manchester. Details from M. Burgoyne, 15 Parsy Road, Farnworth, Bolton, Lancs.

Sunday, September 9: Evesham Fishkeepers Society's Second Open Show at Evesham High School, Four Plains Road, Evesham, Warks. Schedules from E. M. Thornton, 41 Gosco Lane, Studley, Warks. Tel: Studley 7125.

Sunday, September 9: Zarah Aquarist Society (Southwest) 1st annual open show at Charter Hall, Southcombe, Jaegering to Y.A.S.S. standards and rules. Benching 12 noon to 2 p.m. Judging 2 to 5 p.m. Schedules available from T. Robinson, 47 Shpton Road, Southcombe, DN18 3BU. Tel: Southcombe 58540.

Sunday, September 9: Koi '79. The British Koi Keepers' Society's 10th National Open Koi Show at Luton Park, Luton, Bedford. Membership details from Mr. M. Wessley, 105 Woodside Road, Amersham, Bucks, HP6 1NR.

SUNDAY, September 9: British Koi Keepers' Society Fourth National Open Show. Commencing 10th best selection of Japanese Fancy Carp in the Country at Luton Park, Luton, Bedford. Details from Show Chairman, Mr. P. Waddington, 1 Ayon Drive, Bury, Lancs. Tel: 061-924-2781.

Saturday, September 15: Hounslow & District Aquarist Society Open Show to be held at Hounslow Youth Centre, Cecil Road, Hounslow. Schedules from show secretary Bill T. Sutcliffe, 23 Holtwood Close, Actonville, Surrey. Tel: Weybridge 54976.)

SATURDAY, September 15: Plymouth and District Aquarist's & Pondkeepers Society Open Show at The Trinity United Reformed Church, Tavistock, Hartley, Plymouth. Show schedules from Show Secretary, John Ruddle, 50 Durham Avenue, G1 Jubee, Plymouth, Devon PL4 6DA.

SUNDAY, September 16: Barnsley Tropical Fish Society Open Show at Ambley Oaks Youth Centre, Barnsley. Details Secretary, M. Whitway, 80 Clough Road, Hoyland, Nr. Barnsley, S. Yorkshire.

Sunday, September 16: Leamington and District A.S. Open Show at Trinity Hall, Trinity Street, Leamington Spa. Details from M. Burridge, Flat 1, Warwick New Road, Leamington Spa, Warks.

Sunday, September 16: Midland Aquarist League Open Show & Inter-Society Show, Coventry. Schedules from F. Underwood, 10 Hyde Road, Kenilworth, CV5 2PD. Tel: 6690.

Thursday, September 20: Kent Area Group C.A.G.R. 1st Annual General Meeting at Coffin Hall, St. Philip's Church, Waterton Street, Maidstone. Details from J. Gilbert, 1 Highfield Cottage, Lower Healdes, Canterbury, S.E.1. please.)

Sunday, September 23: Tonbridge and District A.S. Open Show at Hedlow Village Hall, Williamsfield, Hedlow, Tonbridge, Kent. Details from Mrs. B. Purnham, 8 Albert Road, Tonbridge.

Sunday, September 24: Benloughth & District Aquarist Society 1st Open Show at T.A.V.F.L. Centre, Welling Street, Southwell, Kent. Details and schedule: Norman Raven, 30 Mount Pleasant Road, LE14 5JN, London. 0533 6RD. (Tel: 01 697 2654.)

OCTOBER

Sunday, October 7: Wetherston Aquarist Society Open Show at Oley Community Centre, Benching 10.00am to 12.00pm. Details from Mr. L. Cook, Tel: Wetherston 53353.

SUNDAY, October 7: South Leeds Aquarist Society Annual Open Show at Humblet Boys Club, Hillside Road, Leeds 10. Benching 12 to 2 p.m. 90 shillings annual trophies for section winners. Trophies for all class winners. Schedules from Show Secretary, Mr. A. Austwick, 161 Thrope Road, Middleton, Leeds LS10 4HH.

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<i>Bacopa caroliniana</i>	30p
<i>Cabomba tomentosula</i>	30p
<i>Cabomba peltocarpa</i>	30p
<i>Ceratophyllum demersum</i>	30p
<i>Ceratophyllum submersum</i>	40p
<i>Ecladina densa</i>	25p
<i>Gynostemma spaldingii</i>	30p each
<i>Hydrophila polypetala</i>	30p
<i>Hydrophila salicifolia</i>	20p each
<i>Heteranthera zosterifolia</i>	40p
<i>Heteranthera — Green</i>	15p each
<i>Heteranthera — Red</i>	15p each
<i>Ludwigia mulleri</i>	25p
<i>Ludwigia arcuata</i>	40p
<i>Mixosiphium procerpinacoides</i>	30p
<i>Mixosiphium subrotatum</i>	10p each
<i>Mixosiphium bipinnatum</i>	10p each
<i>Najasphila tamaricis (true)</i>	20p each
<i>Najasphila stricta</i>	20p each
<i>Rotala rotundifolia</i>	30p
<i>Rotala indica</i>	15p each
<i>Sagittaria natans</i>	30p
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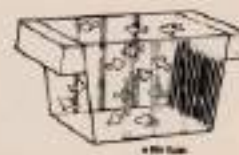
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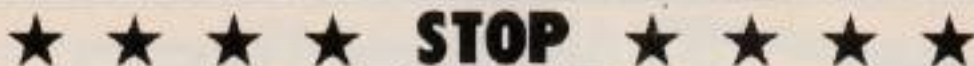


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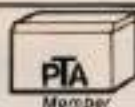
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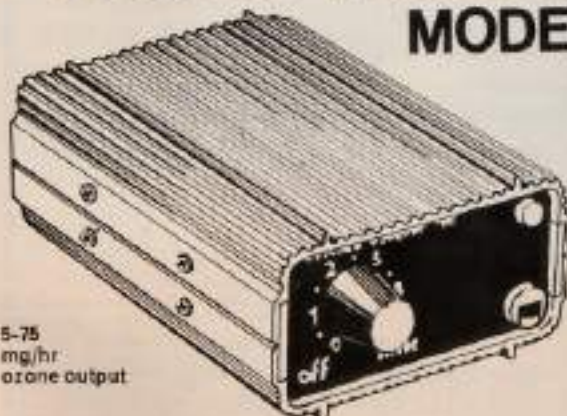
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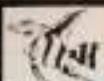
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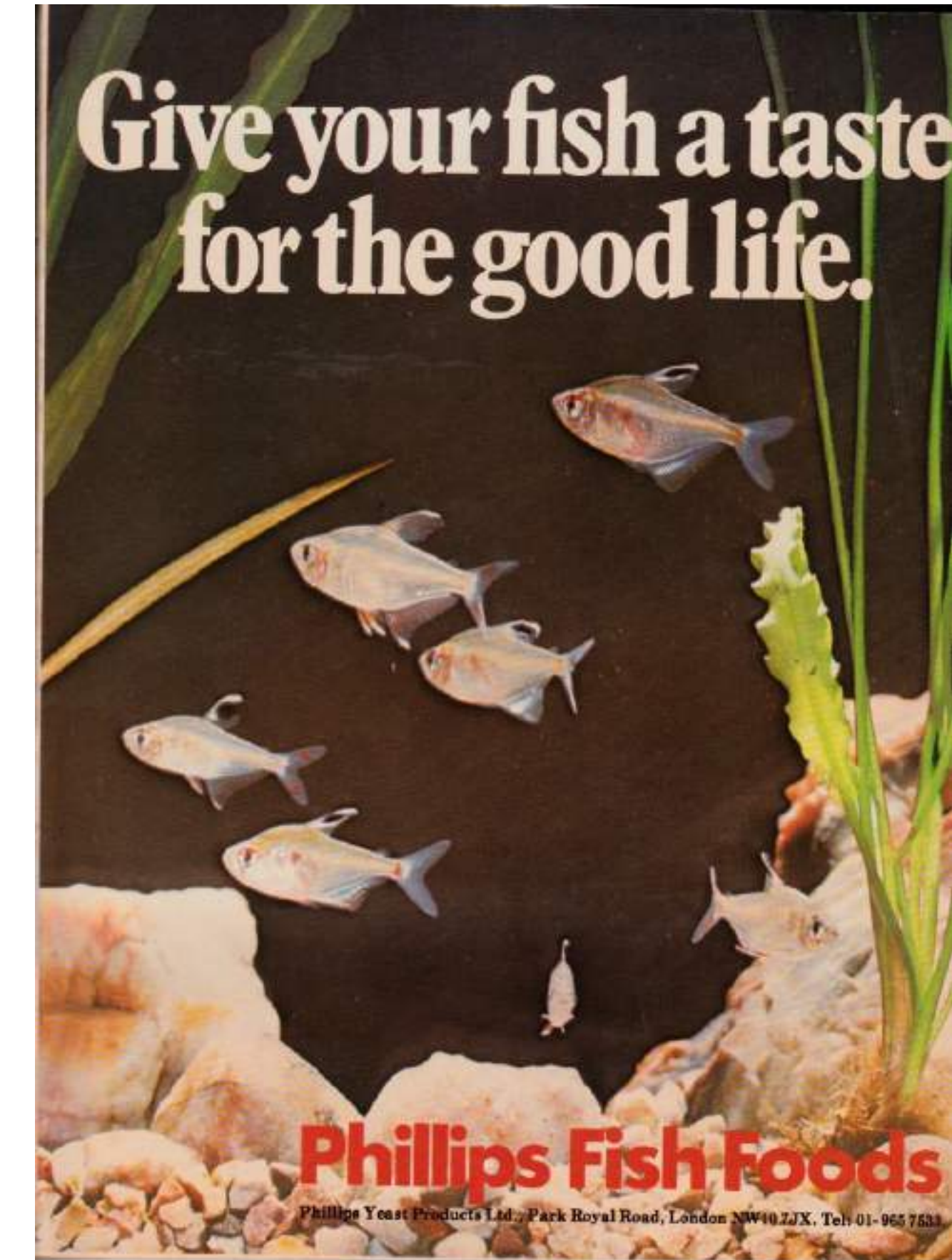
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