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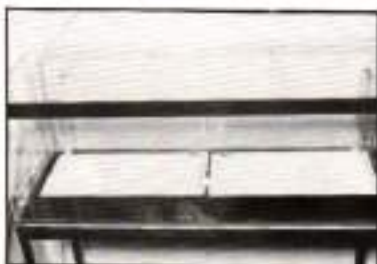
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Next month's issue
out on May 1

ABC 24,007

Certified average monthly
Sale JUL-DEC 1979

Cover picture: A pair of popular tropicals
but full of colour and beauty for all that...
Pearl Danies pictured by Heather Angel.



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PRACTICAL FISHKEEPING

NEXT MONTH

DON'T miss the bumper May issue of PRACTICAL FISHKEEPING—there will be more articles and information than ever before.

And as usual the magazine will be on sale at your newsagents on the first of the month.

But in recent months demand for each issue has been soaring and many newsagents have been selling out.

To avoid disappointment and missing out on the super May issue why not place a firm order with your newsagent.

We will be delighted to either deliver a copy to your home or reserve a magazine for you to collect from his shop. It is by far the best way of avoiding disappointment.

But that is enough of the commercial! Let me tell you what is planned for the May issue and the attractions will speak for themselves.

Here is just a selection of the good fishkeeping information you will find next month. See you on May 1...

Project Pond



May time is most definitely still pond time. It is the month when, hopefully, Spring is fully established and both plants

and fish are really looking good.

We shall be concentrating on ponds in our Project Pond series by Roger Cleaver and Peter Bull. In this month's issue they have installed the PRACTICAL FISHKEEPING pond. In May they will be finishing off the pond with surround and they will also be discussing plants and planting techniques.

May is a perfect time for planting—so don't miss their expert advice.

Science explained



Fishkeeping does involve a lot of scientific background. How much you go into that background is up to the individual. Many find it a fascinating sideline to the hobby, but the majority think it holds hidden pitfalls.

Dr David Ford is a scientist but unlike many of the profession he is able to explain his knowledge in ordinary terms. And it's surprising how much better your fishkeeping can be if you follow some of the scientific rules.

Next Month Dr Ford concentrates on pH and its importance to the hobby. He will explain every aspect of this subject and give beginner and experienced aquarist alike information they will find very useful.

Fish Farm—Apology



This picture of a Fish Farm was used in the January issue of PRACTICAL FISHKEEPING to illustrate an article on fish diseases.

The article by Dr Christopher Andrews explained that hobby fishkeepers had benefited from work done on viral diseases in the fish farming industry. The picture was used to illustrate what a fish farm

looks like for the benefit of readers who had not visited one before.

There is no connection whatsoever between the particular fish farm pictured and disease. This farm has an excellent record of disease-free fish farming. We apologise to the owners of the farm for any impression that may have been given which suggested their trout suffered viral disease.

Catfish display tank

Catfish are not thought of as a display fish. Too often they are used merely as scavengers or they inhabit the tanks of Catfish fanatics who either show them or devote their time to breeding them and the fascinating but limited study of different species.

Inevitably in both cases the Catfish are just not shown off in a well decorated tank.

But Cats can provide an equally beautiful display tank which if carefully designed, well planted and can equal any other species of fish more often used for show.

Catfish expert David Sands is very keen on putting these species on display and he has designed a tank purely for Catfish.

Next month David will explain in detail how it is organised, how it is designed and planted and his suggestion for stocking it.

Growing your Own

Join David Shields for more tips on growing, cultivating and planting your own aquatic plants. Next month he covers the delicate varieties.

David also reveals how you can utilise plants which can be found in local streams, ponds and rivers.

Start a Terrarium

Ever fancied keeping other creatures as well as your fish. Terrapins are a perfect example of the other aspects of our aquatic hobby.

But although many aquarists fancy trying their hand at setting up a terrarium they are not sure of exactly the right way to do it and how to look after the Terrapins correctly.

Next month those problems are all over with an article telling you just how to set up a tank, keep them happily and healthily.

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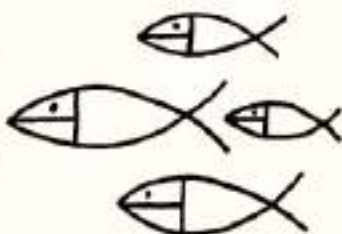
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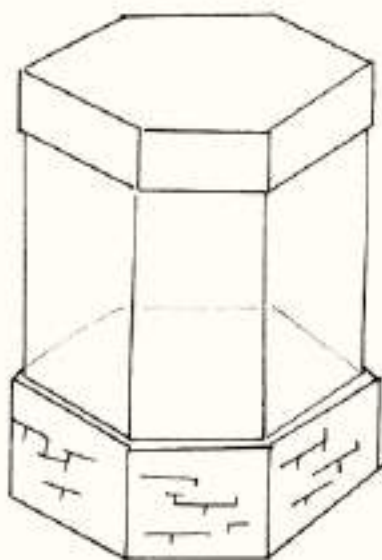
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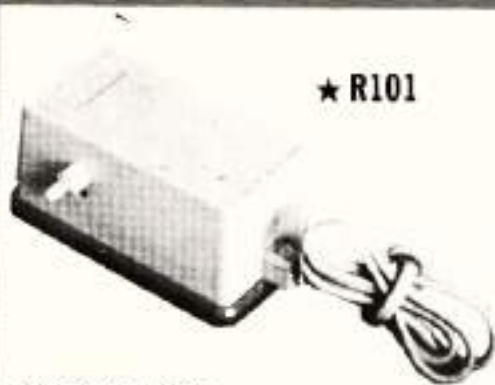
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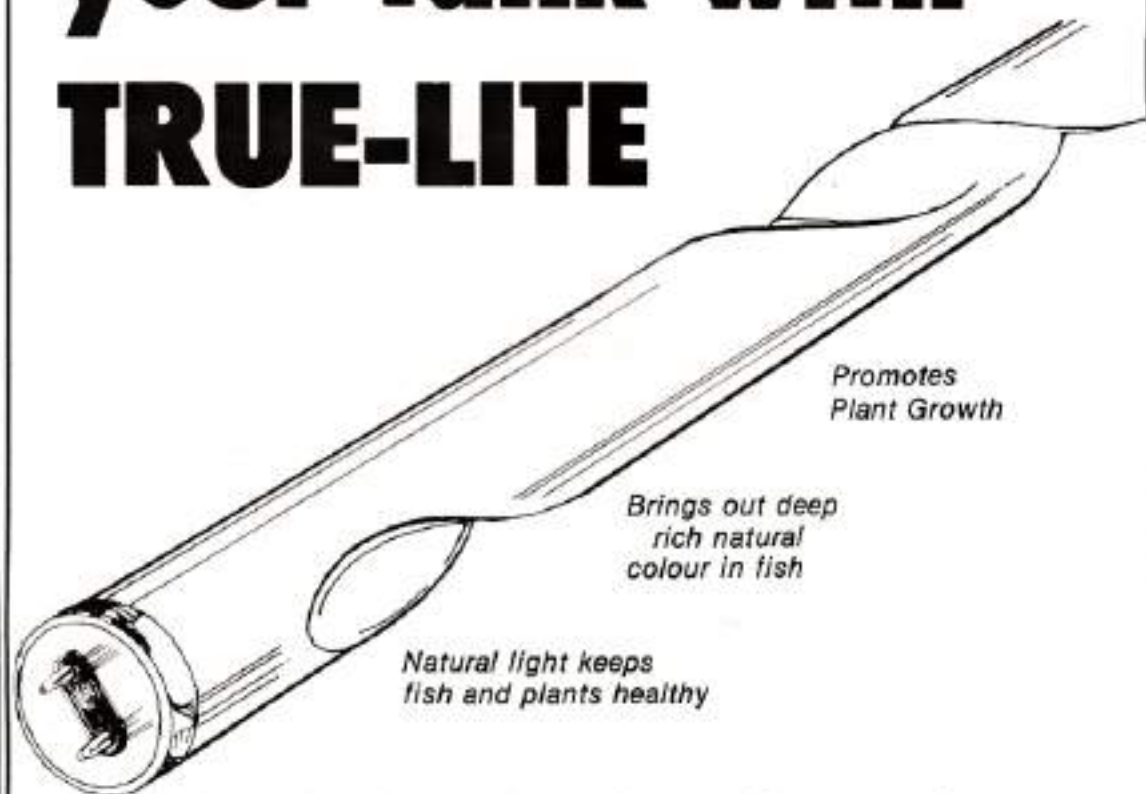
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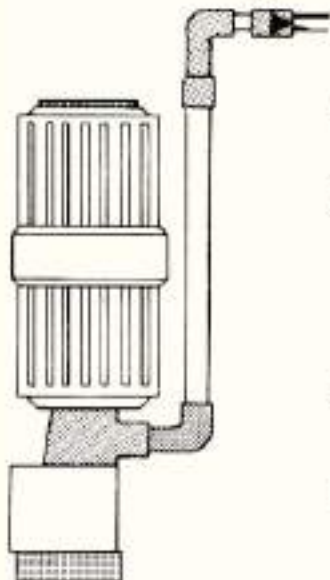
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Fully-submersible Turbine Filter System



1 Powerful
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2 This power is spread over a large filter area:

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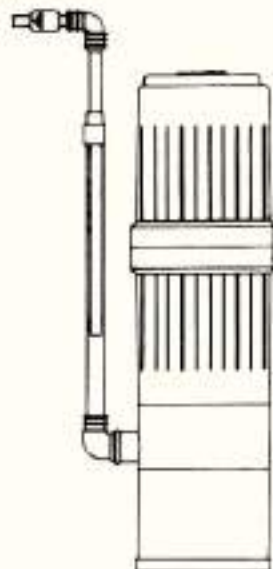
3 Aeration is by one of two methods.

(a) a venturi nozzle, provided with the filter, which sucks in air up to a depth of 8" and bubbles it out in the return waterstream.

(b) by means of a spray boom, which is available as an optional extra, which effects the return of the water to the aquarium through a series of fine jets directed over the water surface. This greatly increases the surface area, and therefore the facility for gaseous exchange.

3 Silent: The motor generates a magnetic field in which the impeller rotates (the only moving part in the whole filter). This impeller is water lubricated, consequently developing minimum noise, and any slight hum is immediately deadened by the enveloping water.

5 Size. The Martin power unit is extremely small when compared with other power filters of comparable output, due to its simplicity rather than its refinements. The principle of operation being to circulate the water rather than to pump it in and out of the aquarium, thereby effecting a much larger output from a much smaller unit.



6 Transposition. The Martin Filter unit is so simple to install. Merely place the unit in the aquarium wherever you desire it and switch on. In order to transfer the filter to another aquarium simply switch off, lift filter out of the tank, transfer to your next aquarium, and switch on! Anyone can use a Martin filter—it is so simple.

7 Concealment. In aid of this aspect it is possible to either lie the filter flat along the surface of the gravel behind the plants, or to stand it upright (e.g. in a corner) but with the motor unit buried in the gravel. This only leaves the capsule exposed which is a mere 5.5" long by 3" in diameter and is coloured a dull green which merges easily in the background planting of the aquarium.

8 Maintenance. The Martin filter is specifically designed to minimise maintenance and attention. A simple cleaning routine is all that is required when the reduced flow of aeration indicates a reduction in efficiency. The filter cartridge is then cleaned or replaced, and the impeller and chamber is cleaned of any algae growth that may have occurred. No further maintenance is required.

9 Safety.

(a) to the user: there are no exposed electrical parts anywhere in the Martin filter, and the construction conforms to EEC regulations, and has been recently approved by SEMKO for sale in Sweden, which may not mean very much in the UK, but it is a sign that the pumps are technically very good.

Conclusion: In short: Powerful, versatile, efficient, simple, safe, silent, and last but not least—value for money.

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(b) for the aquarium occupants: The Martin filter capsule has a perlator running through its core, which effectively spreads the suction created by the impeller throughout the entire length of the capsule, which in turn distributes this evenly across the entire 35 sq in of filtering area.

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10 Versatility. The Martin filter can be used with any filtering medium, e.g. wool, carbon, peat, resins, dolomite, etc. This is by the addition or substitution of a '2K' capsule, which includes two gauze baskets to contain the material, attached to the perlator. No further adaptation is necessary!

11 The Martin filter is suitable for both fresh and salt water applications, and is covered by a full 12 months unconditional warranty, if in any way the parts, materials or labour, used in manufacture, are found to be defective.

12 Price.

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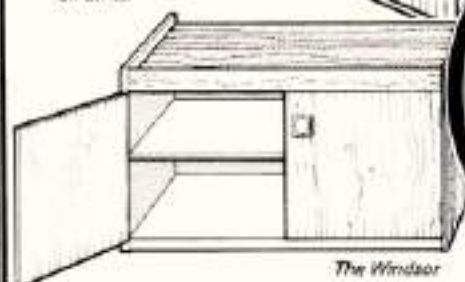
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THE keeping of fish, or indeed any aquatic creatures, can be enjoyed on many levels—from purely a pleasurable pastime up to a reasonably exact science.

One of the joys of the hobby is that anyone can discover something quite new merely by chance, or develop the germ of someone else's idea. Inspiration comes easily when you are gazing into a fish tank.

This month I intend looking back on a favourite childhood pursuit with the benefit of adult hindsight. That pursuit turns out to be the keeping of common British Newts, and it has more to do with the fishkeeping hobby than I first realised.

The relationship between Newts and fish goes much further than the fact that they both spend at least a part of their lives in water. Do they not, after all, have a common bond in the language of the 'Local'? Two phrases commonly heard are: 'He drinks like a fish' and 'Drunk as a newt'.

I'll warrant that not one person in a hundred ever sought to reason out why this verbal connection exists between small amphibians and over-indulging. Yet the connection is there, and it is very simple.

Look at a newt walking on dry land, if "walking" is the way to describe the gait of a reveller weaving from lamp post to gutter and back. The nearside front foreleg jerks forward while its counterpart moves backwards; simultaneously the hind legs do the same thing, but in reverse order, while the whole body twists quite violently.



Canadian Pondweed—quite a good spawning medium for the Newt Tank. Water Crowfoot is another.

This sinuous yet ungainly propulsion looks out of place, and in some ways it is. For such body movement is more at home in water. Sharks, from the massive Great White down to the humble dogfish, swim with just such a motion because their pectoral fins, unlike those of the bony fishes, are unable to help with forward progress and it is left to this bodily 'wave' to impart thrust.

The newt, as an amphibian, has evolved over millions of years from fishy ancestry and now enjoys some mastery of the land. But its legs are not the well-adapted limbs of a wholly terrestrial creature. Once back in the water, they hang feebly while the newt's tail takes over as a propeller, aided by that leashing of the body whose original function—that of swimming—now becomes clear.

The close relationship between amphibians and fish extends to a sharing of gills for breathing dissolved oxygen. But amphibian gills, with the exception of those possessed by some salamanders, are employed only in the larval stage. As the animal progresses to maturity, the gills disappear and are replaced by lungs.

Newts, spanning the gap between fish and true land mammals, are fascinating creatures and well worth keeping. All the aquarist needs is a spare tank, and that only for a few months.

For there are two reasons why wild newts should not find a permanent place in the fish house. The first is that of conservation. British amphibians are now threatened as never before, as their breeding ponds are cleared away to make room for development.

Some of these creatures have never been common—the natterjack toad (*Bufo calamita*) is now confined to a very few locations. And even creatures we take for granted, like the common frog and toad are becoming increasingly thin on the ground. Newts share their plight. Recently I re-visited a small Norfolk pond that once played host to a colony of Great Crested Newts, to find that the once clear waters had been ruined by the careless dumping of manure and offal from a battery chicken farm. So much for progress.

The second reason why newts should be "borrowed" from the wild is that for a large part of the year they are secretive, nocturnal

Borrowed from the wild

Nick Fletcher explains how to keep Newts—but only for a few weeks each year

Nick Fletcher is a keen fishkeeper and a regular writer in PRACTICAL FISHKEEPING. Nick (30) is a full time journalist with Angling Times so he enjoys catching as well as keeping fish. His main hobby interest is Cichlids.



PRACTICAL FISHKEEPING





The Smooth Newt in aquarium conditions. But they are not full time aquarium dwellers and should be returned after spawning.

land-dwellers—hiding under stones and roots and emerging only at night to prey on insects. If you try and keep newts in a tank once their spring breeding period is over, they will make every attempt to escape and are likely to be found dead in the furthest corner of the room.

There are three native newt species in Great Britain—the Smooth, the Great Crested and the Palmate. The first of these (*Triturus vulgaris*) is by far the commonest, absent only from parts of west Wales and north East Scotland.

Adults vary in size from 2½ to 3½ inches, occasionally a little bigger. Out of breeding dress, both males and females look similar—rather like smooth skinned, olive brown lizards. The underside is yellow to orange, spotted with black.

The Great Crested Newt is a much larger animal, sometimes growing to 8 inches. It is altogether darker and wartier, and is much more localised than the Smooth Newt, being absent from Ireland.

Rarest of the three is the Palmate Newt, which rarely exceeds three inches. At breeding time the hind foot of the male become webbed, or palmed—hence the name—and the tail ends in a thread-like projection.

Few shops bother to sell British newts, preferring foreign species of salamander. But the home grown varieties are easy enough to catch. As a child I found two methods worked well—waiting for the newts to surface for air and then netting them, or else tying a worm to a piece of thread and lowering it into the water. Newts being fiercely carnivorous, it wasn't long before one would take a firm grip of the worm, enabling it to be belted up before the fine teeth could disengage.

At breeding time it is simple to tell the sexes apart. The males develop a waxy crest along the back, extending from the nape of the neck down to the tip of the tail. The belly colours intensify and the whole animal takes

on a spotted appearance. Females have no crest, remain predominantly olive brown and, due to the developing ovaries, appear fatter and more massive than the males when viewed from the side.

Housing a couple of pairs of Smooth Newts is no problem. Any spare tank, such as that used for separating fry, will do and it needn't be longer than 18 inches. No heating will be required, and it hardly seems worth the trouble of setting up any kind of filtration, since newts breathe atmospheric oxygen and come from stagnant water in the first place. An air stone, however, is useful, particularly when there are larval newts surviving on the scene.

The water for your breeding tank can be brought home in a polythene can or drum from the pond where you caught your newts, but it should be screened for 'undesirables'. Cyclops, daphnia, mosquito larvae or bloodworms are quite okay to leave, since the newts will soon eat them. But the larger dragonfly larvae (*Anax imperator*) or those of the Great Diving Beetle, (*Dytiscus marginalis*) must be removed.

Your newts will need some submerged aquatic plants on which to breed. Canadian pondweed is quite good, although the leaves are a little small for the purpose. Other suitable plants are Water Violet (*Hydrocharitaceae*) and Water Crowfoot (*Ranunculus spp.*)

Feeding newts presents no problems. For their size, these creatures have gigantic appetites for earthworms. The worms can be collected at night from damp lawns and fed either whole or chopped. If a whole worm is placed in the tank, it is quite usual for a newt to grab either end and munch towards the middle, where a skimmish will take place.

With carnivorous feeders like newts, a fair amount of waste matter is bound to be produced and regular siphoning of this will stop the water becoming polluted.

The newts in your charge will already be in breeding dress, but as spawning approach-

es, the cloaca of both male and female will become swollen and enlarged and the male will begin his courtship ritual.

This involves advancing head-on to the female and turning the tip of the tail forward until the whole tail is almost parallel with the male's body. The tail is then vibrated rapidly, and occasionally a more violent, lashing movement is made. The effect is to entice the female forward towards the male.

The male now releases a mushroom-shaped, milky-white sperm packet, which settles on the floor of the tank. The female continues to advance on the male, who stops her at just the right spot so that her cloaca is above the sperm packet. This is then absorbed. It can be seen that the courtship of newts is vastly different from that of frogs and toads, where the male embraces the female in a grasp known as "Amplexus" and fertilises the eggs as they are laid.

The female newt now seeks out the shelter of a submerged water plant, where the eggs are laid singly on the leaves. As each egg emerges, she folds over the leaf with her hind feet so that a protective envelope is formed.

At this stage, it is best to return the parent newts to their pond of origin, for their own young will be regarded as fair game.

The eggs are without the thick jelly coating of frog or toad spawn, but the plant leaves in which they are sheltered ensure good protection. They hatch in about two weeks and emerge as free-swimming tadpoles, much more fish-like and slender than those of frogs or toads. They possess three pairs of branched gills and soon after hatching, as in tropical cichlids, thread-like organs grow from the sides of the upper jaw to enable them to cling on to water plants.

Whereas frog and toad tadpoles possess external gills for only a few days, those of newts remain right up until metamorphosis. The American Axolotl can even breed in the larval stage, complete with its gills—this phenomenon is known as Neotony.

The first food of the newly hatched newt tadpoles is algae and bits of vegetable matter, but later they can and should be weaned on to animal food, which speeds their development. Micro-worms, tubifex and daphnia from your fish house are all suitable.

Frog and toad tadpoles will all develop their back legs first. With newts, the reverse happens and the tadpoles look really odd with their large eyes, fish-like body and feathery gills.

By August in a typical year, the young newts will have absorbed their gills, grown a full complement of legs and left the water to seek shelter and fatten up before their winter hibernation. Sometimes however, particularly after a late spring spawning, the tadpoles will remain in the water throughout the cold months.

With captive-bred newts, it is best to provide their tank with a platform of rocks built up out of the water so that as their lungs develop, they can climb out to rest. Once this happens, it is a sure sign that the young amphibians have successfully made the transition from aquatic to land-dwelling animals and it is at this time that they, too can be returned to the wild.



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.

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AQUATIC QUERIES

Research by Dr David Ford

Removing unsightly algae

I HAVE a 36 in coldwater aquarium which is lighted by a 30 in Gro-lux tube. I live in a flat six floors up, and the room is fairly bright and does get morning sun.

My problem is this. My plants are growing steadily but I am troubled by blue-green algae, and though I can clean this off the glass and rocks, it is also coating the plants, which doesn't improve their appearance.

I tried lighting the tank for six hours a day, but am presently switching on before I go to work, and this works out at 10 hours a day, but the algae is still there.

Can you advise me how to get rid of it, and avoid it in the future. I would also welcome advice on what size gravel to use with the undergravel filter?

I like your magazine, and I think it is good value for money. I have been keeping coldwater fish for over 20 years and PRACTICAL FISHKEEPING has really expanded my knowledge of the hobby.—Mrs M. Calvin, Gravesend, Kent.

Blue-green algae often grows in alkaline conditions, so you could try acidifying the water by adding a bubble up box filter containing a little peat in a nylon bag (knotted tight leg).

The undergravel filter will also encourage algae if it is over six months old without having been cleaned out. Obviously once clogged, it will release soluble materials into the water, which feed the algae.

You could add an algae eater to the tank's community. Also, you could add a 40 watt bulb to encourage the plants to grow at the expense of the algae.

Raising Siamese Fighters



Siamese Fighters—the critical stage in rearing fry is at four weeks.

I HAVE been keeping tropical fish for twelve months now, and get most of my problems sorted out from reading PRACTICAL FISHKEEPING which I have taken each month since it first started.

I am very interested in Siamese Fighting Fish and at my second attempt I got my pair to spawn. I have about 80 fry which are now three weeks old.

The first week I was feeding them on the yolk of a hard boiled egg, and at the present I am feeding them on baby brine shrimp, and they are growing very well.

My problem is the next stage of feeding, what should they be given, and at what age?

Could you please give me

information on feeding up to adult stage?—Mrs J. Beales, Peterborough, Cambs.

Congratulations on raising the *Betta splendens* fry. The next critical stage is at four weeks when the labyrinth (air-breathing organ) begins to develop.

They need shallow water (not more than four inches) and the surface air must be as warm as the water or the fry may be chilled when they first take air.

Use a good cover with tungsten bulb lighting for heat. They can then be fed with a Growth Flake Food and clean (screened) Daphnia and cultured worms, as well as minced kitchen scraps.

Moving house with five Discus

I HAVE a 48 x 15 x 12 tank that houses five Red Discus and a Corydoras. As I am moving house soon what would be the best possible way to move the tank and fish?—Miss S. Metcalf, Tenbridge, Kent.

On the morning of the move, bag off the Discus (individually) in polythene bags (use two, one inside the other) with a little of the aquarium water and lots of air.

Drain the tank and bag off the gravel and fittings.

Repack the empty aquarium with the bags of fish etc. padding with newspaper. Lift the tank (two men required) and contents into the removal van and cover with a blanket to make it dark. This reduces the fishes activity and demand for oxygen.



Corydoras—along with my five Red Discus he is moving home with me.

Rebuild the tank at the new house as soon as possible and return the water from the bags to help 'seed' the new water.

One other tip—do not feed for 2 or three days prior to moving. This reduces pollution of the water by faeces in transit.

Losing fish with Dropsy



Pearl Danio—can I avoid Dropsy spreading to species like this?

AS A keen aquarist and a regular reader of PRACTICAL FISH-KEEPING, I always use your aquatic queries for information. I now find I have a serious problem in one of my 36 x 15 x 12 community tanks.

The problem I think is Dropsy. I have lost two Sucking Loaches, one female Fighter and have four more fish in isolation. These include Neons, Swords and Platys.

The abdomens of the fish swelled out, both male and female.

I wondered if I could treat my whole tank against this disease from spreading further as I have quite a number of Catfish and Sharks in the tank? I am now getting rather worried. I have all the usual under gravel filters and aeration in the tank. —T. Holmshaw, Southwell, Notts.

Dropsy is not a disease but simply a sign (symptom) of many disorders, from constipation to cancer, from bacterial infection to parasites in the kidney.

If just one fish shows the problem isolate it and try the usual chemical therapy (methylene blue, malachite green, etc., most proprietary medicines contain such compounds). If several fish develop the problem you must suspect water quality.

A dirty tank breeds germs and these lead to dropsical conditions. Clear the tank, especially the undergravel filter, and filter back 50% of the water, topping up with 50% fresh water.

Repeat these massive water changes until the tank is clean and the fish healthier. If the problem still persists then try antibiotic treatment.

Choosing species for the community tank

IN MY one metre long community tank I have a variety of fish, including a very good breeding pair of Kribensis and two Flying Foxes. Both my Flying Foxes are about 3½ in long, and, until recently, both were very active and well-coloured.

Lately, however, one of them has lost its colour and its appetite, and takes to staying in one corner of the tank. It floats vertically, tail downwards, on the bottom of the tank, with either its back or front pressed into the corner of the tank.

The pair of Kribensis have recently bred in the community tank, and are incubating the eggs. They chase any fish well into the other end of the tank, except the Flying Fox.

If they try to chase it away it just turns its front to them and floats vertically, as usual, and they leave it alone. It has been behaving like this for about two

weeks now.

Please could you tell me what is wrong with it, and if it can be cured? Also would you tell me the best way to sex and breed Flying Foxes, and also their scientific name? —Ian Ashton (15), Wakefield, W. Yorks.

The Flying Fox is *Epiplatys rhyncus kellepterus*. It does not show any sex differences and there is no record of aquarium breeding.

It is not a good idea to allow breeding to occur in the community tank (except live-bearers of course) because the conflict caused by pairs defending their territory and eventual family leads to stress. This is possibly what is wrong with your Flying Fox, but from such few signs it is possible to diagnose what is wrong, and without a correct diagnosis a cure cannot be offered.



Kribensis—trouble can occur if they breed in the community aquarium.

Trouble for Flying Fox



Red Lyretail—are these suitable for the community tank?

WE would like to start up a tropical aquarium, community tank. We plan to keep a variety of Tetra's X-ray fish, mixture of Barbs, Pearl Danio, White Clouds, Upside Down Catfish, Red Lyretail, Japanese Medaka, Blue Lilia, Guppies, Swordtails, Indian Glassfish, mixture of Cichlids, Angel Fish, Kissing Gouramies, Bumble Bee Fish, Glass Catfish and Pearlfish.

Can you please tell us if these fish will live quite happily with one another. Would you also tell us their feeding and breeding habits and the water they will live in? —Miss M. Richardson, Brockley, London, SE14.

Your choice of tropical fish is generally satisfactory, but a few species you have chosen are

rather demanding. The Cichlids must be Dwarf varieties—many of the large Cichlids, especially African varieties, are aggressively territorial and so unsuitable for community tanks.

The Bumble Bee fish is not a suitable community fish. It needs special care and brackish water.

I am not sure what you mean by Pearl Fish no such name is listed in the standard literature. (There are Pearl Danio, Pearl Gourami, Pearl Sucker and Pearl Tilapia!) The Medaka prefers cooler waters.

If you wish to mix fish different to the usual well known community species, it is necessary to research each fish to make sure you know their requirements are compatible.



Fixing this rotten wood

I PURCHASED two large pieces of Malaysian bog wood for my six foot long fish tank. I thoroughly cleaned them and for the first week the water was slightly murky, but eventually became crystal clear.

However, as time went on the water has become murky again with millions of tiny particles of wood debris floating in suspension. I can only suggest that the wood is rotting at a very slow rate and the agitation of the water by the two outside filters is slowly eroding the surface of the wood away.

This problem is causing the gravel to look filthy and the filters are blocking up faster than they should.

Is there any way of sealing the surface of the wood with a non-toxic water repellent material and yet still retain the natural look of the wood, which is why I bought it in the first place?—H. W. Russell, Bristol, Avon.

Yes, the wood is rotting and you will have foul water problems eventually. It is only safe to use petrified wood really. If you wish to retain the piece of wood, dry it out and paint it with polyurethane varnish.

Several coats are necessary to ensure no pinpoints are left untreated, or the water soaks in and lifts the varnish giving white blobs which look unsightly. The "glossy" look does not detract from the wood's appearance because it was glossy anyway when wet.

AQUATIC QUERIES

Research by Dr David Ford

Advice on a new aquarium

MAY I first of all congratulate you and all concerned with PRACTICAL FISHKEEPING. It is a first class magazine, full of facts and information on all aspects of the hobby. I look forward to each new issue with great enthusiasm especially the enquiries pages which have helped me and I am sure many others greatly—well done!

I have had a 30 x 15 x 12 tank set up for just over one year now. It is filtered by an undergravel filter powered by a RENA 301 pump and lit by a single Gro-lux tube and heated by a 100 watt heater/thermostat.

My aquarium is furnished with a large piece of bogwood and several species of plants are growing quite well (but could be better).

In my aquarium I have two Angels, two Neons, two Zebras, eight Guppies, one Sucking Loach, one Khuli Loach, and two Leopard Corydoras. I have managed to get the Angels to spawn on several occasions but have had no success after the eggs have hatched either when raised by the parents or not.

I intend to set up a 40 x 18 x 18 tank built into a stone fireplace about 3 feet away from the actual open coal fire. I wish to transfer all the fish etc from the old tank to the new tank.

I want to use peat under the gravel to help plant growth so I intend to use Tetra Brilliant Polyfoam Filters as used by Dr Andrews rather than my old undergravel filter. My queries are:

1. How much lighting and heating will be required for my new aquarium?
2. How many Polyfoam Filters will be required, and what are their cost?
3. Will I have to boil the old gravel out of the old tank or will washing in tapwater be good enough?
4. What will be the safe stocking limits for more community fish Tetra's, Guppies etc?
5. What are the stocking limits to add Corydoras without causing upset to any of the other bottom dwellers especially the Khuli Loach.
6. Are there any tropical freshwater crabs available? Are they suitable for community tanks and if so what are their sizes and their requirements, and where can I get them?—K. Walker, Timdon Station, Co. Durham.



Angel—my problem is successfully raising the fry.



Guppy—what is a safe stocking level for this species.

1. Use a 150 watt heater for a 40in tank and 3 x 40 watt or even 60 watt bulbs, or 2 x 30 watt fluorescents.
2. I cannot price the Polyfoam filters because there is no retail price maintenance these days, so a shop can charge whatever it wishes. You need to shop around for a bargain buy. Two should suffice.
3. No need to boil the gravel, just flush well with tap water whilst stirring in a bucket.
4. One inch of fish per 12 square inches of water.
5. Stocking levels are the same for all fish whether top, middle or bottom dwellers. Some Corydoras can breathe air and so accept more crowded conditions but that doesn't help the other fish.
6. There are several species of freshwater crabs, but they will probably eat the fish.

Dwarf breeding

COULD you please give me some information on breeding Dwarf Gouramis because I have just started keeping tropical fish and people say they are not very difficult to breed?

Could you also tell me why Scats change colour from yellow and black spots to nearly all black and should they have salt in the water and be fed on live food?—K. J. Clark, Flanshaw, Wakefield, W. Yorks.

The Dwarf Gourami is not difficult to breed—the problem is in raising the fry. The baby fish are particularly small and need fine infusoria as a first food.

Scats, like many fish, show their moods by colour changes. These fish to need some salt in the water. In fact, the older the fish the more salt is required. In the wild the young are born in fresh water and they steadily migrate to the sea as they age.



PRACTICAL FISHKEEPING

Keeping Terrapins

I AM thinking of setting up one of my tanks for keeping Terrapins. I would be grateful for any information and/or titles of books worth reading. The tank is 24 x 12 x 15. Would I need to use a heater, and how many terrapins could I have in the tank?—Philip Greet, Derby.

To keep Terrapins successfully, you need to supply four major requirements: access to land and water, a tropical temperature, adequate light and a suitable diet.

To set up a 24 in tank, I would do the following: I would use an undergravel filter in the normal way, but only fill the tank approximately half full.

Use a low wattage heater/ostat (50 watts) and an ordinary 40W

light bulb. Furnish the tank with rocks so that the terrapins can climb out easily onto dry land.

The tank would comfortably hold 3 or 4 terrapins, but you might need to provide larger quarters in 2 years or so.

Feed your pets on as varied a diet as possible, tubifex, blood-worms, shrimps, flake food, meat, fish, and vegetables, etc.

Provide bone meal mixed in their diet occasionally, and mix their loads in very small amounts of vitamin supplement—I use Vionate. The food should be put in the water, not on land.

"Tortoise" by David Robinson, a Batholomew publication is excellent value at £1.25 and should fill in on any other questions you may have.

Building a safer pool



Koi—I lost several good specimens through pump failure.

AS A regular reader of PRACTICAL FISHKEEPING, especially any articles on Koi, I wonder if you could possibly answer a query of mine. I have kept Koi for a few years now but last August had the misfortune to lose what I would regard as good specimens when my pump packed up while I was away on holiday.

To try to prevent this happening again, I have enlarged my pool to roughly 14 ft square, using a butyl liner.

Before starting excavations and alterations I pumped water from my existing pool into a child's paddling pool 6 ft x 4 ft x 15 in deep and transferred my fish stock into this with a new pump for aeration.

My stock of fish consists of 12 Koi ranging from 10 in to 2 in, one large nymph, two 4 in Sarasa Comets, one 8 in Mirror Carp, and two 6 in Tench.

My query is how soon can I transfer my fish into the new

pool which varies in depth from 3 ft 6 in to 12 in? Obviously I would put the pump in the new pool by day to agitate the water, but I think it would be wise to use it in the paddling pool by night.

The Water Authority in this area do not put fluoride in the water supply.—M. J. Minnett, Exmouth, Devon.

If you have made a new pond with a butyl liner, you can stock it immediately because no maturing process is needed such as occurs with concrete pools.

You say the local authority do not use fluoride. In fact it would not matter if they did—the chemical does not affect fish at the levels used.

Have you a copy of *Koi for Beginners*—it is 50p from Fred Ayres, The Tannery, Tan Pitts Lane, Burton in Kendal, Cumbria.

Terrible Discus disease

I'VE kept Discus fish in a small way for about ten years. I started with two, one of these lived for about five years before dying from what I believed to be 'Hole in the Head'.

The other lived for another two years. I then bought four more two years ago, one died after 5 months, the other three are still alive, one female and two males.

A pair spawned a month ago. The problem is that the female keeps getting small white fluffy looking spots on her head. I understand that 'Hole in the Head' first shows the same symptoms, but along the lateral line before showing on the head, and that there is another disease that shows on the head only.

The first two I treated with various medications without any certain cure. The ones I have now I've treated but nothing seems to be effective.

The two males do not seem to be infected, only the female. Please could you tell me if there is more than one Discus disease, and also if there are any preparations that will give a definite cure, as from past experience with my other tropical tanks

many fish medicines are not as reliable as claimed to be?

I should like very much to cure my Discus as having a pair. I don't want to start again with the uncertainty of sexing.—R. West, Westbury, Wilts.

'Hole in the Head' remains a serious problem with Discus fish and no definite cure has been found. The disease is a complex mixture of bacterial protozoa, possibly viral, and stress factors. It is claimed that the disease will not occur if the correct water (low pH and very low hardness) is used, with frequent changes.

The fish must be unstressed by careful handling and correct stocking levels etc.

If the condition does develop, some successes in treatment have been found with Flagyl (Metronidazole) at 250 mg/15 gallons of water continuous bath plus 50 mg/oz added to food. The chemical is rejected by the fish so do not mix it with the food but roll it inside a lump of meat etc. Your local Vet can prescribe it.



Discus—Hole in the Head remains a serious problem.



New tanks

HAVING kept tropical fish for some years now, I think that I have gathered enough experience to start keeping marine fish. At the moment I have three angle iron framed tanks which I know are not as suited to marine fishkeeping as all glass tanks are. The best one of these I shall use for marine keeping.

The tank which I shall be using is a 36 x 12 x 12. The metal frame is coated in a white plastic. My other three foot tank (which now contains tropicals) is also coated but this has split exposing the metal beneath. My four foot tank has no coating at all, so this also is no use.

The tank has an aluminium lid which is not painted on the underside, so I have constructed a wooden lid which is made from chipboard. I have painted this with a white non-lead undercoat and two coats of non-lead gloss. Would this be safe with marines?

The lighting will consist of two 2ft Tri-tight tubes. Would this lighting be sufficient to sustain an invertebrate population as well as a fish community?

I am also thinking of using a Eheim power filter 2010 plus an internal box filter. Will this suffice?

Following your outlines on beginners fish in your January issue of 1979, I am thinking of keeping a couple of Common Clown Fishes, a Regal Tang, an Electric Blue Damsel and a population of invertebrates, including Anemones for the Clown fish.

Is this too many fish to start with, following the rule of one inch of fish per four gallons of sea-water, or should this figure be more like 1:8 for the first few months?

All about Marines

by Dave Keeley

Would two 100 Watt heaters be sufficient to heat this tank in a totally unheated room?

Also, if everything goes well, I will be getting a 72 x 12 x 18 all glass to keep the larger marine species. I would rather have a 72 x 15 x 18 tank. Would it be dangerous to put this on a 72 x 12 frame? I hope you can help me with my problem.—Hugh Davies (14), Kingswinford, West Midlands. Your tank should be suitable, providing you make sure that the plastic is sound, and providing you line all the inside joints and underneath the top frame with silicone sealer. Not having seen your lid it is a little difficult to pass judgement, but I would certainly recommend you to construct a close fitting purpose made cover glass, even if your hood does not need protecting, your lighting will.

Which brings me to your third question. Yes, your lighting is most suitable.

As far as filtration is concerned, though you have not made mention of them, I presume, correctly, I hope, that you do intend to employ undergravel filters—in my opinion an absolute necessity. Based on this assumption, I would think that the internal box filters would be slightly redundant if you are using the Eheim mini filters as a permanent fixture.

As long as the fish you buy are on the small size (do not exceed five inches in total) there appears to be no obvious problems or drawbacks in your stocking proposals. Purchase your fish and invertebrates slowly.

The general rule of thumb concerning stocking levels that seems to have been universally adopted is the following: one inch of fish per four gallons of water for the first twelve months, which may be expanded thereafter to one inch of fish to two gallons of water. In your particular case, this means you can buy five inches of fish initially. By the end of twelve months, the growth of the fish will probably mean you have about eight inches of fish, allowing for so fatalities, which will allow you perhaps to purchase one more fish to complete your system. Yes, two 100 W heaters should cope comfortably.

If you want to put a 15 in wide aquarium on a 12 in wide stand, then I suggest you purchase a 15 in wide piece of blockboard—not chipboard, which would give adequate support. I hope you are successful.

Marines without undergravel filters



Mullet like this pair can be kept but only with a cooling unit.

I AM setting up a Tropical Marine Aquarium using a 36 x 12 x 15 tank with an Eheim 2010 outside power filter. I do not wish to use an undergravel filter. Would this be suitable? If not what would you recommend?

I will later be moving to a South Coast area and I would like to start a sea water aquarium using the local resources, again with a 36 x 12 x 15 tank. How would I go about this? I am, among other things, wondering about the use of local sand etc. lighting, temperature. Would aquarium food be taken? Your recommendations would be very much appreciated.—D. Lawrence, Brislington, Bristol, Avon.

I have received a number of letters similar to yours with people expressing a reluctance to employ undergravel filters. I am not really sure why this is, whether it is the idea of the filters themselves which is disliked, or whether noisy pumps are the problem.

If you read Tropical Marine Aquaria by Graham Cox, he explains in depth the three ways of maintaining seawater tanks—he is firmly in favour of the semi-natural method, using undergravel filters, and I certainly would not use any other method. If you are determined to use the clinical method you would probably need another Eheim 2010, one at each end of the tank.

If you simply do not like undergravel filters because of noisy pumps, why not try connecting the inlet pipe of your power filter to the uplift stems of your filters and thereby achieve a near silent system. You might

have to insert a small airstone to further oxygenate the tank, but a small pump like the Rena 101 or the Whisper 400 is really no problem at all.

Or have you tried the new Silent Giant Pump from America—my preliminary tests indicate this to be excellent. May I also suggest that you read this article on undergravel filters in last month's issue—it might help you to understand their working a little more clearly.

As regards setting up a local marine tank, use undergravel filters or whatever you decide. Use washed local sand by all means. Try the same lighting as for your tropical system, and the same foods should be readily acceptable.

Do not be tempted to collect your own seawater I think you will find too many occurrences of disease being introduced, even if you are able to find a completely unpolluted source.

The main problem I experienced in my forays into local marine keeping was that of maintaining a low temperature through summer. I used to suffer considerable losses, especially among the more mobile inhabitants who would not normally be expected to be trapped in rock pools.

Eheim make a cooling unit, but the price is very high, or you may have the ability to butcher an old fridge unit connected to a thermostat.

Otherwise you will have to site your aquarium in as cold and shaded a location as possible, and stock it mainly with littoral life. I have found the Collins Pocket Guide to the Sea Shore to be a most useful identification guide.

Can I beat this algae problem?

I HAVE had a 40 gallon marine tank set up for over 12 months now, illuminated by two 3ft Gro-lux tubes for 12 hours a day. The inhabitants of this 4ft tank are at present, one Clown Surgeon, one Domino and is landscaped with red and white coral, shells, rocks etc.

For the first few weeks everything looked beautiful. My problem now is that everything is coated with a thick blanket of green algae, so naturally all the beauty has gone.

How can I control the algae when I have heard that marine tanks must have this amount of lighting. I am also thinking of setting up a 4ft x 12in x 15in marine tank containing Acemones, but I have also heard that to keep these creatures alive the lighting would have to be double that of the tank described above.

If so, I am going to have worse trouble than I've already got. My tank has an undergravel filter. Will I benefit by adding a power filter to this system?—J. Wilburn, Barnsley, S. Yorkshire.

They say that beauty is in the eye of the beholder. Where one person may prefer a pure white, sparkling clean aquarium, his neighbour is aiming for realism, and accepts that corals, rocks and the tank slides covered with algae present a far more realistic representation of the sea bed. I would wager that your Clown Surgeon certainly approves of the algae!



Anemones—I have never found a power filter necessary for inverts.

Really you have two choices of action. Either you accept the situation and perhaps re-align your decoration so as to make the most of the algae cover-up or secondly you can fight nature!

This is best done by having two sets of decor, so that whilst one set is in the tank, you can be cleaning the second set and swap them perhaps every two or three weeks as you think necessary.

You can remove one set, stir up your coral and thereby 'bury' the coating algae, effect a small water change so as to remove any detritus, and then replace the newly prepared corals, etc.

Corals and rocks are best cleaned the same way as when first purchased. Simply immerse the corals in a solution of one cup of household bleach to one gallon of water for 24 hours, then run the items under running water until all smell of chlorine has disappeared.

Even though you obviously want your aquarium as 'clinical' as possible, I would recommend that you do not remove the algae off at least the back glass of the tank—then you will be leaving some grazing area for your herbivorous surgeon fish.

Though I have never used it myself, the literature states that copper sulphate added at the rate of 3 ppm to a system also has a detrimental effect on algae—it is up to you whether you wish to experiment on these lines.

Of course, you could not use

copper in your proposed invertebrate system. Though I can understand your desire for a clean 'sea bed' type of tank for your fish, surely an invertebrate tank should really look like part of the coral reef—an algae encrusted wall.

I have, however, two positive pieces of advice. In my opinion aquaria look brighter and even healthier if the gravel bed is kept white. Simply by raking over your coral sand gently and syphoning some out and cleaning it, and occasionally adding some fresh sand, you will find both your tanks show up better.

If you have not yet purchased your tank, may I suggest you buy an 18in deep aquarium, you will find then your lighting is still sufficiently strong for the well-being of your invertebrates, but the extra 3in depth lessens the density of light actually striking the gravel bed.

I personally have never used a power filter on an invertebrate aquaria—a properly managed system should not really need one. A power filter's main use is as a supplementary filter to either an overstocked tank, or an overfed tank, or to an aquarium containing large, messy gross eaters—Groupers etc.

If you want a power filter, I would certainly not dissuade you, but the only one which could have any possible effect on algae growth is a diatomatic filter, the use of which with marine tanks is open to question.

One final point, you could try fighting nature with nature—pack your aquaria with algae eating marines: all tangs and surgeons, angel fish, hermit crabs, urchins and cowries are the best.

Losing my Cow Fish

I HAVE been keeping marine fish fairly successfully for about a year now. I recently bought a Long Horned Cow Fish. All was well for a few weeks then I noticed that skin was peeling from around the base of the horns.

This did not seem to bother the fish at all, then suddenly I noticed that both the front horns had fallen off—this also did not seem to bother the fish. Then the fish didn't bother to come for food. This went on for about two days.

The fish started to lose its balance and could not keep afloat in the water, and sank to the bottom and died. I would be very grateful if you could help me identify what caused this as I cannot find much information on these fish and I would like to try to keep another one if possible?—Kenneth Garland, Newark, Notts.

Questions concerning unspecified diseases on specific fishes are most difficult to answer. Firstly, marine fish diseases in general are far less documented than those of freshwater fishes.

Secondly, with nearly all marine fish being wild caught, as opposed to commercially bred, they are liable to be carrying literally any one of any single disease that it is possible for marine fish to carry.

And, thirdly, of course, the impossibility lies with trying to diagnose fish disease by proxy.

Cow Fish are notoriously bad travellers; it is my experience that a large percentage (perhaps up to 40 or 50%) of imported specimens do not survive the rigours of being shipped here: it is quite possible that this fish simply did not recover from the trauma of being caught and brought to the UK.

On the other hand, I have known Cow Fish to lose their 'horns' and for them to regenerate, rather as deer antlers. At this stage I am still no wiser as to why your fish died.

The loss of balance may have been the product of another illness or injury, it may have been caused by damage of one sort or another to internal organs, it may have just been part of the general malaise of the fish.

My best advice to you is this: Firstly double check all the obvious parameters of your marine system, i.e. s.g. pH, temperatures, nitrite and nitrate levels and if necessary take steps to remedy any faults.

Secondly, change 25% of your water. Then, if all your other fish appear healthy and happy, and are feeding well, begin your search for another Cow Fish. Though these are not common, do not snatch the first one you find. Try and ascertain that it has been in the country for 3–4 weeks, and convince yourself that the fish is 100% fit.

Then, and only then, should you try again. I hope you are successful—let me know how you get on.

Right: The Pearl Danio (*Brachydanio albolineatus*) originates from South East Asia and is one of the hardiest of tropical species. It has a pearl sheen with an orange stripe and is a quick and active swimmer. The fish is easy to breed with the pair dropping their eggs on the aquarium bed. Remove the parents before they can eat the eggs.



Below: The X-Ray Fish (*Pristella riddlei*) is a Tetra from South America. Its name comes from a translucent body which ranges from red through pink to silver. Another certain identification mark of this community fish are the dark spots on dorsal, ventral and anal fins.

TROPICAL CHOICE



JUDGING by many of the letters we receive a lot of PRACTICAL FISHKEEPING readers are keen to have information about the hundreds of species of tropical fish—the sort, both unusual and common, that make good community or specialist tank dwellers.

Here is a selection from that huge gallery of tropical species which makes fishkeeping such a fascinating and varied hobby.

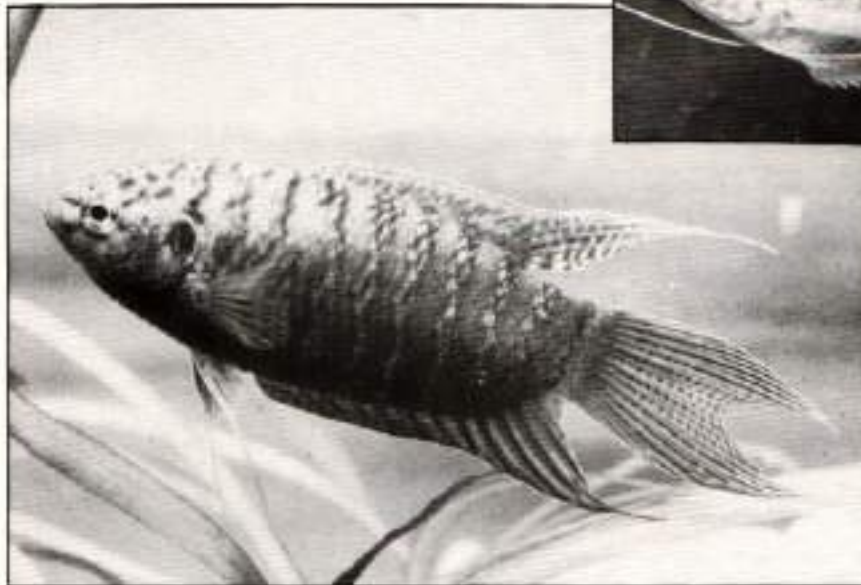


A beautiful pair of Panchax Chameil (*Epiplatys dageti*) from West Africa. A good community fish, it prefers soft water and is a myriad of colours from greens through metallic blue to red.



Left: The Elegant Rasbora (*Rasbora elegans*) is just what its name suggests—an aristocratic specimen with slender good looks and a beautiful colouring to match. It originates from the Malay Peninsula and Borneo. The beautiful colours begins with browns, black edged scales on the back, travels down the sides in a red-brown hue with green lustre and finishes with a pale yellow belly. Two black spots finish off this finery.

Below: The Snakeskin Gourami (*Trichogaster pectoralis*) is similar in shape and size to the more popular Pearl Gourami. It is a dark basic colour with dark and gold zebra stripes. The fish originates from South East Asia and is a straightforward to breed bubble nester which usually does not attack its fry.



Left: Another bubble nester is the Paradise Fish (*Macropodus opercularis*) from China and the Far East. A superbly coloured fish with bright markings and superb finnage, especially the male. They can be aggressive so are best kept in a community of bigger fish.



Left: A predator from its teeth clad mouth to the end of its streamlined body, the Pike Top Minnow (*Belontiex belizanus*) is definitely not a community tank member. But they are an interesting fish to keep and are fairly easy to breed livebearers. They come from Central America and like plenty of live food.

Write to:

Letters

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

Java success



Java Moss—I use this as an extremely useful method of protecting Livebearer fry. I believe it is a method well worth trying.

FIRSTLY, I enjoy your magazine immensely. I hope you will carry on producing it. This letter is to tell you about my method of breeding livebearers. It is mainly meant for the novice, because it is very simple and cheap.

To hold the fish, swordtails in my case, a cheap plastic fish bowl is used. This costs about 80p to £1. This is floated in the main aquarium and in the bowl I put a lot of Java Moss or Fern.

This floats about half way up the water level. When the female is fat and has a dark gravid spot I net the fish and put her in the tank. I have good results using this method.

I hope this will help your novice readers rear their first fish. The fry hide in the moss and the female should be removed.

The fry should be fed proprietary brands of fry food or small particles of boiled egg.

The Java Moss may be hard to get hold of, but a small piece will soon grow in strong light. —Steven Wroe, (14) Barmley, Yorkshire.

Rasbora identified

THE probable identity of the Green Eyed Rasbora referred to in the June 1979 and January 1980 issues of Practical Fishkeeping is *Rasbora dorsocellata*, which is more commonly known as the Eye-Spot and occasionally Hi-Spot Rasbora—both being illusions to a distinctive black spot on the dorsal fin of this species.

Although the name



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

Green-Eyed Rasbora is sometimes used by aquarists it has not become established in the aquarium literature, hence the failure of your researchers and correspondents to trace it.

However, the name is applied to this species at least twice within the covers of your predecessor, *Petfish Monthly* (May 1975, Page 29 and March, 1976, page 538).

The descriptive terms Green and Emerald-Eyed are not inappropriate, since anyone who has seen this species under the right conditions will have been impressed by this strikingly attractive feature. In certain lights, the lower portion of the eyes and gill covers emit a brilliant emerald sheen which contrasts sharply with the otherwise plain silver body colouration.

R. dorsocellata comes from the Malay Peninsula and Sumatra, where it inhabits streams and ponds with soft, acid waters at temperatures around 76°F. It looks at its best in the aquarium when kept in small shoals.

Mature females are stouter than males, and spawning takes place amongst fine-leaved plants at 78-80°F. Maximum size is given as 2 1/2 in but most aquarium specimens are much smaller than this.

Messrs. Bouvard and Taylor should be able to confirm identification of their fish by the dark dorsal spot which is sited at the centre of the anterior edge of the fin. —James Barrie, Farnon, Chester.

Mystery fish revealed

I'VE read PRACTICAL FISHKEEPING for a year now, and would like to congratulate you on an excellent magazine.

I am writing in reply to Mr N. E. Taylor's letter in the January issue, about Emerald Eyed Rasbora. I had twelve of these delightful fish, which unfortunately died of a bacterial disease before I could attempt a breeding programme.

There is a photograph of *Rasbora dorsocellata* the Eye Spot Rasbora on Plate 12 of the

Hamlyn Guide to Aquarium Fishes, by Claus Paysan. This illustration is the same fish that was sold to me as the Emerald Eye.

There is not much information on the fish, as this book is more of an identification book for quick reference. However, it does state that the distribution is the Malay Peninsula and Sumatra. They can be bred and eat all the regular aquarium foods. —John Myers, Netherton, Merseyside.

How I keep my Piranha



Piranha—mine need a Guppy to teach them to feed properly.

I HAVE only recently started to read your publication and I have noticed in two issues

(November and December) readers queries regarding keeping Piranha species. I through my own experience may be of some use to you readers.

I bought four *Serrasalminus nattereri* (Red Piranha) about three months when they were less than half an inch long. I keep them in a 24 x 15 x 15 tank where I already kept a pair of Guppies. My previous experience with another batch of Piranha's I had (an accident wiped them out) found they were shy, timid fish and I had difficulty in feeding them.

I used the Guppies to teach them to swim around freely and to feed readily.

I usually feed them twice daily on mainly white worms (incidentally my cultures are 18 months old) flakes, centivore

flakes, shrimp tablets, freeze dried tubifex (they didn't like live tubifex) and lately my only surviving two inch piranha has taken to small chunks of raw Conger Eel.

Two more points I've found useful when feeding the Conger Eel bits (I suppose all fish meat is the same) I found that when cut and placed in the tank a lot of bits washed off and clouded the water.

To stop this I now dip them in a jar of warm water to wash off any loose bits. I say warm water because the eel is kept in the fridge prior to use and needs to be warmed before feeding.

Also I've put a slate on the tank floor so that any food drops onto this making feeding easier for the fish, as the Piranha is obviously not a gravel feeder by choice (or nature).

This last idea is handy for all types of fish anyway. —A. Jones, Runcorn, Cheshire.

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One sided livebearer

Livebearer expert Dave Cheswright finds a new species with an odd twist

WHEN Mike Thomas of South Wales and I visited members of the West German Livebearers' Society, we were pleased to see a very interesting aquarium containing, we were informed, *Jenynsia lineata*, a species of Livebearer which I had never seen before.

I had only known of it from the sparse information in various publications and never thought that they were being kept and bred by fellow Aquarists so close to the UK. We, of course, asked if there was any chance of our taking some home with us.

Their stocks of this species were not large and we were delighted in being given two trios. The reader may be surprised at trios instead of pairs but the reason for this will shortly be clear.

The scientific name of the one-sided livebearer was so decided because it was first found by Dr. Jenyns in 1842 when he named it *Lebias lineata*. According to K. Jacobs, "Livebearing Aquarium Fishes", Dr. Jenyns first published a description of this species in the "The Zoology of the Voyage of H.M.S. Beagle" edited by Charles Darwin. In 1866 Günther re-named it "Jenynsia" in honour of Dr. Jenyns.

The fish is found in the wild in Southern Brazil, Uruguay and Argentina in small slow-flowing rivers and streams, at altitudes of up to 7500 feet.

There is a marked difference in size between the sexes with the males reaching about 30-40mm. Females are much larger and may attain up to 90-120mm. In West Germany we did see one female of about 90mm and I would have thought that this is more of a reasonable size to expect in aquaria.

The background colour is silvery and there are black streaks and dots all over the body horizontally. There is no definite pattern in the markings which are therefore random ones. The name "lineata" means "lined or streaked". Young females show a small orange mark by the anus but this apparently disappears once a female is pregnant and does not appear again.

Why this colour is present in virgin females only is a mystery which some research may throw light on in the future.

Now we come to the reason which makes this species unusual and gives it its common name. The male's gonopodium is somewhat short and is slightly curved at the tip. Furthermore the gonopodium can be moved by the male only to one side; i.e. some males can move it to the left only and some to the right but never both ways.

The genital opening of the females is also one-sided and, in her case, this is caused by a slightly displaced scale. Therefore, a left-"handed" male has to mate with a right-"handed" female and a right male with a left female.



Most Livebearers like these *Platies* have a fairly straightforward breeding sequence. But the One Sided Livebearer is dramatically different.

This makes the distribution of this rare fish to other Aquarists a little difficult to say the least and so far I have parted with fry only in batches of 5 to 8 fellow Aquarists.

I imagine that when they sex out there may have to be an exchange operation in order to obtain matched pairs. Quite what the chances are with 8 fry will be interesting to see.

The males can be allocated to one side or the other easily as one can see in which direction he can move his gonopodium. I do not have the facilities to closely examine the females and we will have to rely on the physical contact by the males.

They are extremely active in fertilising females continually and the gonopodium, if matching, can clearly be seen to be actually inserted into the female. In this way a matched pair can be spotted and removed from the aquarium. The original trio I had were 2 males, which both proved to be right-"handed" when viewed from the rear plus 1 female which amazingly turned out to be left-"handed". By the end of December 1978, I was beginning to despair as the female showed no signs of being pregnant.

However by the end of January she obviously was looking much plumper. I removed the 2 males and, on 16th February some dead fry were produced, together with 3 live ones.

On 17th and 18th February she produced more fry and the total was 10 live plus 26 dead. The second brood came on 8th April and the third on 20th May, the intervals being 49 and 42 days.

The numbers in the 2 latest broods were 36 and 42, the last plus 1 dead. All the fry have grown well and the first brood shows some males. The fry are as long as those from

Goodea species but are much thinner bodies when born.

The fry eat all foods although they obviously do better on live-foods and ox-heart. The parent fish I was given will still not take any dry foods at all but one food they particularly relish is crushed snails. The female in particular enjoys these daily but this preference is not shown in the growing fry although they do most definitely eat crushed snails which I drop onto a saucer in the aquarium. This is very useful as it helps keep down the snail population in my fish-shed.

The temperature at which I have kept this species has varied from 20 to 25C. K. Jacobs confirms this range and G. Sterba in "Freshwater Fishes of the World" quotes 16 to 23C.

Mike Thomas has had broods of only about 10 at more frequent intervals of about 25 days and it may be that higher temperatures produce smaller broods more frequently. However it may be that other fry were born but were eaten by the female as Mike has kept his in a larger aquarium with little plant.

I always make sure that the female's tank is almost filled with plant and nylon mops.

This species is basically a slow-moving one spending most of the time near or just above the bottom of the aquarium or hiding in the darker parts. They have not been in my experience pugnacious either to each other or to other species. I have raised the first brood with other live-bearer species in the same Aquarium (*Xiphophorus montezumae*) and have seen no signs of any disagreement.

They are, therefore, a peaceful fish to date and should, I hope, be suitable for community tanks, if and when they are in sufficient supply.

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Installing the pond

Roger Cleaver and Peter Bull explain
the next stage of our Project Pond



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.

Roger is chairman of the growing Midland Koi Society.



This is our Albatross pool. You can see the plant shelf on one side, it has a similar shelf on the side nearest the camera. This means that when digging commences you must dig a shelf in the hole for support. The first stage is to place the pool in exactly the position you want it as we have done here.

LAST month we discussed the various alternative methods of constructing a pond. Now we are getting down to installing the PRACTICAL FISHKEEPING "Project Pond"—a fibreglass affair.

As we proposed in our article on planning the Project Pond we intend to show you how to put the fibreglass pool, add a rockery surround plus a bog garden and a water course.

But all that landscaping is in the future. First of all comes the problem of digging the hole!

The pool we have chosen is a Lotus pond called an Albatross.

It measures approximately 7 ft 7 in by 6 ft 9 in and is 10 inches deep.

Once you have decided on your own choice of fibreglass design and decided where to put it—as we explained in our February article—you can begin work.

We do think it is best to make sure you have the right tools for the job. We suggest you have the following ready before you start:—

- Spade
- Half-moon turf cutting tool
- Spirit level (Builders type, if possible)
- Rake
- Riddle
- Long Length of straight edged wood.



Using the half moon cutting tool, carefully trace round the edge of the pool to mark out the shape by cutting through the turf. This will give the exact shape needed for the top of the pond once it is sunk into the ground. You can then remove the pond out of harms way until the main digging is over!



You now have the shape of the pond cut into the turf. The next task is to remove the turf inside that template. Again use the half moon tool to divide the area into turves for easy removal. Divide the area into strips the width of your spade and twice the length of your spade.



Once the whole area is cut with the half moon tool you can use your spade to carefully lift out the turves. When they are completely removed you will be at this stage with the shape of the pond marked out in bare earth. You can remove the turves to another part of the garden ready for a new use, or as we have done stack them by the side of the pond to form the base for a rockery mound of earth.



Once the turf has been removed to allow for the pond you need to remove further turf to cater for any paths or pool surrounds you have planned for the edge of the pool. In our plans we wanted a crazy paved edge along part of the house side of the pond. It is necessary to remove the turf because the path needs to be at a lower level than the rest of the grass so you can use your lawnmower right up to the edge of the path. Mark out the width of the path like this we made it about 18 inches deep. But don't cut out the actual turf yet...



First of all you must start to dig out the pond around the section where the path will be. Just a couple of spades will do from each section of the path edge. This way when the path turf is removed the edge of the pool is clearly defined and you know where to dig down.



As you can see the pool edge is now clearly marked and we have started removing the turf to allow for the path, this can be removed now before digging proper starts in earnest.

Installing the pond



Now excavate the pond to shaft depth. Once this depth is reached you need to mark out the width and length of the shelves and dig out the rest of the pool area to the rough depth of the pond. You will then finish up with a hole like this. A word here about the excavated soil. You can just see from the picture that we have heaped the soil on top of the shelves to form a mound for the rockery. This is the most convenient method of dealing with the soil. But if you do not want the soil for landscaping you will need to make arrangements to move it somewhere else. There is quite a bit to dig out for a pool of this size.



Remove any stones or pebbles from the inside of the hole to prevent damage to the fibreglass.

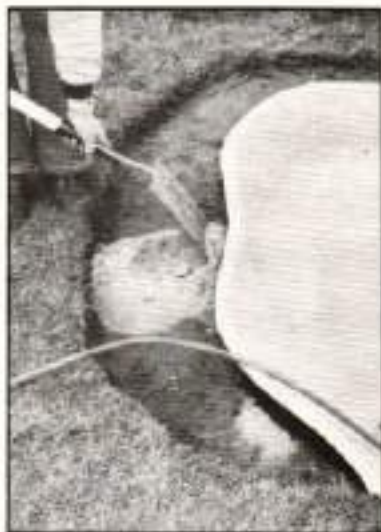
Now that everything is just right remove the pool for the final time. Cover the base and shelves (as here) with either sifted soil—using the riddle—or fine sand. Once spread the soil or sand needs to be raked gently into a soft level base.



Once you have the hole and shelves dug out roughly, lift the pool to check for the correct fit. The idea is to adjust it so that both the bottom of the pool and the shelves are supported. If it doesn't fit at first lift out the pool and trim away the soil as required. It will almost certainly take several fittings before things are just right. The secret is not to take away too much soil at once. Just ease it away in all the areas which need trimming until the fit is perfect.



Once the pool is sitting snugly in the hole lay the long plank across the top edges and check that it is horizontal with the spirit level. This is most important and you must check the level in all directions. If the pool isn't level adjust it until everything is perfect.



The pond can be placed into its final position and filling with water begin. As the water level rises the gap between the pool and the earth can be filled with either sifted soil or sand. The water pressure will help compact this into a firm setting for the pond.

NEXT MONTH: Finishing off the pond with surround and beginning the landscaping.

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Beautiful

INVERTEBRATES

Setting up a tank – by Norman Wright
and Clive Nicholls

TAKE a look at the beautiful invertebrates pictured on these pages. Then you will know how rewarding they can be to keep.

It was the thought of really exotic creatures like this that started us off on our PRACTICAL FISHKEEPING Invert tank which we described setting up last month.

Since then the filter bed of the tank has matured and after a week of nil nitrite readings we decided to stock the tank.

Marine invertebrates are expensive creatures. This and their delicacy can spell the problem of losing a lot of money—quickly.

So we felt the best way to go along was cautiously.

Ideally the rockwork in an invert tank should be living rock with additional decoration from living coral.

Firstly we ruled out living coral for the time being. It is

Right: A close-up of a tropical sponge pictured on a reef in the Caribbean. Picture by Ian Took, Biofotos.

Below: Richly deserving its name is the Fire Shell Clam. This is a magnificent invertebrate for the aquarium. Picture by S. Summerhays, Biofotos.





difficult to keep and feed. Far better to keep straightforward inverts properly before meeting the challenge of corals.

Living rock is a certainty in our tank—eventually. But the initial outlay of something like £200 worth of living rock for our three foot tank seemed a needless risk when the tank was so new.

We felt it was far better to spend around £15 on aquarium rock—nevertheless attractive—and start to buy and add living rocks gradually.

We adopted the same attitude with our invert occupants.

For the first few weeks we intend to drastically understock just to make sure that all is well in the tank.

So our first three purchases were a *Radianthus Anemone*, a *Feather Duster Tubeworm* and a small *Fire Clownfish*.

Later after a few weeks of successfully maintaining the tank we shall add more inverts and two or three new *Clownfish*.

A tropical sea cucumber often known as a sea apple. This adds variety, colour and a splendid creature to the invert tank. Picture by Heather Angel.

Beautiful INVERTEBRATES



Sea Cucumber, Tubeworms and Anemone—just three of the inverts we had to choose from.

AFTER a week of nitrite readings the first step before considering stocking anything in our newly set-up invert tank was a water change.

Using the same Instant Ocean brand of salt we started with we change five gallons—just over 25 percent.

It is then wise to check pH levels before stocking.

An additional task for our tank was to fit a box filter which was filled with Poly Filter material to act as a protein skimmer.

As we mentioned earlier the rockwork originally selected was not living rock. So we picked a mixture of suitably hard, non-porous pieces and arranged them in the tank after thoroughly cleaning them.

This consisted of a long period under a cold tap followed by soaking in bleach for 24 hours and then another very thorough washing to remove traces of bleach.

Choosing the first stock was a problem. As mentioned before we intend to take things fairly slowly and not rush into overcrowding a new tank.

The fish was simple—a relatively cheap but superbly coloured Fire Clownfish.

But what invertebrates should we choose? In the end we plumped for an Anemone and a Feather Duster Tubeworm.

To add them to the tank simply follow the rules of any stocking operation.

Float all of them in their polythene bags for at least half an hour to enable the temperature to equalise slowly.

During this time add small

amounts of aquarium water to the bags at regular intervals.

Then simply and gently release the creatures into the water of their new home.

Next month we will move on to feeding invertebrates and working out a routine diet to keep them healthy.



This is the Tubeworm which we eventually picked—a Feather Duster. It is certainly a beautiful addition to the tank.



The Poly Filter foam and box filter assembly to bolster the tank's undergravel filter system.



Above: Another attractive species of Anemone. However, we choose a Radiantus species for the Clownfish.

Above left: A superb ivory coloured Anemone with delicate pink-tipped tentacles.

Far left: Float the Anemone in its polythene bag for at least half an hour.

Left: A selection of suitable rocks.

PLANT EXPLOSION

That's what will happen if you grow your own
says David Shields

I WANT to begin this month's article precisely where I left off last month... just about to begin planting out cuttings ready to grow my own supply for my tanks.

Last month I explained how to choose a site and how to prepare containers with peat then a gravel layer.

If you have never tried this sort of thing before it is probably best to start with the hardier and easier plants and it is this I want to cover.

With the species I shall mention here there is no messing about with re-planting and I would say no chance of failure. If you follow my methods I am certain you will have success. I have found these particular plants very hardy.

I have several trays of them either in the garden or fish house. The garden trays have been frozen solid for much of the winter—and remember it is a lot colder up here in Halifax than many other places in Britain where you may be reading this.

I know they have been frozen solid because I check them every night when I go

This is a *Ludwigia* species very similar to the Needle *Ludwigia* I have mentioned.



This illustrates how plants will grow and spread in a boggy container.





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.

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 AS. He has been a fishkeeper for more than 20 years.



You need some soft window lead strips like these to bed the cuttings down in your trays.



Myriophyllum—a slightly less hardy plant, but one you will be able to grow quite comfortably.

out to switch off the the fish house lights.

Even so, as I write this article in early March after a mild spell, I can see new shoots starting to come up.

I have no doubt that with a few weeks of this warmer Spring-like weather the trays will be packed with useable cuttings for the tank.

The first two plants I want to talk about are probably the hardest—Ludwigia.

I use two types—Ludwigia mullerti, Red or Common Ludwigia, and Needle Ludwigia which is Ludwigia arcuata.

I'll assume you have your container or tray ready as I explained last month.

First step is to acquire some cuttings.

You can either get some from a fellow fishkeeper who has too much, your local aquatic dealer or one of the big plant suppliers.

The cuttings will be four or five inches long and you can get as many or as few as you wish—even one will eventually fill your tray to overflowing.

As I said last month any size container will do. The bigger you go the more plants you will get.

The common Ludwigia varies greatly in colour when it grows in bog conditions or submerged.

The cuttings will probably be a rosy shiny colour on the upperside and a beautiful wine red underneath the leaves.

Grown as I am about to explain this beautiful colour will be enhanced.

First of all cover the gravel in the container with one to two inches of water. You need to keep an eye on this water level and make sure it is topped up.

I have found if the trays are left outside during a normal Spring the usual rainfall will keep it pretty well at the right level, but do keep an eye out.

According to how many cuttings you get, spread them out evenly over the tray. Use a piece of lead on each and push the lead into the gravel.

The whole plant should sink to the bottom with the end just curving up to the surface.

Before long each cutting will begin to shoot and creep out to cover the tray completely. Eventually you will have a seething mass of plants.

Below in the gravel you will have a mass of roots. In fact it will cover the bottom

rather like a poited plant does. When you remove the pot the roots are intertwined throughout the compost and pressed tightly against the walls of the container.

If you want to start off another tray you can lift out a clump in a square.

But for using in your tank, all you have to do is take five or six inch long cuttings from the new growths that are covering your tray. You can see exactly what you have got because the shoots will curve up and grow one or two inches above the water surface.

Just go round and nip the cuttings off. They will live wine red stems like tree trunks and will grow quickly in the tank.

The only difference will be that the red will become paler as time passes and the texture of the leaves will become softer.

That's the growth in your tank. Meanwhile back in the tray the Ludwigia will be spreading out again and within a few weeks that seething mass of plants will be back.

It is just like cutting your lawn the more you cut it the faster it grows!

The advantage is that you can have a constant stock to replace plants in your tank if you either prefer the darker red or if they are not growing well.

Many people write to me saying they cannot grow plants. The secret of success is doing a fair amount of experimenting with water conditions, lighting and fish.

With this supply of plants you can afford to experiment, lose the plants and start all over again. And if, whatever you do, your plants will not thrive, you can replace them and brighten up your display every few weeks.

The method for Needle Ludwigia is exactly the same with the same results.

Hydrophilis isn't quite as hardy as these two but it can be grown in virtually the same way. The difference is really that you need to start off with perhaps a sheet of glass or a sheet of polythene over the tray until it is established.

It isn't quite such a quick starter. But really it is a hardy plant and will certainly respond, if a little later.

Myriophyllum is supposed to be delicate but I have found it to be very hardy. My stock stays in the fish house all winter in a five foot tank. As soon as Spring is here I have a beautiful wine red stock busting out of the tank.

Again these two will regenerate throughout the summer. I remember as couple of seasons ago the Sandgrounders AS at Southport installed a couple of tanks at Southport General Hospital. I was able to send them some bundles of plants for the tanks without affecting the supplies I needed myself.

Another simple plant to grow is the *Acorus* species.

Plant them in the same way and the roots will spread out covered with tiny new plants.

They have spiky leaves, some with white markings and are very hardy decorations.

I am not saying they will be perfect in submerged situations. The leaves will lose some of their lustre eventually, but after a couple of months you can remove them and replace them in the boggy tray for them to regain their glory.

They will survive, but I think it is a good idea to change the tank round from time to time, tidy it up and give it a new look. This fits in perfectly with *Acorus* which can be rejuvenated by a few weeks out of the aquarium.



This shows the bigger leaf and dark underside which is typical of Common Ludwigia.

Give a the



your fish taste for good life

Keeping fish healthy is a serious business. And keeping them well fed is absolutely vital.

That's why so many aquarists insist on Phillips Fish Foods. They appreciate the research which goes into every product. Research which ensures that every ingredient is correctly balanced for the highest nutritional value.

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Who says the good life is expensive.

Phillips Fish Foods

Phillips Yeast Products Ltd, Park Royal Road, London NW10 7JX.

Pumps

WHEN one brand of air pumps can claim to have captured 90% of their market sector in the USA, there must surely be something special in them. British aquarists will now have the chance to judge for themselves, the first shipment—modified to meet our stringent Electrical Safety Regulations—having been imported just a few months ago.

The "Whisper" range encompasses eight pumps, of which two are merely rheostat fitted versions of others, all pumps having an identical style and colour of casing.

Without minimizing their more solid virtues, I do feel that much of their enormous success is due to the way in which they are presented to intending purchasers as a cohesive and complete range, aided in no small measure by the attractive counter display stand that you have probably seen at your local store.

That stand really does help fishkeepers to pick out the model that will best meet their needs, or suit their pocket, though of necessity the accompanying descriptions have tended to use "tank size" rather than aeration or filtration requirements as the relevant criterion.

The "Whisper" pumps are of a very traditional design, with the emphasis being placed on small detailed points (such as the "Stallex" valves) and quality control to ensure optimum performance. Since the design has been well-proved in three years of sales in the USA, and the pumps are constructed in Japan, there are unlikely to be any snags still to be ironed out.

All the components are well constructed, and can be disassembled in a few minutes for routine checking or repair. One excellent feature is that every model has an air filter, and provided it is cleaned or replaced regularly there should be no fall-off in performance due to dirt deposits on the valve

seats: the bases were very well-fitting, ensuring that no unfiltered air would find its way in, and the rubber feet seem to absorb the vibrations very effectively.

My only real criticism is over the noise levels of the pumps: in relation to their output they were certainly no quieter than most of their competitors, this being especially true of the smaller models. However, as I have often said before, the noise of the pump is likely to be drowned by the sounds of the filters and airstones as they bubble away, so that will rarely be a problem except in the most peaceful surroundings.

The two models fitted with rheostats, the 500 and 800, would be especially good buys. As you probably know, the rheostat varies the pump's output by reducing the power of the coil, and as the output falls so too does the noise.

The advantage of this arrangement is that if you change the layout of your tanks, or the number and type of filters the pump serves, you can "dial" just the amount of air you require. The controls on the Whisper pumps were fitted with click-stops, and gave a usefully wide range of adjustments. As you may have gathered, I am very keen on this sort of filament, and I regard it as being well worth the pound or two it usually adds to the cost of the basic pump.

The accompanying table compares the output of each pump in a 12in depth of water, a fairly realistic test for normal use, and shows the recommended retail price. The output figures in themselves won't tell you how many filters or airstones each pump will operate, so next month I hope to cover this aspect in some detail; photographs will show, for example, just what 0.5 litres/minute of air looks like bubbling from an airstone, so you really will be able to match your needs to a specific model of air pump.



On File

Equipment reviews by technical writer
Giff Harrison

I plan to run some long-term tests on "Whisper" pumps, so I will be able to report back, in six or twelve months time, on how reliable they have been in use. For routine servicing, there are available kits of spare (diaphragm, gasket, hinge, air filter, and valves), at a cost of just under £1 for the single-output models, though individual items can be obtained if required.

"Whisper" pumps are distributed in the UK by Interpet Ltd, Curtis Road, Dorking, Surrey.

Whisper Model	output*	Retail price
100	1.1 litres/minute	£3.90
200	1.3 litres/minute	£4.49
300	1.7 litres/minute	£5.00
400	2.7 litres/minute	£5.45
500	range 1.0 - 2.9 litres/minute	£7.25
600	3.8 litres/minute	£7.90
700	5.2 litres/minute	£11.73
800	range 1.8 - 5.2 litres/minute	£13.75

*in 12in depth of water

Servicing

JUST a few days ago, while I was visiting my local aquatic shop, an inate young man brought in an air pump, complaining that it had stopped working after only six months. That surprised me since the pump was one of the better medium-output pumps.

The manager examined the pump and pointed out that the air filter was black with accumulated dust and dirt; unfiltered air had then seeped in at the joints, fouling the valve seatings and reducing the output to almost nil. The pump had obviously never been routinely serviced.

This is a true story, and according to the manager of that store, a very common one. It seems that most fishkeepers take the attitude that equipment is best left alone while it is working satisfactorily: the fallacy of that viewpoint is seen in the inconvenience or harm that is caused when the air pump does eventually cease working, something that will happen sooner or later to even the best and the most expensive models. Filters will cease working, and if the tank is overcrowded the fish may die from shortage of oxygen.

An air pump may not be as complex as a computer, but it does have various components that tend to wear, split, loosen or block up over a period of time. Provided that you regularly check the pump, something



The Whisper range of pumps which have been very popular in the States are now available for aquarists to try in this country.



The "Regula 200" is an unusual design. The coil comes out when the base is removed and the magnet is attached directly to the diaphragm.

that should not take more than five minutes every month or two, you can either prevent or remedy those processes before they affect the pump's performance.

Dirt and grease in the atmosphere are two of a pump's greatest enemies, since they combine to form a crust on the valve seatings that will prevent the rubber valves making an air-tight seal; in certain environments this can happen in as little as two or three months. A filter built into the body of the air pump will remove most of the airborne impurities provided it is replaced or cleaned regularly.

If neglected, unfiltered air will eventually find its way into the pump via the joints in the casing. The valves on the Rena 101 and 301 models are of an unusual design, very efficient in operation but more susceptible than most to a build-up of dirt on their seatings.

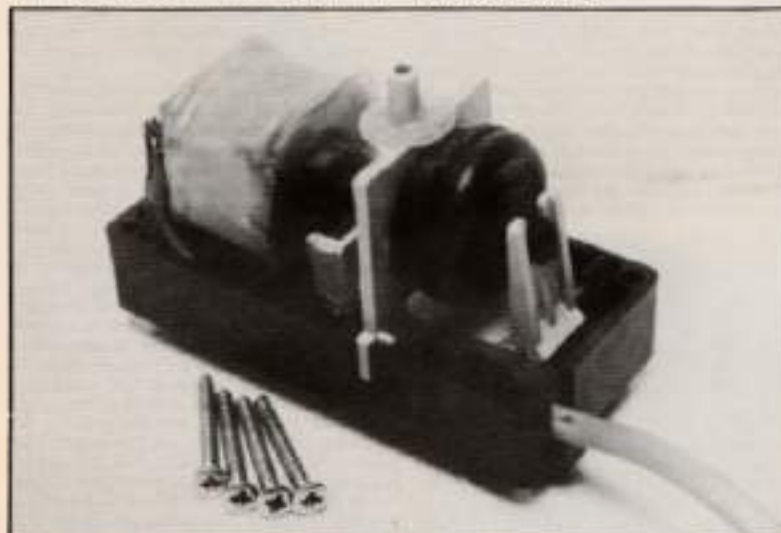
The Rena use circular pads of felt to filter the air, so prompt renewal when dirty (i.e. when the pads become noticeable darker in colour), is both essential and simple. Some other pumps, such as the Regula and



The diaphragm may seem OK at first sight but if you twist the fixing shank the split will be obvious.



The Pixie pump is a unique design once the cover is removed all working parts slide out to facilitate servicing.



This is the Pixie again with the working parts slid back in ready for the cover to be replaced.

Schwarzer models, use a small quantity of nylon filter wool in a rather deeper filter chamber; this system is even cheaper to renew, so there is really no excuse for putting it off to another day.

Perhaps you will appreciate the need for filtering the air when you realize just how hard air pumps work; according to some quick calculations, I reckon that a medium-sized pump will produce a roomful of air every five days, that's about 1,250 cubic feet.

It isn't just on the valve seats that dirt and dust causes problems; most will go straight through the pump, and cause blockages in the air control valves, and also clog up the airstones. The material of which airstones are made is really a very fine filtering material—it has to be to break the air up into minute bubbles, and the dirt naturally becomes trapped in the small central cavity. It doesn't take many weeks of unfiltered air to block them up, and that is not only expensive in replacements but also puts a strain on the pump as back-pressure builds up.

Servicing the pump

After a pump has been in use for some months, a steady drop in the airflow through the filters and airstones may be measured (though all too often the change has been so gradual that it has gone unnoticed). The first step is to disconnect the tubing from the air pump and to blow hard down it; if your lungs cannot produce enough air to operate the filters, then the pump certainly can't. If it is difficult, try adjusting the airline valves; they often "set" after a period in use, and require loosening a fraction.

Airline clamps require very frequent adjustment, and for that reason I really can't recommend them nowadays.

If air still isn't produced easily, check each airstone and filter individually; airstones cannot be cleaned, so must be renewed, but on some filters the rigid air pipe does sometimes get blocked at its narrowest lower point. Any obstruction can be loosened by alternately sucking and blowing whilst keeping the lower end in a bowl of water.

Once all these points have been remedied, reconnect the pump to check on its performance. If it still seems to be operating "below par" then it is due for a service.

First disconnect the pump from the electricity and its airline. Remove the base, which is usually held in place by 4 cross-head screws, and that will expose the works. First, unscrew the air-bleed screw if there is one, prise the edges of the rubber diaphragm off the valve block, and then undo the bolts or screws holding the valve block and vibrator arm in place.

Sometimes this metal arm will be mounted on a rubber hinge, but the method of removal will be obvious. Check the diaphragm for signs of cracks or splits, especially around the central fixing lug, by flexing and twisting it under a strong light; if there is any sign of weakness it must be replaced.

The valve block contains a pair of small flat rubber valves, one on each side, usually held in place with a thick semi-circular wedge. Remove the wedges and the valves, cleaning both carefully with a tissue dampened with water (never use any solvent).

If any hard deposits have built up on the

Servicing



Old style metal clamps have been superseded by more efficient control valves—Algaflex top and Hyko lower.

valve seats, remove them with a pointed matchstick—not with anything metal—and then wipe over with the tissue, refit the valves in place with the wedges, pressing them down very firmly.

The valves on the Rena 101 and 301 models have a small hollow lug at each end, and this is refitted using an ordinary pin pushed into the hole; make sure that the flap part of the valve sits centrally over the seating otherwise output will be affected.

When you reassemble, start by fixing the valve block in place (the depressions in the rubber gasket will show you which way round it fits beneath the block). Be careful not to over-tighten the fixing screw. Now fit the vibrator arm, and stretch the diaphragm carefully but firmly over the top of the valve block. Refit the base, then the air-bleed screw (if there is one), and renew the air filter medium. Plug in the pump, and place your tongue lightly over the air outlet; it should be pushed away by the air pressure; if not then disconnect and check that the diaphragm and valves have been correctly re-installed.

It will help if you make a brief sketch of how everything fits together when you dismantle the pump for the first time, but if you do it on a Saturday morning you can rush round to your local dealer for help in the unlikely event of your encountering any problems.



Replace when air filter looks like this!



You can see how dirt has built up on the valve seatings, seriously reducing output.

Although the valve seats will only need to be cleaned infrequently, I strongly recommend that at least once a month you check the diaphragm for signs of splitting: this is absolutely vital with the medium-to-high output pumps because they have to work so hard. The air filter should be checked then as well, and replaced as soon as is necessary.

Noisy pumps

Some pumps are naturally rather noisier than others, though the actual degree is often related to the output. If, however, your pump suddenly starts to rattle or buzz, then first check the diaphragm—it is often the warning sign that a split is developing in the rubber. If that is not the cause, check that all the fixing bolts are tight (but not too tight), and that any fixed or wedged components such as the coil or the magnet on the vibrator arm are indeed secure.

If back-pressure has built up in your airline circuit, then that could cause noise, and eventually damage as well: if you have more air than you need, bleed off the excess through the pump's own bleed valve, or fit one into the circuit. If your pump has an electrical output control, then turn it down until it produces just the amount of air you require.

You may find that your pump is noisy only on certain surfaces: the answer then is to sit it on a sheet of plastic foam. Hillside produce



Rubber gasket makes an airtight seal between valve block and pump body.



On File

Equipment reviews by technical writer
Cliff Harrison

a special mat with two densities of foam to solve this problem. If you decide to hang your pump on the wall to reduce the noise, check that the fixing rings on the base really will support the weight of the pump for a long period: if the base is made of rubber, the chances are that it's not strong enough. Never suspend it from the electrical flex. One point finally worth checking is that the noise isn't coming from the airstone touching, or being close to, the side of the aquarium: it's amazing just how loud a "hum" this can produce, yet it is very easy to remedy.

Before you do get down to overhauling your pump, it might be wise to check that your local dealer has spares in stock for that model: the chances are that he has if it's a popular model, but if not get in touch direct with the importer or manufacturer.

Ponds

EVEN as recently as ten years ago, pool filters were almost unheard of: fountains and waterfalls, as now, were commonplace, but not filters. The trouble is that in a pool you don't see just how thickly the muck and other debris is accumulating since it tends to settle on the bottom: if your aquarium were in a similar state you'd be pretty concerned for the welfare of the fish.

In fact the main function of the pond filter isn't to make it look cleaner and clearer, but to ensure that there is a minimum of debris to start releasing toxic gases during the winter months, especially when a layer of ice forms over the surface to prevent their being harmlessly dispersed into the atmosphere. It seems likely that those gases are a far greater problem than any amount of cold weather provided your pond is at least 2" deep in places.

In the autumn you should cut back and remove the leaves of the lilies and marginal plants as they begin to die off, and suspend a fine-mesh (1/2") plastic netting just above the surface to catch the leaves from neighbouring trees as they come drifting down.

Those precautions will make a big difference to the state of the pond, but remember that coldwater fish are greedy eaters during the warmer months of the year and they produce a considerable quantity of waste matter. If your pond is stocked fairly close to its maximum capacity, a filter to attach to the waterfall or fountain pump would be a very sensible purchase.

Plants

One such filter, using a special filter wool similar to that in ordinary aquarium filters, is the "Derbert" filter: or rather, filters, since it comes in two sizes—the Minor, recommended for pools up to 1000 gallons capacity, and the Major for larger pools or more rapid filtration.

The filter is of straightforward design, and cleaning out is therefore particularly easy.

As a by-product of removing the solid waste, you may well find that "green water"—suspended algae—is less of a problem as its food-source is removed.

You will also be able to see darkly-coloured, bottom-dwelling fish, such as tench, far more clearly; it always seems a pity that these beautiful fish are not more often found in garden pools.

If you would like more information about the Derbert filter and local stockists send a stamped addressed envelope to: **Derbert Filter Fountain Co. Ltd.**, Dept PF, Gogate Farm Works, Coles Green Road, Cricklewood, London, N.W.2.



Aqua Serens Ltd., 120 Cricklewood Lane, London NW2 have brought out their **Instant Water and Rock Garden** which is a complete prefabricated package of fibre glass rock units together with heating, lighting effects and plants which builds up anywhere to form the effect pictured. Water falls down the rocks into the pool below. Ideal for reception areas it retails at £275 plus VAT.



The **Plant Pillow** bags both small and large show the variations in plant sizes and numbers that can be planted.

Heaters



THE PAST winter has been a pretty easy one for tropical enthusiasts since there were no nation-wide power cuts, either from inclement weather or industrial disputes. However that situation cannot be guaranteed in future years, so a new product should prove to be of great interest for standby use.

It is the **Moorfoot Emergency Heater**, which operates at a safe 12 volts from a car battery: it consumes only 40 watts, so it will not drain the battery too quickly, yet it has enough heat output to slow down or halt the temperature drop in a typical sized aquarium provided that it is draped around with a blanket or newspapers.

It will operate for around 10 hours from a normal car battery, and that period should be enough to prevent the fish suffering any ill effects before the mains supply has been restored.

The **Moorfoot Heater** is a rugged element enclosed in a 4" long glass tube, packed around with fine sand to dissipate the heat, and fitted with a 6 foot length of cable. It

comes complete with a pair of heavy crocodile clips ready to attach to the battery. It must be immersed in water at all times while connected up, like all immersion heaters, otherwise damage will result from overheating.

The heater was designed by the director of an electronics company who had experienced more than his fair share of power blackouts over the years, something not too surprising since he lives on one of the islands off the coast of Scotland.

At present it is available only by mail order at a cost of \$5 including V.A.T. and post, from: **Moorfoot Services**, "Argentine", Whiting Bay, Isle of Arran, KA27 8PZ.

Although we are now moving towards the warmer months of the year, I think a battery powered heater should be an automatic addition to the "emergency chest", along with battery-operated air pump and assorted remedies: if it helps to save just one valuable or prized fish, then it has repaid its cost in full.

If you are one of the not uncommon breed of aquarists whose plant growing capabilities are zero-rated, there is a new product you should try before you give up in disgust and decorate your tanks with roots and rockwork.

Underworld Products, a Loughborough-based firm, have brought out "Plant Pillows", which are polythen sachets rather like miniature gardening "growbags" containing pH adjusted compost and nutrients to suit three most commonly encountered types of water—acid, neutral and alkaline.

The firm also sell a chart which recommends the type of plants most suited to your local water, together with their light requirements. If you follow instructions, it is claimed that you can't go wrong. All you need is an accurate pH reading of your tank water and the correct **Plant Pillow**.

Each pack contains four sachets of compost, two large and two small, so that individual show plants or clusters of background plants can be bedded in. A hole is simply pushed into the polythene and the roots carefully manoeuvred in. The pillow is then buried shallowly under the bottom gravel.

It is too early to tell whether my own experiments with **Plant Pillows** have been successful, but I am keeping my fingers crossed for my *Cryptocorynes*, which haven't yet turned to jelly as they generally do.

Where I can see this new approach to plant growing really scoring is in a tank with undergravel filters. The enclosed sachets keep plant roots free from the effects of the water circulating through the base medium, and give them a head start in a new tank where waste matter from the fish has not yet had time to be broken down into nutrients. **Plant Pillow** packs are £1.95 each with the chart selling at £1.04.

Nick Fletcher.

Catfish Expedition

David Sands completes his collecting trip to South America



DAVID SANDS spent three hectic weeks in Brazil last autumn fulfilling one of his greatest ambitions—to collect his own *Corydoras*, especially *Corydoras barbatus*.

David and his photographer companion Steve Pritchard found plenty of *Corydoras* and other Catfish on the trip.

In two earlier Practical Fishkeeping articles David described the early part of the adventure. This month he concludes the story of his trip.

He is now a partner in DeeSee Aquarium World at Tarleton, near Preston, Lancs.



Right: David Sands joins local fish catchers as they net *Corydoras* among the flooded channels of grass.

Below: *Corydoras barbatus*—one of the most sought after Catfish. This specimen came from water at 65°F.



AFTER our collecting trip at Sao Paulo Museum of Zoology we began our planning to collect the rare *Corydoras* which abound in the creeks along the Rio de Janeiro to Santos coast.

With seine nets, containers and plenty of optimism Steve Pritchard and I set out from the skyscraper lined horizon of Sao Paulo through the hills of the Southern Brazilian 'Sierra'. We were guided by our Brazilian friends, fish collectors Roberto and Juan, who knew exactly which streams we should visit to collect these Catfish.

The 'Sierra' had been cut away to pave the road we travelled along. Dense forests lined our route, sometimes shrouded in mist.

After hours of travelling we left the highway behind and began winding our way through the smaller dirt tracks, passing villages with Indian names. Many rivers followed our route, each one providing the supreme temptation for us to pause and attempt collecting.

Roberto knew that if we stopped at every river we would not reach our destination. With several hours of travelling behind us we approached a sand track which was fringed with exotic foliage—the lush green of the jungle looked striking against the yellow sand.

"Here are the *Barbatus*," Roberto announced, our faces lit with smiles, all the planning



A view across the coastal region where we fished and shrouded in clouds the island where we had hoped to be the first to collect *Corydoras*.

We came to a halt along side a lagoon which flowed under the sand track through storm drains. I rapidly changed into swimming gear, even though the weather seemed cool (a slight drizzle made me feel at home).

Steve and I photographed the general area, films were shot faster than ever before we were determined to record the environment of this sought after Catfish.

By this time, Roberto and Juan had prepared the seine net and collection bags and were ready to take the plunge. I ventured into the tea coloured water and retreated—I couldn't believe how cool the water was. Steve checked with the thermometer and it read 68° F, in a tropical country?

But of course it was the winter season—(the summer wasn't due until January!). I asked Steve if he wanted a dip too but he muttered something about me being the hero, so I held my breath and descended into the lagoon to chest depth.

Only a bolt of lightning could have prevented me from fulfilling my special ambition. The first seine revealed many small sucking catfish—*Oreochromis* types. No larger than an inch in length with a striking brown body, edged in black. I later discovered Dr. Britaky at Sao Paulo and Dr. Garavello from Sao Carlos University were about to describe this catfish new to science—a new species and genus.



A *Tilapia Cichlid*. These are African, introduced as food, but they edge out native Cichlids.

PRACTICAL FISHKEEPING

We found mainly female *Corydoras macropterus* as the season was the breeding time for many fish, it appeared these catfish swam up the channels to spawn into the submerged grasses.

I captured a fine male specimen of *Corydoras macropterus*—it shone a brown gold pepper and held erect long pectoral and dorsal spines—the longest I had ever seen on a *Corydoras*.

Roberto attempted to follow a small creek into the jungle depths—Steve handed me my camera and I followed. We caught some superb adult specimens of *Corydoras barbatus* in the dark shallows, but the trees closed in and prevented us continuing. At this point the rain increased and we all began to shiver. We returned to the car and dried out before surveying the area further. A small clearing drew our curiosity, it lay further on from the lagoon area. It had the appearance of a small beach, small palms bordered it's edges, so we decided to investigate further. Beyond the palms, hidden from immediate view, lay the most beautiful sight I had ever seen (after my wife I hasten to add).

A small pool sat inside the thicket, embroidered with the most exotic plants, some poured into the water from half submerged branches.

Yard for yard, this small pool matched the scene of my imagination of where *Corydoras* would be. A volley of camera shots later, I plunged into this pool with Roberto and proceeded to seine. The first net revealed many juvenile *Corydoras barbatus*, these 'killers' had me captivated. Perhaps the adults spawned in this secluded area leaving the fry to grow uninterrupted in the shallows by larger fish.

We completed our collecting trip in the rain at this oasis—I bagged the juveniles and wandered back to the vehicle proudly holding the bag high, my bare feet sinking in the soft white sand.

We drove onto the coast a mere twenty miles from the creeks and had a warm meal. We watched a fisherman silhouetted against the sea reeling in a Catfish (what else!).

Perhaps I should say a perfect day was complete, but the myriad lights of Santos (a beached skyscraper city) as we descended from the hills, is still brilliant in my memory.

I eagerly searched the net for specimens to place into the collection bag, small *Characidiums* (Darters) flicked about amongst the debris and hidden away Roberto spotted a *Corydoras*. I examined the catfish and identified it as *Corydoras macropterus* a species known to share localities with *Corydoras barbatus*.

The next seine had Roberto yelling with delight. He passed the Catfish to my hand and I called Steve who was photographing from the bank. In my hand I held a beautiful black and gold banded catfish, long and slender and at last I could relax because the object of the expedition had been reached.

We fished the lagoon area and surrounding slow moving creeks which spilled out from the main water area, more *Corydoras* were caught in each sweep of the net along with freshwater crabs and shrimps. We trod the water carefully as it was littered with submerged logs and branches. The tea colour of the water amazed me—Steve and I tested the water later and found it to be extremely soft and acidic, well below our lowest pH reading of 4.8.

Alongside the lagoon ran shallow channels of water carpeted with grass, outside of this wet season they would usually be dry. With a small hand net I amused myself fishing along these channels with Roberto.

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 to 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.

APRIL

Sunday, April 8: Hyde Aquarist Society are holding their 1980 Open Show at Peter Sander at the usual venue The National Community Centre, Hattenale Road East, via Hyde, Cheshire.

Monday, April 7: Southampton Aquarists Society Annual Open Show at the Avenue Hall, The Avenue, Southampton. Schedule and information from Mr. D. Mills, 30 Fenwick Way, Ottermoor Park, Southampton, SO2 4BT.

Sunday, April 15: Kettering Aquarist Society Open Show to be held at the McKinnis Theatre, Kettering. Show schedules can be obtained from the new secretary of the Society, I. Ured, 52 Heatham Road, Kettering Northants. Tel: 518492.

Monday, April 14: Wycombe Marsh Aquarist Society meeting at 8.30pm at the Social Club, Ballico Limited, Loudwater, High Wycombe, Bucks. Trevor Butler on Circular. Further information from Mike Fox, 24 Kelvin Close, High Wycombe, Bucks. Tel: High Wycombe, 38822.

Sunday, April 20: Malvern & District Aquarist Society Open Show at Christ Church Hall, Ramsons Green Road, Malvern. Schedules from J. V. Walton, 1 Beaver Cross, Lower Wick, Worcester. For further information telephone 04562 42800.

Sunday April 20: York & District Aquarist Society Open Show to be held at York Lido Centre. Schedules can be obtained from R. Sleet, 56 George Street, Boothferry, York.

Sunday, April 28: Reading D.A.S. Open Show at 20, Peters School, Church Road, Basing, Nr Reading. Schedules and further information from P.C. Ruchysnow, 34 Melrose Gardens, Arborfield, Grafton, Bucks. Tel: Arborfield Cross 760303.

Sunday, April 27: Shropshire Aquarist Society Annual Open Show to be held at Ince Hall, North Parade, Shrewsbury. Further details from Mrs. G. Fair, 6 Albany Road, Shrewsbury. Tel: 83251.

Sunday, April 28: Leigh Aquarist Society Open Show to take place 12 noon at Leigh Church of England High School. The new Secretary is Mr G. Williamson, 56 Hildon Avenue, Leigh, Lancs. The Show Secretary is now Mrs B. Waterhouse, 495 Liverpool Road, Puffin Bridge, Wigan, Lancs. For further information Tel: Wigan 832735.

Sunday, April 27: Merseyside Aquarist Society Annual Open Show to be held at the Rainhill Village Hall, Rainhill, Lancs. Secretary: J. Bailey, 11 Auburn Road, Liverpool. Tel: 226 8169.

MAY

Thursday, May 3: Kingston & District Aquarist Society Spring and Day Sale at the Methodist Church, 441, George Road, Warner Park, S.W.20 at 9 a.m. All welcome. Further details from J. J. MacGormack, 47 Hampden Road, Kingston upon Thames, Surrey. Tel: 31 648 8302.

Sunday, May 6: British Koi Keepers Society A.S.M. to be held at the Centur Hotel, Leobester at 1.00 p.m. (Friday evening). Toll quality Koi will be offered. Further details from R. Taylor, 8 Back Lane, Garforth, Wetherby, W. Yorks. Tel: Garforth 968.

Sunday, May 11: Trickle Aquarist Society 1st Open Show at the Grange Institute Association, Newburn Road, Throckley, Benning 13.2 p.m. Further details from Mrs. D. Keady, 31 Healey Crescent, Throckley, Newcastle upon Tyne. Tel: 952 47026.

Sunday, May 11: Corby A.D.A.S. Open Show, at the Civic Centre, Corby. Schedules and information from C. Mollister, 15 Meadow Road, Corby, Northants.

Sunday, May 11: Bournemouth Aquarist Society Open Show at Kinson Community Centre, Kinson, Bournemouth. Show Secretary: Jack Jeffrey, 30 Brunel Avenue, Bournemouth, Dorset.

Sunday, May 18: Medway Aquarist Society Open Show, The Social Hall, Turbury Avenue, Chatham, Kent. Schedules and details from P. Brown, 1 Grove Road, Strood, Kent. Tel: Medway 74066.

Sunday, May 18: Scarborough Fishkeeping Society 1st Annual Open Show. Schedules and details later from Miss J. E. Snow, Show Secretary, 17 Green Street, Scarborough, North Yorks, YO11 1NP.

Sunday, May 20: Portsmouth Aquarist Society, Inter-Club Show at the Portsmouth Community Centre, Secretary W. J. Hyder, 202 Kirby Road, Portsmouth, PO2 9QB.

Sunday, May 25: Seelings & District Aquarist Society Open Show at Hereward Junior School, 35 Annual Meadows. Further details from R. Walker, 30 Rosebery Avenue, Brimington, N. Hants. Tel: 330.

JUNE

Sunday, June 1: Loughborough & District Aquarist Society Open Show, held at the Bursleigh Community College, Thorpe Hill, Loughborough. Schedules from Mrs. S. Purdy, 10 Cleveland Road, Loughborough, Leics. Meetings are held at the Charnwood Inn, The Butts, Loughborough, on the second and fourth Sundays of the month at 8.00pm. All new members welcome.

Sunday, June 1: Mid-Sussex Aquarists Society's Invitation Interclub, Sidney West Sports Centre, Lesland Road, Burgess Hill, Sussex. Information from the Show Secretary, Mr. T. Tozier, 10 Cyprus Road, Burgess Hill, West Sussex PH10 6QR. Telephone Burgess Hill 43202.

Sunday, June 1: Redcar Aquarist Club Open Show, to be held at the Colman Bow, Redcar, Benning 10 noon-2 p.m. Details and bookings from the Secretary, Mr. D. Redman, 1 Lovel Avenue, Redcar, Cleveland.

Sunday, June 1: Loughborough & District Aquarist Society Open Show of the Bursleigh Community College, Thorpe Hill, Loughborough. Schedules and information from Mrs. Purdy, 10 Cleveland Road, Loughborough, Leics.

Saturday, June 7: Sudbury Aquarist Society Open Show at St. John's Church Hall, Danehill Avenue, Wimbles, Middlesex. Further details from L.J. Snaker, 60 Ormsley Way, Kewton, Middlesex. Tel: 81-204-5374.

Sunday, June 8: Northwich & District Aquarist Society Open Show at Hartford High School, Greenbank Lane, Chester Road, Northwich, Cheshire. Judging to F.N.A.S. standards and Show League judging. Further details from the Show Secretary, D. Vanden, 42 Hartford Road, Davenham, Northwich, Cheshire. Tel: Northwich 9524.

Saturday, June 14: Luton Major Aquarist Society Open Show to be held at Luton Major Comprehensive School. Judging commences at 12.30 p.m. Benching 6.30-11 noon.

Sunday, June 15: Bedford Aquarist Society Open Show at the Activity Centre, Wilton Road. Schedules from R.F. Adams, 20 Emory Road, Bedford.

Saturday, June 21: South Park Aquatic (Club) Society Coldwater Open Show to be held at Wimbledon Community Centre, St. Georges Road, Wimbledon. Details and Schedules from the Show Secretary, L.S. Copp, 18 Dymott Way, Boreham Hill, Kent. Tel: 652 6924.

Sunday, June 22: A.K.A. Auction will be held by the B.K.A.S. Birmingham Section at the Botanic Gardens, Edgbaston at 2 p.m.

Sunday, June 22: The Havant & District Aquarist Society Open Show at the Hornsea Community Centre, the Macdonald Hall, Hornsea, N. Humberside. Schedules available from M. Ashgate, 74 Park House, Park Way, Leigh Park, Havant, Hants. Tel: Havant 473392.

Sunday, June 23: British Koi-Keepers Society meeting at 8pm. at Conway Hall, Red Lion Square, London. New members welcome. Further information from Tony Bullock, 80 Edson Avenue, Homchurch, Essex.

JULY

Sunday, July 6: South East London Society will be holding their Open Show at 141 Greenhithe High Road, London SE13. For information telephone 899 0283. The Show Secretary is Mr. W. Hastings, 4 Lynden Road, Blackheath, London SE3.

Sunday, July 20: The Sandpounders Aquatic Society Open Show to be held at North Copp School, Merle Cop Road, Southport. Further details from Mr. R. Rawlin, 10 Olive Grove, Southport, Merseyside. Tel: 3774 42284.

AUGUST

Sunday, August 3: Blackpool & Fylde Aquarist Society Open Show at St. Peter's, North Parade, Blackpool. Further details from Janet Bruns, 20 Hatfield Close, Thornton, Clevelands, Blackpool. Tel: 609 8194.

Sunday, August 10: Grimsby & Cleethorpe Aquarist Society—Open Show to be held at the National Hall, Cleethorpe. Benching from 12.05 to 2.00 and judging will begin at 2.15 pm. Show schedules from Mrs. B. Matthews, 15 Swales Road, Hummerston, Grimsby, South Humberside. Tel: 4473 81423.

Saturday, August 18: The Northern Goldfish & Pondkeepers Society Open Show at the Sports Centre, Giverside Street, Bolton, Greater Manchester. Further information from Mr. E. Rothwell, 4 Whalley Road, Mill, Cheshire.

Sunday, August 17: Cheltenham Tropical Fish Club Open Show to be held at St. Mark's Community Centre, Heaters Way, Cheltenham, Glos. Schedules from Mr. Jenkins, 3 Marlborough Place, Pevens St, Cheltenham, G.A.E. please.

Sunday, August 26: Long Eaton Aquarist Open Show to be held at Gregory's Rose Gardens, Telton. Schedules details from G.A. Simkins, 47 First St, Stapleford, Notts.

Sunday, August 24: Flomwell & District Aquarist Society Open Show. Meetings held at the Strawberry Gardens 1929, Peulton Road, Fleetwood every first and third Wednesdays in the month at 8pm.

Sunday, August 31: Nunston Aquarist Society Annual Open Show. New members always welcome. Meetings are held every 3rd Tuesday of the month at the Pop-40-79 P.U.M.S. House, Cooney Road, Nunston at 8.00pm. Further information and schedules from Mr. G. Horning, 102 Tomkirk Road, Nunston, Warwickshire. Tel: Nunston 322271.

SEPTEMBER

Sunday, September 7: North Witley Aquarist Society Annual Open Show. Further information and details from the Secretary, Mr. G. Reynolds, 29 Marlwell Way, Wroughton, Swindon, Wilt.

Sunday, September 7: Huddersfield Tropical Fish Society Open Show to be held at Salford Heath Civic Hall. Further information from Mrs. P. Town, 187 Abbey Road, Salford, N. Huddersfield. Tel: Kirkstall 7042.

Saturday, September 13: Bristol Aquarist Society Open Coldwater Show to be held at St. Andrew Church Hall, Sandford Road, Whitland, Bristol 5. Schedules from W.G. Hart, 18 Imperial Road, Bristol. Tel: 673 77623.

Saturday, September 13: Hounslow & District Aquarist Society Open Show to be held at the Youth Centre, Cecil Road, Hounslow. Information and Schedules from Mr. T. Bonington, 2 Honeysuckle Close, Actonstone, Surrey. Tel: Weybridge 04275.

Sunday, September 14: Don't forget Hall 90 at Birmingham Gardens for Club, North or the A100. Watch this space for further details.

Sunday, September 14: Harlow Aquarist Society Open Show at Moor Hall, the Show House. Further details from Dave Bennett, Tel: Harlow 8027 275, or Peter Marshall, Tel: Epping 32314.

Sunday, September 14: Bridgewater Aquarist Society Open Show at the St. Georges Community Centre, Little Hurton, Nr. Manchester. Further details from the Show Secretary, S. Allingham, 20 Oaktree Close, Hove Bridge, Altrincham, Tel: Altrincham 827899.

Sunday, September 21: Tonbridge & District A.S. Open Show at Hodge Community Centre, Hadlow, Kent. Further details and schedules from Mrs. V. A. Fear, 5 Pollards Wood Road, Deal, Kent.

Sunday, September, 21: British Koi Keepers Society meeting at 8pm. at Conway Hall, Red Lion Square, London. New members welcome. Further information from Tony Bullock, 80 Edson Avenue, Homchurch, Essex.

OCTOBER

Saturday, October 4: South Park Aquatic (Club) Society, Coldwater International Show. Open Show for Tropical and Coldwater Plants at Wimbledon Community Centre, St. Georges Road, Wimbledon. Schedules and further information from L. & G. Gapp, 10 Chertsey Way, Beckenham, Kent.

NOVEMBER

Sunday, November 20: British Koi Keepers Society meeting at 8pm. at Conway Hall, Red Lion Square, London. New members welcome. Further information from Tony Bullock, 80 Edson Avenue, Homchurch, Essex.

Yorkshire Festival 1980



One of the super fabulous entries from last year's show.

THE Yorkshire Aquarist Festival at Doncaster Racecourse is the biggest and brightest show in the world of fishkeeping.

And this year's event on August 16 and 17 will be bigger and better than ever before.

The many attractions are legend with plenty to do and see for a family day out.

Number one attraction must be of course the superb society tableaux displays.

Hours of careful work goes into those clever, well crafted and often witty stands—and they feature some magnificent fish and tank decorations as well.

Another big boost for the show is the support they get from the aquaria trade. There are literally hundreds of yards of trade displays with equipment and fish on show and on sale.

PRACTICAL FISHKEEPING will be playing a full part again with a superb furnished tank show and exhibition.

We shall be providing a display of furnished tanks and our plant expert David Shields will be on hand to give a planting demonstration during the weekend.

And included in the plant and

furnished tank section will be a furnished aquaria show.

This show is open to any aquarist and will be for tropical or coldwater tanks.

Entry is FREE and there are several super prizes in the form of luxury tanks. The best tank in the show will win a really magnificent tank worth over £300! Anyone can enter including juniors—there will be a special prize for the best entry by a youngster.

Judging will be to special rules for this contest.

To enter the show simply fill in the entry form on this page.

Full details of the rules and specifications will be sent to every entrant.

And David Shields will be writing one of his monthly articles on the techniques of competition furnishing and how to interpret the rules—just to give newcomers to the subject a few ideas.

Full details of the prizes will be announced in PRACTICAL FISHKEEPING as soon as possible.

And we will keep you in touch with details of the rest of the show and its attractions over the next few months.

Top tank

THE 1980 PRACTICAL FISHKEEPING/AQUARIAN Top Tank Competition is launched this month.

The contest is open to all recognised societies who are staging an Open Show in 1980 after April 1.

And there is a big change in the structure of the contest this year.

Instead of having just one top tank at each show there will be three!

The Best Fish in Show will qualify for the award as will the Best Pair and the Best Breeder. All three will receive a £3 voucher donated by AQUARIAN plus a certificate.

And all three fishkeepers will go forward to the draw for a superb £250 holiday voucher at the end of the year.

The winner picked out of the hat from all our Top Tank certificate holders will receive the voucher plus £50 for his club's funds.



If your fish is a best in show like this you could win a holiday.

All clubs have to do to include the class in their show is to fill in the form on this page and send it to the address shown on the form.

Make sure it is at least one month before you show, earlier if possible. We will send you posters to use for advertising the event and the vouchers and certificates.

Don't delay now fill in your form and become a Top Tank Show.

I wish to enter the PRACTICAL FISHKEEPING furnished tank show. Please send me full details and rules.

Name

Address

Tel no.

Society (if any)

Post to Furnished Tank Show, Practical Fishkeeping
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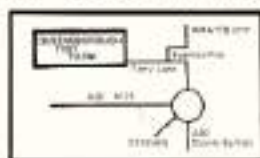
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We also sell a complete range of ponds, liners, pumps, fountains, ornaments, lilies, marginals and oxygenating plants, etc.

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Queensborough's atmosphere is unique, in fact it's a "fishy" place for "fishy" people.

Some of our customers travel hundreds of miles to visit us. We give a free oxygenating service to them to ensure that their fishes safely reach their home ponds and aquariums in perfect conditions. Our gardens are for your pleasure, and we have a private car park for your convenience.

Staffed by professional aquarists with many years' experience, who are only too pleased to assist you in any way.

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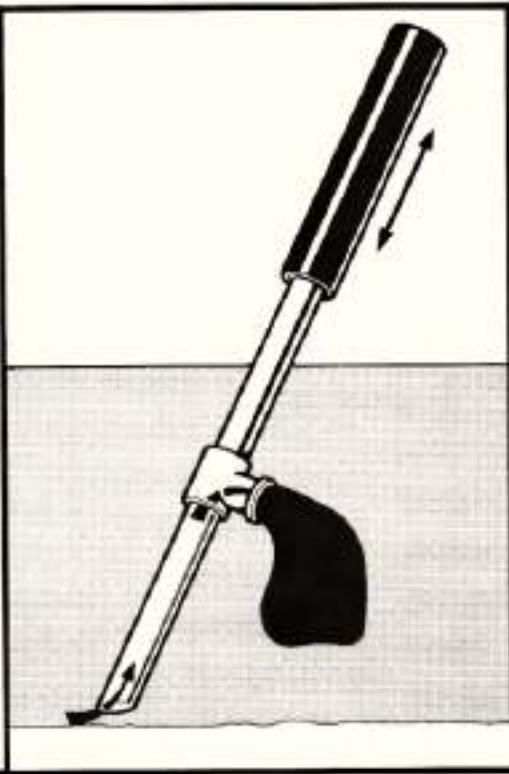
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STANDARD ALL GLASS AQUARIA

All edges smooth ground. Sizes 24 x 12 x 12 in. and over are triple sealed at the base. Polystyrene base strips are incorporated to minimise installation problems. Sizes from 14 x 8 x 8 in. to 72 x 18 x 18 in.

CLEAR VIEW TYPE DISPLAY AQUARIA COMPLETE WITH EQUIPMENT

Ideal for beginners and those who prefer to buy a complete piped and wired self-contained unit. Includes lampholders and reflector. Air pump—heater thermostat—cable tidy switch unit, also under gravel filter. High quality appearance with black plastic trim, sliding condensation lids on top cover.

CLEAR VIEW DISPLAY AQUARIA

Special construction with smear free rounded corners for high quality appearance. The design incorporates the following: Base design as for larger aquaria. Lamp pockets complete with reflectors. Accommodation for air pumps. Sliding glass condensation lids and sliding stipolyte glass covers. Black plastic trim including gravel masking. Metric sizes to suit standard lighting tubes from 1000 x 260 x 315 to 1850 x 550 x 450. Larger sizes available.

SLIDING LID HOOD AQUARIA

As standard all glass but including a removable front to back sliding lid hood. Combines neat complete unit appearance, with easy access for feeding. The front glass lid slides in plastic tracking and the rear glass lid is complete with a polished aluminium hood with black plastic ends.

LARGE SIZED AQUARIA MAINLY FOR MARINES

Incorporates laminated base strengthening, polystyrene cushioning and a partly recessed chipboard base. This design combines maximum strength, good appearance and simplifies safe installation. Sizes from 48 x 24 x 18 in. to 72 x 24 x 24 in. Sizes up to 96 in. long available.

SUPER CLEAR VIEW DISPLAY AQUARIA

As above but incorporating an obscured glass corner compartment. This unobtrusive compartment hides air lift pipes, heaters, etc. It is designed to take an Eheim submersible pump. A well tested design giving excellent water circulation and heat distribution, also isolates heaters from fish and invertebrates.

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SCHWARZER SP pumps are precision made units that are silent in operation.

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EHEIM power filters have gained a reputation for their powerful and constant performance.

They combine all the functions of filtration, circulation and aeration in a single unit and are available in sizes to suit tanks up to 1500 litres capacity. Illustrated—the 2008 immersion filter for aquariums up to about 50 litres.

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Dr David Ford is a specialist in fish nutrition and head of the Fish Research Laboratory of the Animal Studies Centre, Melton Mowbray. The 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 foods. The result of their labour has been Aquarian, 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.

WILL ALL MY TROPICAL FISH EAT AQUARIAN?

Yes. Trials at the Animal Studies Centre have proved Aquarian to be the one favourite

tropical fish food. Even finicky feeders, like Piranha, Discus and Butterfly fishes, have thrived *exclusively* upon it! The reason's simple: Aquarian has fresh meat, fish and vegetable. It's because these fresh ingredients are closer to the foods tropicals would choose in the wild that Aquarian is a more attractive diet. More than that, however, it's nutritionally right. Aquarian has all the highest quality proteins, vitamins and amino acids, essential for top class condition, in a perfect balance. Whereas traditional foods concentrate on quantity of materials and sacrifice quality, Aquarian achieves top quality in all ingredients. That's why it's healthier. And that's why it's more appetizing. Aquarian is the one flaked food all fish enjoy.

WON'T THE FRESH FOOD CLOUD THE WATER?

By cooking the fresh food into flakes we avoid this problem, achieving a food form that's perfect for all fish. Flakes float for surface feeders, suspend for middle feeders and lie

discreetly on the gravel for bottom feeders, all without clouding. And thanks to Aquarian's higher quality proteins, fish excrete less ammonia and nitrite to pollute the water.

DON'T ALL FISH FOODS HAVE FRESH INGREDIENTS?

No. Extensive trials proved quite conclusively that the world's traditional fish foods were either cereal or fish meal and meat meal based with an almost negligible fresh content.



"Aquarian flaked food a

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Aquarian, however, has fresh meats, fish and vegetables backed up by aquatic insects and added vitamins and minerals.

ARE THE COLOURED FLAKES REALLY DIFFERENT?

They certainly are! For example, the brown flakes are fresh meats, the greens fresh vegetables and so on, all nutritionally balanced. There are also correct levels of oils and fats to keep fish in peak condition. Aquarian's coloured flakes combine to make the ideal diet for all tropical fish.

WON'T THE FRESH CONTENTS OF AQUARIAN DECOMPOSE FAST?

Our airtight container guarantees you get Aquarian's full freshness. And after you've opened your container you can retain that freshness with the special resealable lid.

WHAT DO LEADING AQUARISTS THINK OF AQUARIAN?

Their reaction to Aquarian has been amazing.



They've tried it, tested it, proved it and are now endorsing it openly as the one food they can trust. And the fact is, the majority of prize winners in the national shows for the past three years have used Aquarian.

Professional fish breeders too, have been equally open in their appreciation of Aquarian's quality and reliability.

WILL IT BE TOO EXPENSIVE FOR THE HOBBYIST?

Although each container of Aquarian has the freshest of natural food ingredients balanced scientifically by fish nutritionists, and has a back up of years of research, it is no more expensive than many other foods.

IF I DO CHANGE TO AQUARIAN, WHAT DIFFERENCE WILL I SEE?

Aquarian will make all species bigger, brighter and more full bodied, and for two reasons. Firstly, because of the natural healthy freshness. Secondly, because it's an appetizing, enjoyable food. All fish find that goodness attractive.

WHAT ELSE DO AQUARIAN MAKE?

There are thirteen different fish foods developed by Aquarian, ranging in speciality from Marine fish food to Goldfish food. There are also tablet foods, pellets for pondfish and a series of seven remedies and water treatments.

Each has just as intense a research and quality control back-up as Aquarian tropical fish food.

so you can see why Aquarian is a name in fish care that you can rely on.

IF I HAVE ANY PROBLEMS CAN I CONTACT YOU?

Yes. We run a free service for all Aquarian users, including a very special guide for beginners. Write to me:-

Dr David Ford,
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Freeby Lane, Waltham on the Wolds,
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MODEL	Capacity for tanks per min	Output litres per hour	RRP	OUR PRICE
04.1001	0400	150	19.99	17.94
04.1002	0800	150	28.13	27.32
04.1003	1600	180	40.11	36.10
04.1004	3200	240	53.29	47.91
04.1005	6400	260	79.00	71.18
04.1006	12800	300	102.05	90.83
04.1007	25600	1000	233.82	207.74
04.1008	51200	1500	253.82	207.74
04.1009	102400	3000	42.99	38.70
04.1010	204800	6000	67.99	61.71
04.1011	409600	12000	102.00	92.23
04.1012	819200	24000	162.00	147.37
04.1013	1638400	48000	282.00	254.74
04.1014	3276800	96000	462.00	418.57
04.1015	6553600	192000	782.00	700.94
04.1016	13107200	384000	1262.00	1126.70
04.1017	26214400	768000	2022.00	1806.53
04.1018	52428800	1536000	3222.00	2866.36
04.1019	104857600	3072000	5022.00	4466.19
04.1020	209715200	6144000	7822.00	6866.02
04.1021	419430400	12288000	11622.00	10265.85
04.1022	838860800	24576000	17422.00	15265.68
04.1023	1677721600	49152000	25422.00	22265.51
04.1024	3355443200	98304000	37422.00	33265.34
04.1025	6710886400	196608000	53422.00	47265.17
04.1026	13421772800	393216000	77422.00	68265.00
04.1027	26843545600	786432000	111422.00	98264.83
04.1028	53687091200	1572864000	161422.00	141264.66
04.1029	107374182400	3145728000	231422.00	203264.49
04.1030	214748364800	6291456000	331422.00	293264.32
04.1031	429496729600	12582912000	471422.00	413264.15
04.1032	858993459200	25165824000	671422.00	583263.98
04.1033	1717986918400	50331648000	971422.00	843263.81
04.1034	3435973836800	100663296000	1371422.00	1213263.64
04.1035	6871947673600	201326592000	1971422.00	1733263.47
04.1036	13743895347200	402653184000	2811422.00	2433263.30
04.1037	27487790694400	805306368000	3951422.00	3433263.13
04.1038	54975581388800	1610612736000	5551422.00	4833262.96
04.1039	109951162777600	3221225472000	7851422.00	6733262.79
04.1040	219902325555200	6442450944000	10951422.00	9333262.62
04.1041	439804651110400	12884901888000	15351422.00	12733262.45
04.1042	879609302220800	25769803776000	21551422.00	17333262.28
04.1043	1759218644441600	51539607552000	29751422.00	23333262.11
04.1044	3518437288883200	103079215104000	40751422.00	31333261.94
04.1045	7036874577766400	206158430208000	56151422.00	41333261.77
04.1046	14073749155532800	412316860416000	76151422.00	55333261.60
04.1047	28147498311065600	824633720832000	104151422.00	74333261.43
04.1048	56294996622131200	1649267441664000	141151422.00	99333261.26
04.1049	112589993244262400	3298534883328000	191151422.00	13133261.09
04.1050	225179986488524800	6597069766656000	256151422.00	17533260.92
04.1051	450359972977049600	13194139533312000	346151422.00	23133260.75
04.1052	900719945954099200	26388279066624000	466151422.00	30633260.58
04.1053	1801439891908198400	52776558133248000	631151422.00	40633260.41
04.1054	3602879783816396800	105553116266496000	851151422.00	53633260.24
04.1055	7205759567632793600	211106232532992000	1141151422.00	71633260.07
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MONEY, PETROL
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MARINE, TROPICAL; COLDWATER FISH IN STOCK ALSO PLANTS

HEATERS (state wattage, please)	OUR PRICE	CODE	OUR PRICE	CODE
22-1006 Interpet HI only, Mk2, 50, 75, 100, 150, 200 W *	4.80	4.14	22-1159 TMC marine cure	
22-1012 Uno Regal—50, 75, 100 W	2.95	2.67	22-1201 Myxazin (general tonic)	
22-1016 Uno Regal—125, 150, 200 W	3.45	3.11	22-1202 Protosol (white spot)	
COMBINED THERMOSTATIC HEATERS				
22-1038 Ea Ea Control—50, 75, 100 W	5.95	5.25	22-1205 Cupressin (Diatom)	
22-1042 Ea Ea Control—150, 200 W	7.25	6.53	22-1207 Serrazin (Cope pods)	
22-1044 Interpet Super Max/Mini—125, 150, 200 W	7.70	6.99	22-1208 Serrazin P (podlets)	
THERMOMETERS				
22-1007 Gorkal thermometer, water digital	1.51	0.91	22-1211 Sea Green (plants)	
22-1001 Blue line spot Ultra	0.59	0.55	22-1213 Seawafine	
22-1002 Silver line spot	0.62	0.59	22-1215 Seachip	
22-1007 Rega digital 0-30°C	1.50	0.91	22-1217 Seachip II (air, water)	
THERMOSTATS				
22-1025 Interpet Outside *	10.00	9.00	22-1219 Aquadip (dip)	
22-1026 MK2 control internal, interpet, external control *	4.80	4.14	22-1221 Sea Salt	
22-1027 Uno 5 heat/circulator 100 W	5.54	5.91	22-1223 Tachofin	
22-1028 Uno 5 heat/circulator 200 W	6.83	6.35	22-1225 Humusol	
22-1029 Interpet inside 300 W	3.91	3.32	22-1227 Helwin	
22-1040 Thermostatic Interpet Pot/Pan	1.52	1.11	22-1229 Seakite	
LIGHTING (state wattage, please)				
22-1001 Anadia control units—14, 15, 20, 30 W *	7.10		22-1231 pH test kit	
22-1005 Anadia control units—40, 60 W *	8.99		22-1233 Nitrate kit	
22-1012 Interpet control—14, 15, 20, 30, 40 W	9.90		22-1235 Aquasol water testing kit *	
Grass/Tubes				
22-1017 2in. (60cm)	2.14		22-1237 Nitrite kit	
22-1018 18in. (46cm)	1.70		22-1238 General hardness kit	
22-1019 24in. (60cm)	2.30		22-1241 Carbonate hardness kit	
22-1020 30in. (76cm)	4.99		22-1243 Complete hardness kit	
22-1021 36in. (91cm)	3.33		22-1245 pH test kit—low range	
ROQUAQUA (Tropical)				
22-1025 12in. (30cm)	3.55		22-1247 pH test kit—high range	
22-1026 18in. (46cm)	2.75		22-1249 pH test kit—complete range	
22-1027 24in. (60cm)	3.65		22-1251 Colourimeter for colour wheel	
22-1028 30in. (76cm)	3.71		22-1253 Colour wheel for corals	
22-1029 36in. (91cm)	4.40		22-1255 Colour wheel for pH test kit, low range	
22-1030 36in. (91cm)	4.24		22-1257 Colour wheel for pH test kit, high range	
ROQUAQUA (Temperate)				
22-1031 12in. (30cm)	3.55		TETRA PRODUCTS, FOOD, ETC.	
22-1032 18in. (46cm)	2.75		22-1003 Tetrafin Staple, double 1in.	0.77
22-1033 24in. (60cm)	3.65		22-1005 Tetrafin Staple, double 1in.	1.55
22-1034 30in. (76cm)	3.71		22-1007 Tetrafin Staple, double 1in. *	3.50
22-1035 36in. (91cm)	4.40		22-1012 Tetrafin Staple, double 1in. *	16.15
22-1036 36in. (91cm)	4.24		22-1016 Tetrafin Staple, double 1in.	0.85
22-1037 36in. (91cm)	4.40		22-1017 Tetrafin Staple, double 1in.	2.85
22-1038 36in. (91cm)	4.24		22-1019 Growth food—double 1in.	0.99
22-1039 36in. (91cm)	4.24		22-1021 Conditioning food—double 1in.	0.95
22-1040 36in. (91cm)	4.24		22-1023 Super food—double 1in.	0.95
22-1041 36in. (91cm)	4.24		22-1025 Tetrafin Staple—double 1in.	0.95
22-1042 36in. (91cm)	4.24		22-1027 Tetrafin Staple—double 1in.	1.89
22-1043 36in. (91cm)	4.24		22-1029 Tetrafin Staple—double 1in.	0.45
22-1044 36in. (91cm)	4.24		22-1031 Tetrafin Staple—double 1in.	0.87
22-1045 36in. (91cm)	4.24		22-1033 Tetrafin Staple—double 1in.	2.80
22-1046 36in. (91cm)	4.24		22-1035 Tetrafin Staple—double 1in.	0.99
22-1047 36in. (91cm)	4.24		22-1037 Tetrafin Staple—double 1in.	2.31
22-1048 36in. (91cm)	4.24		22-1039 Tetrafin Staple—double 1in.	0.25
22-1049 36in. (91cm)	4.24		22-1041 Tetrafin Staple—double 1in.	0.95
22-1050 36in. (91cm)	4.24		22-1043 Tetrafin Staple—double 1in.	2.20
22-1051 36in. (91cm)	4.24		22-1045 Tetrafin Staple—double 1in.	1.10
22-1052 36in. (91cm)	4.24		22-1047 Tetrafin Staple—double 1in.	2.20
22-1053 36in. (91cm)	4.24		22-1049 Tetrafin Staple—double 1in.	1.39
22-1054 36in. (91cm)	4.24		22-1051 Tetrafin Staple—double 1in.	2.49
22-1055 36in. (91cm)	4.24		22-1053 Tetrafin Staple—double 1in.	1.59
22-1056 36in. (91cm)	4.24		22-1055 Tetrafin Staple—double 1in.	0.89
22-1057 36in. (91cm)	4.24		22-1057 Tetrafin Staple—double 1in.	3.05
22-1058 36in. (91cm)	4.24		22-1059 Tetrafin Staple—double 1in.	2.40
22-1059 36in. (91cm)	4.24		22-1061 Tetrafin Staple—double 1in.	0.84
22-1060 36in. (91cm)	4.24		22-1063 Tetrafin Staple—double 1in.	1.37
22-1061 36in. (91cm)	4.24		22-1065 Tetrafin Staple—double 1in.	2.79
22-1062 36in. (91cm)	4.24		22-1067 Tetrafin Staple—double 1in.	0.99
22-1063 36in. (91cm)	4.24		22-1069 Tetrafin Staple—double 1in.	0.44
22-1064 36in. (91cm)	4.24		22-1071 Tetrafin Staple—double 1in.	0.80
22-1065 36in. (91cm)	4.24		22-1073 Tetrafin Staple—double 1in.	0.35
22-1066 36in. (91cm)	4.24		22-1075 Tetrafin Staple—double 1in.	0.47
22-1067 36in. (91cm)	4.24		22-1077 Tetrafin Staple—double 1in.	0.37
22-1068 36in. (91cm)	4.24		22-1079 Tetrafin Staple—double 1in.	0.44
22-1069 36in. (91cm)	4.24		22-1081 Tetrafin Staple—double 1in.	0.79
22-1070 36in. (91cm)	4.24		22-1083 Tetrafin Staple—double 1in.	0.39
22-1071 36in. (91cm)	4.24		22-1085 Tetrafin Staple—double 1in.	0.29
22-1072 36in. (91cm)	4.24		22-1087 Tetrafin Staple—double 1in.	0.35
22-1073 36in. (91cm)	4.24		22-1089 Tetrafin Staple—double 1in.	0.35
22-1074 36in. (91cm)	4.24		22-1091 Tetrafin Staple—double 1in.	0.35
22-1075 36in. (91cm)	4.24		22-1093 Tetrafin Staple—double 1in.	0.49
22-1076 36in. (91cm)	4.24		22-1095 Tetrafin Staple—double 1in.	0.28
22-1077 36in. (91cm)	4.24		22-1097 Tetrafin Staple—double 1in.	0.35
22-1078 36in. (91cm)	4.24		22-1099 Tetrafin Staple—double 1in.	0.31
22-1079 36in. (91cm)	4.24		22-1101 Tetrafin Staple—double 1in.	1.21
22-1080 36in. (91cm)	4.24		22-1103 Tetrafin Staple—double 1in.	4.48
22-1081 36in. (91cm)	4.24		22-1105 Tetrafin Staple—double 1in.	3.48
22-1082 36in. (91cm)	4.24		22-1107 Tetrafin Staple—double 1in.	0.77
22-1083 36in. (91cm)	4.24		22-1109 Tetrafin Staple—double 1in.	1.85
22-1084 36in. (91cm)	4.24		22-1111 Tetrafin Staple—double 1in.	0.87



BOOKS recommended from our large selection

Beginners Aquarium Digest (Tetra)	0.45
Wang Encyclopedia of Tropical Fish by K. Seger	4.95
Marine Aquarium in Theory and practice by	7.95
Complete home aquaria	4.95
Garden Ponds	1.25
Goldfish and Koi in your home	5.95
The Practical Encyclopedia of Fishes	2.95
Aquarium Plants (Brimmer)	3.95
Decorate	1.15
Catfishes	2.50
How to Keep and Breed Tropical Fish	3.75
Cichlids	0.77
Aquarium Plants	1.58
Practical Marine Fish—Volume 1, 2, per vol.	12.95
Fresh & Saltwater Fishes of the World	7.95
Lotus Garden Catalogue (indivisible)	35
British Flower Plant Catalogue	40

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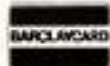
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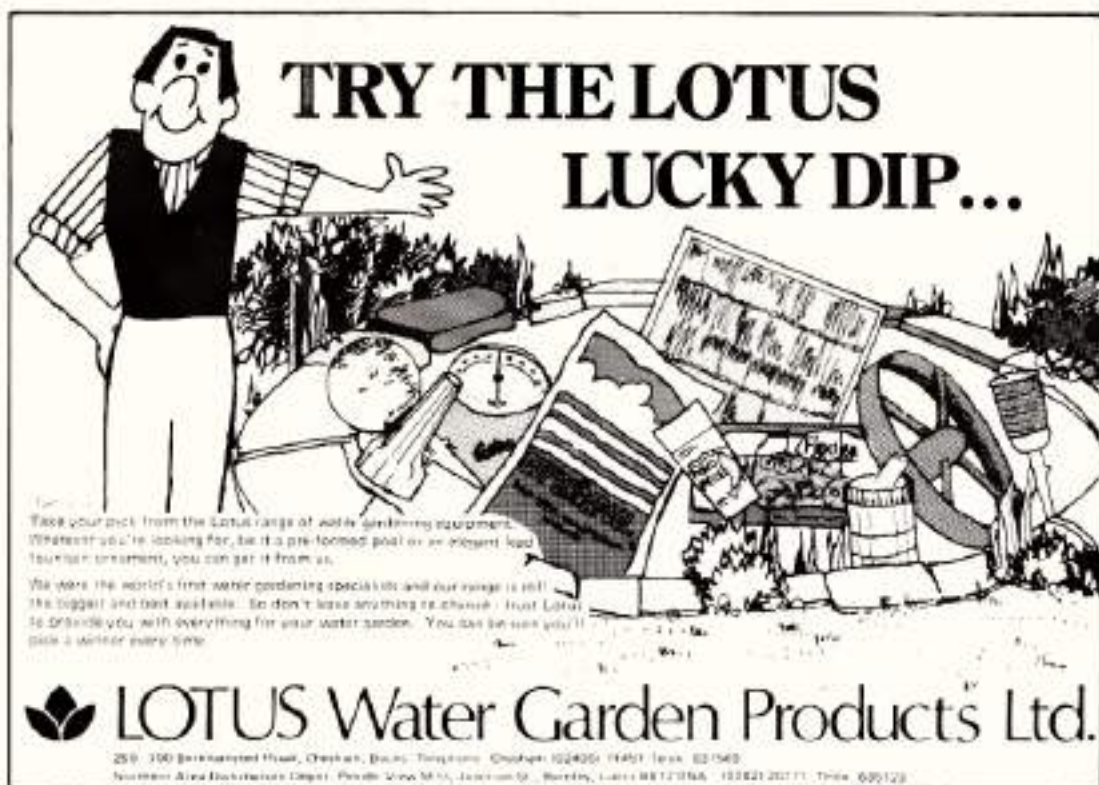
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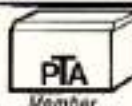
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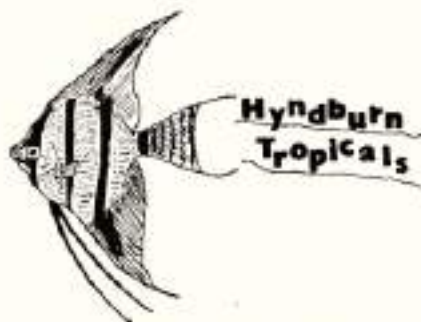
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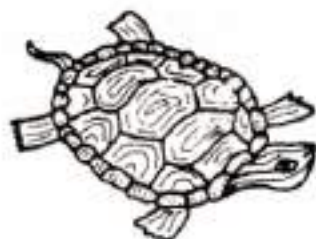
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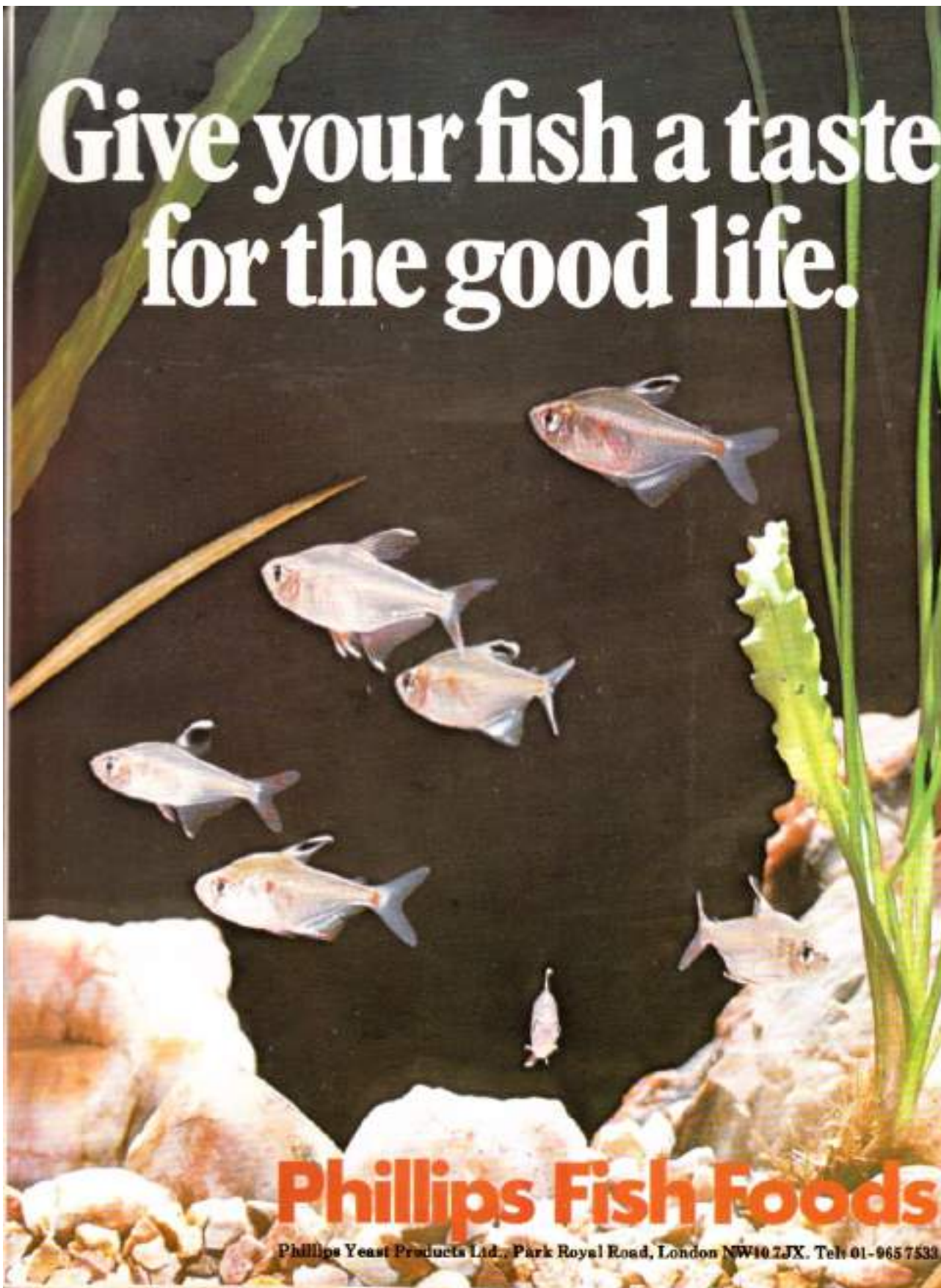


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