

The Aquarist

and Pondkeeper

JUNE 1963



MONTHLY
Vol. XXVIII No. 3

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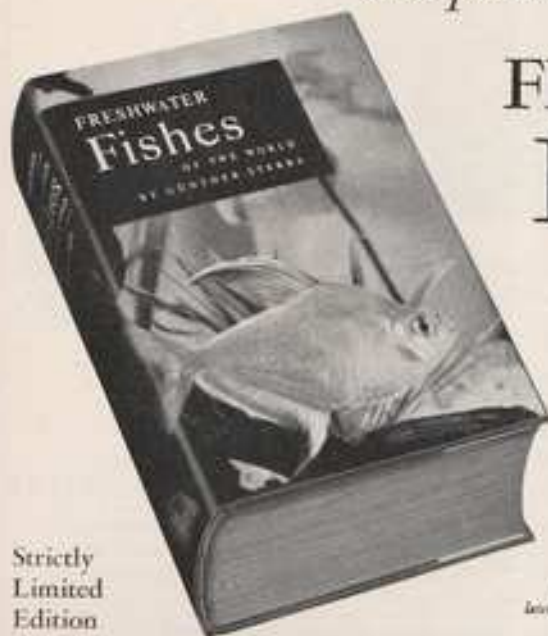
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By Professor
GÜNTHER STERBA

*Director of the Zoological Institute,
the Karl-Marx University of Leipzig*

Translated and revised by
Dr. DENYS W. TUCKER, D.Sc., M.I.Biol.,
Lately Assistant Keeper (Fish Section), British Museum (Natural History)

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Goldfish Breeding

by C. E. C. COLE

MANY years ago I was acquainted with a parks' superintendent who was extremely proud of the fact that during a period when goldfish were almost impossible to obtain, those in the ornamental pond in his beautiful park were doing extremely well. Anxious to obtain commendation for initiative and enterprise, he decided to provide sufficient fish for all the needs of his area by helping those in his care to increase.

To do this he waited patiently until he saw one or two fine specimens of females well swollen with eggs, netted them out of the pond and kept them entirely on their own so they could raise the expected babies without interference!

He, at least, knew the difference between male and female goldfish. Many pond-owners and goldfish-keepers are not sure even of this. They take over or construct a fair-sized garden pool, plant a few lilies and 'oxygenating weeds', purchase a very mixed bag of goldfish, tip them into the water and—the job is finished for all time. They have no idea whether their fish are strong and healthy or weak and diseased or pest-ridden.

Occasionally the fish increase in number. More often (particularly after such a severe winter as the one we have just come through), all stock needs replacement. And small wonder! Let us look into the pond world of the goldfish. To the student this is a fascinating, absorbing world—the world into which your female goldfish ejects her eggs.

Nudged and buffeted by excited males, the females are pushed and chased amongst the reeds, releasing a stream of amber hued, separate, semi-adhesive eggs (each about the size of a large pinhead), which stick to whatever solid object they reach first. The males emit a milky fluid called milt, containing millions of sperm which enter and fertilise as many eggs as they can find. The potential number of fertile eggs is astronomical—if all those thrown by a single female during the breeding season were able to reach maturity, the pond would be solid with fish.

A high proportion, however, are never even fertilised. The sperm miss many, and these are doomed from the start. Then in the wake of the breeders come the fish that were not breeding; with keen senses of sight and smell

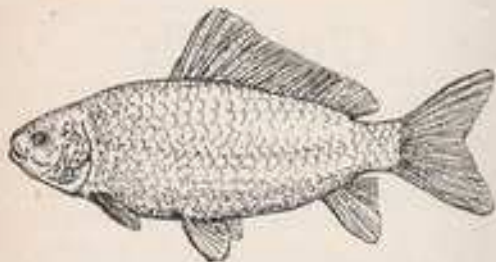
they consume as many of the eggs as they can get. And after the fish come a host of smaller egg-eating creatures which I will discuss in a later article.

Within 4 to 10 days of fertilisation (time depends upon temperature of the water) the surviving embryos burst from the softened membranes of the eggs. They wriggle free and hang suspended like quarter-inch splinters of glass from plants or rocks. They barely make any effort to move. Independent of external food supplies, they absorb the nourishment contained in their yolk sacs, and wait for the development of their swim bladders, the organs that enable them to control their movements.

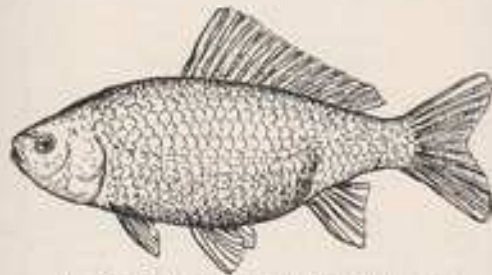
It is during this brief period that they are most vulnerable. Prey to infestation by surface parasites—such as the gill flukes—and at the mercy of all other fish, including

The first and most obvious step is to restrict your adult fish to those most nearly approaching your ideal. Take a single pair embodying all you like best, and breed from these. Save as many of the young fish as you can until you see their potentialities, and raise only those showing the greatest promise. That is the procedure in a nutshell, but it is not so simple as it sounds. If you spawn the fish under natural conditions the chances are that very few youngsters will survive a single season, and you will have no say as to which should do so and which should be disposed of.

You need lots and lots of fry from which to choose, and I intend to tell you in my next article how you can get them, in conditions where they stand a good chance of escaping the normal hazards of existence.



Male goldfish showing tubercles on the gill cover



Female goldfish with abdomen distended with eggs

their parents, it is a marvel that any escape at all. Those that do, provided that they can find a sufficiency of food and there are no violent sudden changes of temperature, will make satisfactory progress during the summer months.

With the approach of autumn and winter, however, comes further dangers. The drop in temperature causes appetites to begin to fail, and this alone can be very weakening. Then lots of leaves will drop into the water, first keeping out light and afterwards adding poisonous by-products of decomposition as they lie on the pond bottom. Many of the aquatic plants will also begin to die down, adding their quota of pollution. The fish can move nearer the surface of the water, but they seem to prefer the depths. Finally they have no choice—the surface of the water freezes and seals them out of contact with atmospheric air. The oxygen supply cannot be sufficiently replenished, the water becomes really foul and death ensues. If the pond freezes solid quickly enough some of the fish might be saved, remaining in a state of suspended animation until thawed out.

In spring the ice melts and any survivors are able, if not too weakened by their experiences of the winter, to partake of the abundance of suitable live food once again present in their environment. They are also subject to fresh attacks by their many enemies, who are taking advantage of favourable conditions to increase in numbers.

So there you have it—some details of the perilous journey of goldfish from egg to adult when raised under "natural" conditions in outside ponds or pools.

The natural hazards are not the only objections to indiscriminate spawning, however. The shape and condition of the fishes can be improved by selective breeding.

Serious minded breeders have compiled ideals at which to aim when breeding goldfish. Whereas you may not agree that the ideal shape they like is the most desirable one it is well to take note of the best procedure to adopt to produce an increased number of fish of the shape you prefer.

Siamese Fighting Fish

HOW reliable is the white 'egg' beneath a fighting fish's abdomen as a guide to the sex of the fish?

What is the age at which fighters will breed? Are white eggs from a fighting fish dead ones? How can the breeder determine the earliest safe time for the male fighter to be taken from the breeding tank after the eggs have hatched? What can be done to save fighter eggs in a deserted bubble nest? Will one male look after the eggs of two bubble nests? Is it possible to breed a pure strain of blue fighters? What causes the brilliant colours of the fighting fish?

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Rearing the Fry of Cichlids

by ROBIN SANDERS

FEW people would disagree that breeding a pair of adult cichlids, and witnessing the devoted attention shown by the parents towards their young, is one of the most satisfying achievements an aquarist can experience. It is equally rewarding, however, to raise these youngsters to maturity, and I feel that it is not until he has done this that the aquarist can feel a real sense of achievement.

Most varieties of fishes present their own particular problems as far as breeding and rearing are concerned, and cichlids are no exception. With cichlids there are two extremely important factors to consider. Spawnings are usually large, and may run into many hundreds, and the fry grow rapidly and need ample space in which to develop. This calls for an abundance of food, especially live food, and also for spacious tanks. For the purpose of analysing the development of these youngsters, it will be convenient to divide the process into four stages.

Stage 1

This stage begins at the time when the young fry first become free-swimming and have absorbed their yolk-sacs. With the large cichlid fry, such as *Cichlasoma bicellatum* (Jack Dempsey) and *Herichthys cyanopomata* (Texas cichlid), this stage does not apply, as the fry will be large enough to start on Stage 2. But with the smaller and medium fry, such as those of *C. nuchii* (firemouth), *Aequidens paraguayensis*, *Aequidens latifrons* (brown and blue acaras), it is necessary to start them off on a fine preparation, such as hard-boiled egg yolk, mixed to a smooth cream with a small quantity of water. This stage will last only for 1 or 2 days, until the fry are able to cope with live shrimp in Stage 2. It is unnecessary to culture Infusoria, as the fry prefer a larger form of food such as that just mentioned.

The quantity of feed should be small, but given frequently. Three or four times a day is not too often, but care must be taken not to overfeed, as this may lead to the water becoming polluted, and the entire batch of fish being lost. The exact quantity to give can only be learnt from experience, and I learnt the hard way! My fault was in overfeeding, not in underfeeding. The secret is to give small quantities often.

Stage 2

This is the live shrimp stage. I believe brine shrimps to be an essential with young cichlids. The fry love it, and grow rapidly if they are fed often. Their swollen pink stomachs are an indication of whether or not they are feeding well. It is also a very successful way of caring for the large numbers of fry.

Brine shrimp eggs can be purchased from nearly all dealers, and should be hatched out in an open dish. At 80°F (27°C) they will take only 24 hours to hatch, and so feeding can be done once a day, the shrimps being siphoned off and collected by filtering them through a piece of linen or muslin.

The live shrimp stage will last for a couple of weeks until the fry are large enough to graduate to the third stage. An exact number of days would be misleading, as it depends entirely on the size of the fry and the many factors influencing their rate of growth, but about 14 days is normal.

During this stage the diet should be varied by feeding with portions of finely powdered dried foods, or, in the early days, continuing also with the egg solution mentioned

above. If this is not done, the continued feeding of live shrimp will adversely affect the fish because of its salinity, and they may die. This is one of the few disadvantages in feeding with live shrimps, and one that can easily be avoided. One daily feeding of live shrimps, and one of dried food, is a fairly reliable guide.

Stage 3

This is about 3 weeks from when the fry are free-swimming. By now they should be capable of eating finely chopped *Tubifex* and white worms, and once doing so they should be encouraged to continue. These worms can easily be cut to a manageable size with an old pair of scissors, and a good feed of one or the other should be given every day. My particular routine is to feed the fry twice daily. In the morning they receive dried food, and in the evening chopped *Tubifex* (on 3 days of the week), and white worms (on the other 2 days).

Not surprisingly the fish are now beginning to put on weight, and it is at this stage that they really begin to be miniature versions of their parents.

Stage 4

At about the 6 weeks stage it is no longer necessary to chop the worms, and the young fish can be seen wrestling with full length *Tubifex* worms. This is a milestone on their path to maturity, for it now means that their mouths are large enough to consume small scraps of meat, and their diet can be varied accordingly. I have an order for a regular supply of fresh minced beef which I find very successful, both for young fish when cut up finely, and for full grown specimens in larger pieces. Particularly during last winter, this food has been an excellent substitute for garden worms.

This is the last stage, with the tank no longer full of fry, but of young healthy fish, only too anxious to eat their way through all the *Tubifex*, white worms and raw minced beef that the aquarist can obtain. From now on this will be their main diet, but with a corresponding increase in consumption as they continue to develop. It is perhaps fortunate that their favourite food is the common garden worm. Once again, with a pair of old scissors the garden worm can be cut into appropriate portions for all sizes of fish, right down to our youngsters at Stage 4. The only cost involved is in the physical effort entailed in going to the bottom of the garden to dig for worms!

Take Eggs from the Pond

IF bunches of water plants have been provided for the fishes to spawn on they should be removed when a good number of eggs are seen to be attached to them. The bunches can be replaced by fresh ones and those with eggs can be placed in hatching tanks. The water should be warmed up if possible as this brings a quicker hatch. The time taken for goldfish eggs to hatch depends entirely on the temperature of the water. If it is 70° to 75°F the eggs will hatch in 4 days. If at 65°F they can take a week, and if in the fifties they can take a fortnight to hatch. A fairly quick hatch means that the eggs are less likely to be attacked by pests whilst development is taking place.

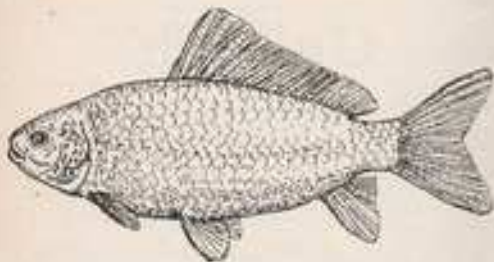
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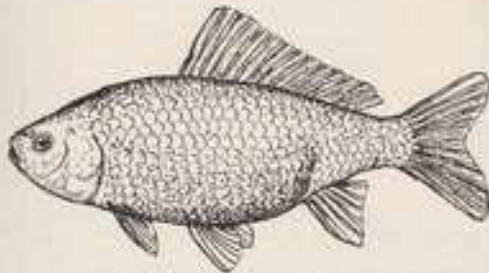
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This is about 3 weeks from when the fry are free-swimming. By now they should be capable of eating finely chopped *Tubifex* and white worms, and once doing so they should be encouraged to continue. These worms can easily be cut to a manageable size with an old pair of scissors, and a good feed of one or the other should be given every day. My particular routine is to feed the fry twice daily. In the morning they receive dried food, and in the evening chopped *Tubifex* (on 5 days of the week), and white worms (on the other 2 days).

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Assessment of Finnacle

by FRANCIS BARRATT

THE fourth character to be assessed in judging is finnage, which can receive 20 points. After the complications of judging colour this part is comparatively easy; firstly because most photographs of fishes are in profile and whether colour or monochrome makes no difference; secondly because there are many line drawings in profile which cover nearly every species that appears on the show bench. These line drawings have a big advantage from the judge's point of view, in that they almost always show the fins spread and of the correct size and shape. I refer here to the drawings that appear in books, or are copied from the originals which were made for scientific purposes when suitable photographs were not available.

In most classes which appear before us there will not be a great deal of difference in the fins of individual entries within the class. A class of barbs will have perhaps one or two of the species in which the males have filamented dorsal fins. There is perhaps a little more variety among the characins, anabantids and cichlids, and still more among the livebearers. This latter is partly because the livebearers have been subjected to the attentions of the specialists in breeding new fin shapes to a rather greater degree than any of the other tropical classes.

However, there are slight variations in shape of dorsal, caudal and anal fins of even closely related species, and it is our duty as judges to learn all these variations to the best of our ability, and to keep up to date with new species as well as retaining our knowledge of the older ones.

It is easy to forget details of fin shapes among those species we have not seen for some time, and we may find ourselves wondering if this barb should have a pointed or round tip to its dorsal, or that cichlid the extended rays of dorsal, anal or ventral fins. We can only be really competent judges if we keep up with our studies, constantly going back over all the books as well as seeing live fishes so as to refresh our mental image of the ideal.

As in body shape, there will be a difference in size, shape and proportions of fins between fish of any one species. This corresponds with the variations in length of limbs in humans, and is natural. There is, however, a tendency to greater variation towards sub-standard finnage amongst those species which have for long been bred by aquarists from "domesticated" stock.

What we must look for is a set of fins which are better than average in size and shape before we give full marks. We cannot just divide the 20 points into so many for dorsal, so many for caudal etc., as do the specialist societies for their special shapes, because in many cases the comparative value of fins varies. We must look at each fin separately for faults of shape, formation of rays, presence or absence of filaments and for alignment. Not all fins are set on the body straight. Some have malformation of main supporting rays. Many have tips missing in such a way that it can be difficult to decide whether it is due to injury or the way it has grown.

If we decide it is injury, we ignore the fault for now, but take notice of it again when judging condition. If we decide this fin has developed in this shape contrary to the

ideal, then it may be treated as rather more serious, being an inherent fault. When each fin has been examined we take them as a whole and look for "balance". Generally speaking a fish will look better with all fins slightly small than with a normal tail when the others are bigger than average.

Here again is where we can use the formula as for "body" and "colour" to assess the points value. Finnacle that is of average good size and shape, with no visible faults, is worth 15 or 16 points, leaving the extra points for those with better development of size and shape, which are so desirable. The practice of first using one of the categories "Excellent", "Very good", "Good", "Fair", "Poor", "Very



Photo:

Country Express

Assessment of an exhibition specimen of *Leporinus* is made by members of the Stratford and District Aquarists Society at their recent open show

"Poor" and "Bad", and converting this into points is very helpful and saves time.

Some of the faults we have to look for are the less obvious ones of missing or abbreviated filaments of tail, dorsal or ventral fins, and in some cases the anal fins. These filaments are not quickly regrown if nipped off during early development and sometimes they show a kink at the point at which new growth begins. Angel fish should show these filaments at top and bottom of tail fin, at least the length of the normal part of the fin; so should the firemouth cichlid and several others. Most medium sized cichlids have the long tapering dorsal fin, which, in the male, end in a single ray.

In most of these cichlids there should be some matching between dorsal and anal fin, with the anal being slightly shorter. Angels, however, have only the anal fin pointed, as opposed to a nicely rounded tip to dorsal.

All the gouramis and most other anabantids have the extensions to ventral fins, in most cases there being no

Continued on opposite page

Knife Fishes

AMONG the interesting families of fishes that differ somewhat from those with which we are familiar is the knife fish family, the name being a reference to their shapes, which come from the South East Indies and Africa.

They have the facility of swimming backward as well as forward without any apparent difficulty, and travel as though they were operated by reverse as well as forward gears. This enables them immediately to retreat from any dangers which may confront them. The operative mechanism for this purpose is the anal fin, which runs practically the whole length of the underside of the body into the caudal fin.

They have large mouths with very many small teeth and are small scaled. They also have a larger swim bladder than most fishes and are able to take air from above water. They are not generally regarded as shoal fish and tend to travel on their own.

Because of their size, which I will describe below, it is better to keep only the smaller specimens in aquaria, which should not be too well lit, be profusely planted and should also have hiding holes, into which these fish will "back-pedal" and keep watch from the opening. Soft peaty water is recommended for their aquaria. They prefer somewhat higher temperatures than normal and these should be 76° to 84°F (24° to 28°C). They prefer all live foods and are usually voracious eaters.

Provided that they are not too large, they will make good community fish if all other inmates of the tank are of similar size, and should never be kept with smaller fishes.

I can recall seeing some specimens in 1951 at the British Aquarists' Festival in Manchester, which belonged to Mr. A. Fraser-Brunner, who used to delight in showing their back-peddling abilities.

The three main species of this family available to aquarists are the following.

Notopterus afer. This is usually found in the Gambia River to the Congo and in Nature specimens are recorded as being up to 24 in. (60 cm.) in length. They have a very flat body with a dorsal fin resembling a small flag. This species has no ventral fins. Young fish are usually a soft red or yellow in background colour, cross-crossed with a fine network of lines. Sometimes dark spots are also present. Older fish are usually violet brown.

Notopterus chitala. These are usually found in Siam and Burma and differ from *N. afer* in having small ventral fins. They can be larger than *N. afer* and reach 30 to 33 in. (75 to 85 cm.). It is, however, more usual to find specimens of 15 to 17 in. (40 to 45 cm.). The ray count on the anal is usually 45 to 50 rays.



Photo

Lorraine E. Perkins

African knife fish (*Notopterus*)

In young fish the background colour is chocolate brown with fine worm-like lines on the underside. Half-grown fish are velvety black-brown in colour, and older fish are usually silvery with dark spots running into the anal fin. *N. chitala* is not recommended as a good community fish.

Notopterus notopterus. This is perhaps the most handsome one of the trio. It is found in India, Burma, Siam, Java and Sumatra and when full size is rarely more than 13 in. (35 cm.). It is much smaller scaled than the two other varieties, particularly on the gill plates. Its usual colour is a grey silver with a darker silvery top to its body. The dorsal fin has a white tip, and the anal fin has a dark rim to it. The iris of the eye is a bright gold and in fact the fish is quite an attractive fellow.

Knife fish are of some importance to the natives in the areas where they are found since they are edible and are considered quite a delicacy.

R. O. B. List

Assessment of Fintage

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normal fin, just the "feelers". Where the extensions occur in the cichlids, however, it is just the front rays of a normal fin that are twice as long as the others. The exception, again, is the angel fish, where the soft rays are absent. Most panchax fishes of the genus *Apocheilichthys* and some of *Epiplax* are other examples.

When these single filaments are missing there is obviously very little missing in proportion to the mass of all the fins, and it is difficult to decide how many points to deduct. No matter how good the rest of the fintage, an

angel or firmouth without the tail filaments, *Apistogramma faszinski* without the dorsal filaments, lined panchax without ventral extensions, or gourami without the long feelers, could not be called excellent or even very good. The number of points deducted therefore must seem high considering the size of the fault. It is a matter of that little bit extra which is the finishing touch, and which is therefore of comparatively great importance.

No one can tell us how many points to deduct for any given fault; it is something that we have to decide for ourselves on the basis of whether we think it reduces "excellence" to "very good", "good" or something lower down the scale. Only our own experience can tell us what category to use.

Setting up the Tank

by A. BOARDER

THERE are several different ways of setting up the aquarium, according to its purpose. The tank for exhibition work is not intended to be permanent and so it requires special treatment. The tank for breeding, perhaps in a fish house, also needs special attention. But first I am going to consider the tank that is to be kept in the house as an ornament and point of interest.

For the tank in the house, which can remain for many years, I consider that some under-compost soil is essential. Planting in pure gravel is not likely to bring about speedy results. No one would think of planting specimens in the garden in a heap of stones, and so it must be realised that if decent growing plants are to be present, a little soil should be included for a start. Once the tank is inhabited by fishes their droppings will make nourishment for the plants, but something must first be added for their benefit. I suggest that some old turf be placed in the bottom, towards the back. If this is unobtainable, John Innes peat compost no. 1 will do. There is very little added fertiliser in this, just about a quarter of a pound to a bushel of compost, and so the small amount needed in the tank will not contain anything likely to be harmful to the fishes.

Soil, Sand and Rocks

Place the soil up to 2 inches deep at the back and graduate it to nothing tight at the front. Then add the ordinary aquarium gravel (compost) so that the soil is well covered, but do not allow any to come above the front frame. If you do there will be so much of the finished picture blocked out. The compost should be well washed and I think it is an advantage to have it fairly coarse, like washed grit. If a type of rock is to be used it will look better if the compost matches it as much as possible. Crushed rock will often make a good covering to the ordinary compost.

Rocks are not essential for the well-being of the fishes, but they can certainly add to the attractiveness of the tank. One wants to create a living picture, although perhaps not like a pond in the wild, as this is probably very foul and ugly at the bottom. The idea should be to make a picture which will instantly attract the attention of anyone entering the room. I have yet to find any person who can enter a room where there is an attractive tank without going straight over to it and admiring it.

Arrangement

Country scenery is very ordinary if flat, but with either hills or small undulations the scene is improved out of all recognition. Therefore the introduction of a few well chosen rocks should enhance the beauty of a tank. Do not have too many as you will only be robbing the fishes of swimming space. See that there are no points or sharp edges that could injure a fish. Do not use any type which will disintegrate in the water or release harmful lime. The type known as Westmorland rockery stone is very good, or well-washed large stones from a river. Try to arrange the rocks in a natural formation. Do not place one huge rock mid centre with one on each side equidistant. Start with a fairly large one to one side and then continue with two

or more in a smaller size; this will look far better. If a platform is desired at one end, this can be made with large flat stones with a little gravel on top. This breaks up the flatness and can be made to look very fine. Do not have the rocks too close to the front of the tank nor yet too close to the back glass, where they could form a trap for the fishes.

Don't be in a hurry to place your rocks, but try them out in several positions before deciding on the best one. Remember they may be there for many years.

Water Plants

There are many coldwater plants obtainable now but I do not think that it is a good idea to include too many kinds. If you do it is possible that the stronger growing ones will gradually choke out the weaker growing ones. For the 24 in. by 12 in. by 12 in. tank about four kinds will be sufficient. The first choice should be *Sagittaria natans*. This seems to last almost for ever. My own tank was planted with some 16 years ago and these plants are still in good order and have not had to be replaced. Any extra shoots or runners not required can be removed quite easily. Try to hide the back frame and ends of the tank, and keep the middle front clear. Another fine plant is *Hydrophila*. Although this is not allowed in an exhibition tank by the Federation of British Aquatic Societies, I consider it to be one of the best plants for decoration. The pale green leaves are very attractive. The plant resembles a smaller leaved *Ludwigia*, but is greener. Some hair grass (*Eleocharis acicularis*) is good for planting just in front of one of the rocks. For the back some plants of *Egeria densa* and *Lagarosiphon major* can be used. These grow very well but must have some pruning now and again as they become rampant. A little *Fountainia antipyretica* can be added near the front. See that any roots are carefully set under the gravel so that they can become established in the soil below. Remember that the plants will soon grow and so do not plant them too thickly.

It is well to have the tank about half-filled with water whilst planting, and then it is gradually filled when planting is done. If a small piece of flat wood is included to pour the water on, the gravel etc. is not disturbed. Now draw a sheet of paper along the water surface to remove any dust or scum. It may be necessary to empty the water out and refill to ensure that the tank looks perfectly clear. If needed, a little duck weed (*Lemna*) can be placed on the surface, as fishes like to eat this occasionally, but see that it does not become too overgrown or it will shade out the light from the lamps.

Now leave the tank in a good light position or put the lights on for a few hours each day. The water plants will then become established before any fishes are added. If you can root any plant cuttings in a jar containing some earth as well as water they will get going far quicker than if they are just pushed into the gravel, where the ends may rot off and the cutting fail to grow.

The next article will deal with the choice of fishes for the tank.



Easy to install are the fibre-glass ponds such as the Leedale (Charplex Engineering Co.) illustrated here. Paving or rocks are used to conceal the edges of the sunken pond.

DURING the last few years manufacturers have been devoting a great deal of research and initiative to the development of a range of ready-made ponds, in a variety of synthetic light-weight materials. The sales potential of their products is enormous, not only to keen coldwater fish fans, but also to the average garden-conscious person who would like the luxury of a garden pool, but lacks either the enthusiasm or the capacity for hard labour necessary to build a concrete pool.

Portable ponds are made from four main materials: 1, heavy-grade polythene; 2, heavy plastic; 3, fibre-glass; 4, Fibro-glass.

Heavy-grade Polythene

Polythene sheet for garden pool construction is usually of 500 gauge, although heavier material of 1000 gauge is also available, and obviously the thicker the better must be the rule when dealing with flexible materials. It is available in blue, black and transparent colours; black is to be generally favoured because its surface is non-reflecting and provides a neutral background for viewing the inhabitants. I remember seeing a transparent polythene pool with a grand growth of dandelion and chickweed luxuriating under the side walls; although somewhat attractive, it did look decidedly odd to say the least!

Polythene sheet is in standard widths, up to 144 in., and of unlimited length. It has been tested by one of the foremost aquatic plant nurserymen in the country, who uses it extensively for his own work and recommends it to his customers.

Polythene may suffer mechanical damage, if for instance a large piece of rock is knocked inadvertently from a rockery by the side, but such accidents are rare and, in any case, puncture repair outfits are available to repair a small hole or tear.

A minimum life of around 5 years can be expected from a correctly installed polythene pool, and even when it does start to deteriorate, it is a simple operation to add a liner and waterproof your pond once again.

Other advantages: 500 gauge polythene costs 7s. 6d. a

"Instant Ponds"

by BARRY R. JAMES

yard for sheets 144 in. and a ready-made pool with seamed corners 5 ft. by 3 ft. by 10 in. costs around 30s. This is by far the cheapest way of making a pool. Polythene ponds can be either formal or informal and can be made with a sufficient depth for the tallest growing lilies and for the fishes to be able to winter successfully below ice level.

Disadvantages: (1) Care must be taken during installation to prevent air pockets and unsightly creases forming. (2) It may be difficult to retain the shape of the sides and prevent them caving in if the soil is crumbly. (3) If the pond is built too near to large trees it is possible that roots may cause damage to the sheeting.

Plastic Pools

The fact that the ponds made to house the sailing craft at London's boat show are made of plastic should be a sufficient testimonial to the worth of this type of material for holding water in large quantities. The plastic used is extremely thick and durable, and it is difficult to pierce by accidental means. Plastic ponds are usually offered already shaped in standard sizes up to 10 ft. in length, but larger sizes can be made to order if required. Another attractive feature offered by one manufacturer is the insertion of cyclet holes along the edges. With the metal stakes supplied, the pool may be staked out during installation, which helps enormously, and enables the whole operation to be carried out by one person. These ponds are flexible and, with the instructions supplied by the makers, informal or formal shapes can be attained.

Although these ponds are more expensive than polythene in my view the extra cost is justified. A 10 ft. pool costs around £10 10s.

Fibre-glass Pools

Fibre-glass is widely used for car and boat bodies because it is light, easily moulded to any desired shape and is virtually indestructible. It is also waterproof and this, combined with the other advantages, makes it an excellent material for pool construction. Fibre-glass ponds are obtainable in many shapes and sizes and usually have ledges and marginal pockets incorporated. Its toughness enables it to sustain severe blows and attacks from frost and ice. The models I have seen offered so far usually have a large surface area but are too shallow (around 15 in. at the deepest part) to enable them to accommodate any but the dwarf growing varieties of water lilies, and during the last severe winter I saw several ponds frozen down to the bottom, resulting in the premature demise of the inhabitants.

However, this apart, fibre-glass ponds have an indefinite life and can be easily dug up and transported if by any chance you have to move house. Placing them in position is simplicity itself in any soil; all you need is a shovel and a spirit level.

Fibre-glass ponds are very expensive. A 10 ft. pool will cost close on £30, although smaller models can be had for

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Skinks for the Vivarium

by ROBERT BUSTARD, B.Sc.

Photographs by the author

SKINKS form a large group of some 400 species with a wide distribution on all six continents, although in Europe the number of species is limited. Representatives of four diverse genera have been selected for this article. In 1959 (*The Aquarist*, 23, 236) I wrote, "The smaller skinks are easy to keep"—this article covered popular African *Mabuya* and American *Eumeces* species.

Schneider's skink (*Eumeces schneideri*) from North Africa is a particularly handsome species although subject to colour variation over its extensive range. The back possesses numerous bright brick-red markings on a chocolate ground, the sides are yellowish and the ventral region is grey-white. As the photograph shows, this is a sturdy species but the limbs are small for the size of the animal, as is characteristic of skinks which are thought to be following the evolution taken by snakes in becoming limbless. There are, however, degenerates (i.e., limbless or with reduced limbs) in many lizard families.

Eumeces schneideri is often sold as the Algerian skink, which is likely to cause confusion with *Eumeces algeriensis*, which requires similar treatment in captivity. The vivarium for Schneider's skink should have a floor area of about 36 in. by 24 in., as although not very active it is a large species. My specimen (illustrated) measured between 15 and 18 inches and was still growing. Specimens possibly reach 2 feet in total length although once again there is



Rainbow or blue-tailed skink from southern Rhodesia



Schneider's (Algerian) skink, a docile and beautiful lizard growing to about 2 feet in length

much variation. The vivarium had a 3 inch layer of coarse sand and two slabs of bark as basking sites and hiding places. A small dish of water was sunk into the sand and a temperature of at least 77°F (25°C) and sometimes 86°F (30°C) was provided by means of light bulbs during the day. In their natural habitat the temperature is said often to reach 104°F (40°C) in the shade during the summer. At night 59°F (15°C) is suitable. Schneider's skink is easy to feed, as in addition to the usual insect fare this handsome skink will readily accept strips of raw meat and chopped banana. This diet I have found to be excellent for many species of large skinks and it has kept them in good condition over many years. When newly obtained this species may bite and hold on with determination. However, it soon becomes tame and is then one of the most gentle species. Like many large skinks it does well in the vivarium, where it is long lived with little attention.

The blue-tailed skink (*Mabuya gumpotamensis murgoyferi*) is a very different animal, which has earned the name rainbow skink because of its beautiful coloration. This name is perhaps to be preferred because only the females possess the blue (ultramarine) tail—the tail of male specimens is orange. The total length of 10 inches is largely accounted for by the exceptionally long tail. The body is iridescent and possesses yellow markings forming stripes and also spots and flecks on a dark chocolate coloration.

The rainbow skink is a native of southern Rhodesia and requires a vivarium of similar size to Schneider's skink, as it is most active. The vivarium should contain stones to provide numerous hiding places and growing plants or moss should be added. The vivarium should not be as dry as for *Eumeces schneideri*. A day temperature of 77°F (25°C) is suitable and any live insects will be eagerly eaten. My specimens fed eagerly on mealworms, which can be dropped into the vivarium singly or placed in a small glass dish sunk into the sand, and bluebottles. This is certainly a most handsome and incredibly fast-moving species.

The next two species are Australian. The giant skink (*Egernia major*) is a handsome and docile lizard attaining a total length of 2 feet. The young specimen illustrated measured 16 inches overall and was of a most gentle disposition. The coloration was subtle, and in my opinion attractive, as each scale appeared as if individually paired



Giant skink (*Egernia major*)



Australian water skink (*Hosula quoyi*)

by hand. The dorsal coloration is light brown with black markings to the scales. The giant skink requires a vivarium similar to that recommended for Schneider's skink, indeed I have kept the two species together. Temperature and food requirements are identical.

The fourth species is the water skink (*Hosula quoyi*), which is chosen because it is different from the others. In Europe we think of skinks living in hot deserts but this species lives in close proximity to water, into which it dives when frightened. Many skinks escape their enemies by speed and agility and others by "swimming" into the sand and so disappearing from view in a few seconds. The water lizard, however, escapes its enemies by hiding in water, and, like many reptiles, is able to stay submerged for many minutes.

My water skinks are housed in a 36 in. by 20 in. by 20 in. vivarium. This has a sandy floor with moss in places and at one end of the vivarium a 4 in. deep water dish is

sunk into the sand. This occupies almost a third of the floor area and is overhung by a piece of bark, which is a popular basking site. Other pieces of bark and tree stump provide hiding and basking places. The temperature is 77°F (25°C) during the day and the usual insect food, mealworms and blueberries, is provided. *Hosula quoyi* is another fast-moving agile species with a long tail. In my experience it does well in the vivarium, where it will soon become tame enough to accept flies from the fingers. The coloration of this species is brown above with black markings on the flanks.

It is difficult to quote prices for these lizards as they are most variable, but it is fair to say that all except the giant skink are sometimes offered at prices between 15s. and 30s. each. The giant skink is likely to cost between 6 and 10 pounds for an adult specimen, but they are easy to rear and the collector should order a baby specimen, for which the price will be much less.

DISEASES OF FISHES

Internal Worms

WHEN a disease attacks any of the internal organs it becomes difficult to diagnose the complaint. In some cases the symptoms can be recognised, whereas in others the fish will die without any apparent cause. Only dissection after death and a microscopic examination will reveal the true nature of the disease.

Sucking worms (Trematoda) are rarely found in aquarium fishes and are generally introduced to the tank with either snails or some of the live foods. Their attacks are seldom fatal and nearly always they escape detection, for the only visible effect they have on fishes is to make their victims appear somewhat wasted in the abdominal region and to be continually off-colour.

If the infection is suspected and treated at an early stage a cure is possible. Treatment may consist of feeding the fish with dried foods soaked in a 1 per cent solution of phenoxetol. A 1 per cent solution is made by adding 1 millilitre of phenoxetol (easy to obtain from dispensing chemists) to 99 millilitres of distilled water.

R. E. Macdonald

Cacti in the Fish House

CACTI in the fish house must be given all the light possible or they may become drawn and weak. They are not then likely to flower. If a shelf is fitted below a window the plants will be quite safe there, will get plenty of light and provide some shade from strong sun during the summer months. The pots should stand on gravel in trays or saucers so that drips do not occur and so that the drainage holes of the pots remain open.

"Instant Ponds" continued from page 47

as little as £7. Water-falls of the same material are also available, though they cost almost as much as the pool itself (just over £6).

Rather similar in properties to fibre-glass, Plasto-glass ponds in some models I have seen are equipped with a drainage plug in the deepest portion, which can be very useful if the pool is situated in low ground where siphoning is impossible. These pools have plenty of depth but are very narrow in some cases, giving them the appearance of bath tubs. There are other models, mostly rectangular, which are very good and are to be recommended.

WATER PLANTS

THREE great genera of amphibious and aquatic plants have been notably exploited by aquarists: *Echinodorus*, *Cryptocoryne* and *Aponogeton*. Species of each of these provide the largest and most decorative of specimen plants for tropical aquaria.

Members of the genus *Echinodorus* occur naturally in the warmer regions of the American continent as members of big floras. Many of them are now commercially available in this country and are admirably suited to submerged growth, some of them displaying an attractive variation in leaf form in the course of the life cycle.

The foliage of each species grows from a short compact rootstock anchored in the substratum by abundant adventitious roots. When planting, this rootstock must not be completely buried. The best rooting media for species of *Echinodorus* contains garden soil or clay mixed with sand and a little peat to keep the compost open. Such a medium is best contained within a 3 or 4 in. diameter pot and covered with a thin layer of coarse gravel or sand to prevent clouding the water. Potting plants generally is to be recommended, even if the pots are submerged beneath the gravel of the aquarium bed, because it greatly facilitates attention to and removal of the plants without disturbance of the root system.

Species of *Echinodorus* are really suited only to tropical aquaria, though some will withstand temperatures as low as 50°F (10°C) for short periods. Most species grow quickly once they are established and occasional discreet trimming of old leaves is necessary for tidiness. Several species naturally produce floating or aerial leaves or both as they approach maturity. Propagation of these plants is not easy; occasionally young plants develop from the parent's rootstock and when these have reached an appreciable size and become established the rootstock may be carefully divided. Some species may, after flowering above the water, produce viable seed and occasionally plants develop directly on the flower stalk. Seed may be germinated and such young plants grown on in pans, containing a fairly fine soil and sand compost, submerged in shallow water at a temperature of from 65° to 72°F (18-22°C). It is usually 18 months or more before seedlings reach a handleable size of about 2-4 in. in height.

Though they may be small when initially obtained, many species grow to a considerable mature size and adequate room must be allowed for future growth, as development tends to be very stunted when competition for space is keen. Similarly, for vigorous growth the artificial light must be good; daily exposure to sunlight is almost essential if the plants are to be induced to flower.



Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5

of the *Echinodorus* Group

by C. D. SCULTHORPE Photographs by the author



Fig. 1

Fig. 1.—A 2 years old specimen of *Echinodorus berteroi*, the tall grass plant, showing the linear and lanceolate translucent submerged leaves; two leaves of a broader shape may also be seen; as the plant matures the leaves become progressively larger and broader and eventually cordate floating and aerial leaves and small white flowers develop.



Fig. 6

Fig. 6.—An 18 months old specimen of the narrow-leaved Amazon sword plant, *Echinodorus paniculatus* var. *gracilis*; leaves are linear to lanceolate, veins less conspicuous.



Fig. 7

Fig. 7.—A 19 months old specimen of the uncommon *Echinodorus macrophyllus*; the more recently formed leaves are narrowly heart-shaped and their veins are conspicuous. At maturity this species is large, with broadly cordate leaves bearing nine or more prominent veins, and provides a handsome specimen plant for a decorative aquarium.

Fig. 2.—A dwarf chain sword plant, possibly *Echinodorus tenellus*; masses of leaves reach a height of 1½ to 2 in., and form a dense carpet; propagation is easy as young rooted plants occur at the nodes of the frequent runners.

Fig. 3.—A flourishing specimen of the juniper sword plant, *Echinodorus brevipedunculatus*, which grows to a submerged height of up to 12 to 15 in. Leaves are pointed and lanceolate, though varying considerably in overall shape; veins are often coppery red. Aerial leaves are rather smaller and rounded. It occasionally produces runners.

Fig. 4.—A 2 years old specimen of the Amazon sword plant, *Echinodorus paniculatus*. Leaves are lanceolate, yellowish green. It grows to a height of about 15 in.; plants frequently develop on the aerial flower stem.

Fig. 5.—A 2 years old specimen of the broad-leaved Amazon sword plant, *Echinodorus paniculatus* var. *rogersi*; leaves are slightly tougher in this variety, with three to five prominent primary veins, and more elliptical in shape.

Fig. 8.—Seedlings of *Echinodorus grandiflorus*; the largest is 8 months old, the small ones 2 months old. Leaves of this species do not change markedly in shape as the plant matures, the juvenile leaves being elliptical and the mature ones more broadly so; the leaves are a rich mid-green and their primary veins are very prominent on the under surface. At maturity the plant is about 15 or 18 in. tall.

Fig. 9.—An immature specimen of the Amazon spear plant, *Echinodorus muricatus*, showing oval, elliptical and spear-shaped young leaves.

Fig. 10.—An older specimen of the species in Fig. 9 showing more nearly mature, elongated cordate leaves with five main veins; foliage is bright green. Mature height in the aquarium rarely exceeds 16 to 18 in.

Fig. 11.—Two specimens of a species of recent introduction, *Echinodorus andrieuxii*. These are young plants showing the juvenile linear, spiky leaves; towards maturity the leaves apparently become considerably broader.



Fig. 9



Fig. 10



Fig. 11

OUR EXPERTS' ANSWERS TO TROPICAL AQUARIUM QUERIES

I intend setting up a tropical tank measuring 30 in. by 12 in. by 12 in. How many small fishes could be safely housed in such a tank and what wattage in heaters would be needed to maintain a suitable temperature?

By small fishes we assume you mean those about 1½-2½ in. long, in which case your tank, without artificial aeration, will support about 20 pairs. We suggest you employ two 75 watt heaters controlled by a thermostat. Wire the heaters in parallel and place them in a horizontal position just resting on the sand. A heater towards each end of the tank will ensure a more even distribution of heat.

I am new to the tropical aquarium keeping hobby and am rather worried because the thermostat I have installed to maintain a temperature of 75°F (24°C) permits a drop to 70°F (21°C) before it switches on again. Will this irregular rise and fall in the temperature have a bad effect on the health of the fish?

The rise and fall in the temperature of your tank is too small and protracted to warrant any alarm. It is a rapid change of several degrees that causes trouble.

A local dealer has some tiny firemouth cichlids for sale. He says they would not prove troublesome in my community tank. Is his statement correct?

Young firemouth cichlids seldom make themselves a nuisance in a community, well-planted community tank. But as soon as they reach about 2½ in. in length, it is advisable to give them a tank to themselves, or choose as their companions robust bodied, alert and rapid-moving fishes of about their own size. When firemouths are in breeding condition they become extremely spiteful towards any other fish venturing near them, or their chosen spawning site.

I had the misfortune to break a mercury-filled thermometer in my tank and a few specks of the mercury seeped from the stem and were lost on the compost. Will I have to take the aquarium down and refurbish it with fresh sand?

We do not think a few specks of mercury will do any harm in your aquarium, but if much of it became mixed in the compost, then it would be advisable to try and spoon it out without delay, or use fresh compost to carpet the bottom.

I have just acquired a 24 in. by 12 in. by 12 in. aquarium. How many pounds of washed sand must I obtain to grow good plants in it?

About 14 lb. of sand will give you sufficient depth of compost to grow most plants satisfactorily. Spread it deepest along the back and ends.

The appearance of my aquarium is absolutely spotless by ceiling standards. What can I do to get really clear water?

First and foremost, exclude bottom-stirring fishes from your tank unless you are prepared to siphon the bottom at frequent intervals. Another essential is a forest of plant life from the back to the middle of the tank and at both ends. Further, try and feed with as much clean live food as possible. If dried food predominates in the fishes' diet, take care not to feed too much at a time. A good filter run every night from 'lights-out' until morning will remove what shows of dusty particles in the water.

I have just purchased a couple of disc-shaped fish called *Akodon nana*. Please tell me something about habits and preferred food.

As this characin grows to nearly 4 in. in length it needs a fairly large aquarium to feel at home. It will get along quite well with companions too large to be mistaken for live food. This, of course, it loves, but it will eat almost anything, including aquatic gromstaff. Therefore you must not expect to maintain a beautifully planted aquarium if you introduce this species into your set-up. *M. anselm*

Many queries from readers of "The Aquarist" are answered by post each month, all aspects of fish-keeping being covered. Not all queries and answers can be published, and a stamped self-addressed envelope should be sent so that a direct reply can be given.

appears to be quite comfortable at a temperature range of 70° to 80°F (21-27°C) and, given proper care and attention, will live for many years in captivity.

How much light is necessary to grow *Cephaelis*, giant *Sagittaria* and chain sword plants in a 30 in. by 12 in. by 12 in. aquarium placed in an alcove out of the direct light from a window?

It is impossible to lay down definite rules about artificial lighting because the quality of natural light reaching an aquarium not in a direct line with a window is bound to vary according to the season of the year, the sort of weather prevailing, the size of the window and its aspect. Thus a window facing south or west permits more light to enter a room than a window facing north or east. Contrariwise, a window overshadowed by trees or outbuildings does not let so much light into a room as one facing an open position. Nevertheless, two 25 watt lamps in a reflector hood should give sufficient illumination if kept switched on for about 6 hours every day to maintain your tank in fine condition; the plants you have chosen are among the few that will flourish without the constant stimulation of a bright light.

I have two tanks placed one above the other. Both receive the same amount of light and were filled with tap water and bedded with washed sand more than a year ago. My problem is this: In the top tank I now grow the most luxuriant-looking plants, but in the bottom tank whatever plants I put in soon show a lot of pulpy yellow leaves and refuse to grow. Soon after the tanks were set up, I introduced various drugs into the bottom tank to clear up an attack of white spot. Do you think these drugs have had anything to do with the plants' decline?

Some drugs used in the treatment of fish diseases are not among the best things to encourage a healthy growth of plant life. We suggest that you empty the tank, wash it out well and set it up anew with a complete change of water and bedding medium (or the original compost stirred well to clean it in a bucket of boiling water).

I have just rigged up a tropical aquarium for the first time, and would like to stock it with small-sized, spectacular-looking (in colour or shape) fishes of peaceful habits. Kindly supply me with the names of a few choice species.

You cannot do better than include some or all of the following in your aquarium: the cardinal or neon tetra, the glowlight tetra, the pretty tetra, the penguin fish, the pristella, harlequin fish, zebra fish, opalescent fish, lamp-eyes, the chaperi and wagtail platys.

How can I prevent planarian worms being introduced into my aquarium on purchased plants?

Make up a solution of one dessertspoonful of ordinary household ammonia to 1 pint of water. Leave the plants to soak in this for a minute or two. After a rinse of clean water, all should be well.

In your opinion, does filtration really help to maintain a tank in first-class condition?

Indeed it does. But there is no need to keep the air pump running every hour of the day. If it is switched on last thing at night and turned off again first thing in the morning much, if not all, of the water in the tank will be cleared of suspended sediment. Nevertheless you must

bear in mind that filtration does not prevent a certain amount of heavy sediment collecting in corners of the aquarium, or in depressions in the compost. This dirt should be dip-tubed away every now and again.

A male dwarf gourami, fed almost exclusively on dried food, has developed what looks like an ulcer near the root of its caudal fin. What should I do to treat this complaint?

Include plenty of live food such as *Daphnia* or washed, chopped *Tubifex* in the fish's diet, and siphon away all dirt from the bottom of its aquarium. With a richer and more natural diet, combined with scrupulous cleanliness, it is likely that the ulcer will disappear of its own accord. But if the ulcer persists, make a nick in it with a new razor blade and press the edges gently to expel any pus. Before returning the fish to the aquarium, swab the wound with

a strong solution of permanganate of potash and smear with petroleum jelly.

I have just bought a smallish knife fish *Xenostomus xiphioides*. I should very much like to know its country of origin, its maximum size, its requirements in the way of temperature and food, and its suitability as an occupant of a community aquarium.

X. xiphioides is native to central and west Africa and grows to a length of about 8 in. It is a good scavenger and eats after dark as well as by day. Though it is not a food-faddist, it likes and should have scraped lean meat and some live food in its diet. It is not recommended for a community tank; for, in its smaller sizes, it is often poked on and nibbled at by inquisitive companions. If it survives such debilitating treatment, it grows spade and then, when it reaches about finger-length, it turns the tables and becomes increasingly aggressive. It has a temperature range of from 70° to 85°F (21-30°C).

COLDWATER FISH-KEEPING QUERIES answered by A. BOARDER

I have set up a tank out of dozes with all the usual plants in it. There are no fish in as yet but although the tank gets plenty of sun all the plants have gone either clear or red in colour. What has gone wrong?

You do not say if you provided any soil on the floor of the tank under the gravel. Many plants must have some nourishment for their roots before they will make good growth, and there is none at all in gravel. Also it may have been very cold out of dozes and if the plants came from warm quarters then they are bound to suffer from the change. No doubt they will improve as the weather gets warmer, or if some nourishment is provided.

I have a number of fishes of various types in an outdoor pond. When I run fresh water into the pond some of the fishes rub themselves against the hose. One or two also have a white spot or two on their bodies. What is this and what is the treatment?

Many fishes like to knock themselves against a hose which is running fresh water into a pond and I do not think that it signifies that there is anything wrong. The white spots on the fishes may be a touch of fungus. This can be cured by the salt bath treatment. Some fishes get a slight attack of fungus at the end of the cold weather but as warmer days appear the trouble clears up. If however any fish is badly infected it should be caught and treated before the disease gets too strong a hold.

What kind of plants do I need to set up a tank for coldwater fishes?

There are many water plants to choose from and the following are the ones most often used for the purpose: *Hydrophyllum*; *Egeria densa*; *Lagarosiphon major*; *Ceratophyllum* (hornwort); *Valisneria spiralis*; *Fragaria* (willow moss) and hair grass. See that tall growing kinds are at the back, especially covering the back corners to hide the frame. Keep most of the plants towards the back so that there is plenty of swimming space in the front of the tank for the fishes.

Please give me some advice about one of my goldfish. Just lately it has been swimming around in the pond very slowly and I now see that the tail has been torn and a "ribbon" of it is trailing behind. What can I do to the fish?

Your fish is suffering from tail rot. This often attacks fish in a pond after a bad winter and those fish with a flowing tail are usually the ones that are in trouble first. You should catch the fish and carefully, with sharp scissors, trim the broken fin away. Then dip it into a mixture of equal parts of iodine and glycerine. During the summer the general health of the fish should improve and the part heal. The cut-away portion of the tail will grow again.

There may be a thickened part where the new growth commences but this will hardly be seen when the fish is swimming in the pond. A salt bath will help all the fish in the pond if they seem to be troubled with any fin rot or fungus.

I am studying the breeding habits of sticklebacks and I caught one a short time ago which was grossly obese. For interest's sake I took it home and after a fortnight I noticed a white ribbon-like substance coming from it. What is this and will the trouble spread to my other sticklebacks?

The fish had a tape worm in it and this caused the belly to swell. The trouble can be easily spread to other fishes in the tank as any small section of the tape worm extruded if picked up by another fish can grow into a normal tape worm. There are many types of tape worm and if a fish is suspected of being infested with one it is better to kill it to save the pests from spreading to other fishes.

I have made a pond in my garden and wish to run water into it from a stream near by. Will a quarter-inch pipe be large enough? I have caught a few fish which I understand are trout. Will I be able to keep these? I have taken some gravel from the stream; is it all right and shall I need plants?

Your feed pipe will be all right as long as it is not made of copper or brass. These metals are fatal to such fish as trout. Otherwise I do not see why you should not be successful at keeping the trout. They are not particular about water plants in their pond but prefer a gravel bottom. However, a few plants will help to furnish the pond and be the home of many larvae etc. that will provide some natural food for the fish.

I am considering approaching a local mason for some stone for my tank. Will this be all right? If I use cement to fix pieces in position will this be harmful and what could I do to make it safe? Is the river bullhead or miller's thrush as aggressive as some books say or do you think it is a suitable fish for a community tank?

The best type of stone is the Westmorland rock as sold for rockeries. This is well coloured and is not likely to give off any harmful soluble compounds. If you use a little cement to fix your rocks the tank can be filled with water for a week, cleaned out, filled again for another week and then when washed out again it should be quite safe. The bullhead is not a very suitable fish for a tank. It can be aggressive but I consider that its value is very little as it usually lies motionless on the bottom of the tank and so can go unnoticed for long periods. I have not found that these fish take kindly to tank life; they prefer running waters.

Please turn to page 56

our readers



write

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

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

Insurance of Fish

IT seems that Mr. Petherick's query about insurance of fish (*The Aquarist*, February) has not yet been answered, therefore perhaps I may be permitted to offer my own comments.

Insurance is generally entered into when there is an element of risk, the insured party passing this risk on to an insurance company for a small payment. The insurance company has, of course, calculated just how much the risk is likely to be, and makes a premium which will allow them a margin of profit on the total of their transactions on that particular kind of risk. These rates are difficult to calculate, and rely on certain factors: for mammals, on the average expectation of life, average bill of health, mortality rates etc. When they come to do the same service for fish, it is easy to see why it is impractical. One fish may live 6 months, another 20 years. It would be necessary to calculate a different premium on every species, and it would be difficult to check on claims. I doubt very much if we will ever see a company willing to insure a community tank, such as the average aquarist possesses.

There is a possibility that we may find companies willing to insure large collections of single species, or smaller numbers of fish like discids, where the fish are valuable. This should certainly help the serious aquarist, who cannot always afford to lay out a great deal of money to replace fish lost through no fault of his own. You may manage to find a company who is willing to insure you against power failures, but I doubt if it will be worth it, as the premium is certain to be high, owing to the difficulty in ascertaining the cause of death of fish under these circumstances.

JAMES McM. URE,
Glasgow, S.A.

Guppies Galore

HAVING read in your April issue of *The Aquarist* that George Phillips "still keeps a few fish", I thought it was time I paid him a long-promised visit. However, when I saw him during the holiday my worst fears were soon dispelled, for he still has more than 20 tanks and 600 guppies (at a guess). It may be that the writer was referring to his coldwater fishes, as he lost all his pond fish during the winter, except for the few special ones he keeps indoors.

A. F. WILKINSON,
Judging and Standards Committee, F.G.B.S.
We believe that the writer of the paragraph concerned took it as read that Mr. Phillips is, as ever, surrounded by guppies, and was referring only to 'a.o.s.'—EDITOR.

Water

I CAN hardly see how Mr. F. Hall (*The Aquarist*, April) can lay the blame for fin rot on tap water. The causative organisms of fin rot would almost certainly be destroyed by the chlorination carried out by the water boards. Surely the answer lies in the pond itself, Mr. Hall's reference to the "sludge" on the bottom of the pond conjures up a picture of black evil-smelling mud, hardly conducive to healthy fish. I don't know whether Mr. Hall puts netting over his pond in the autumn but I find this a necessity for any pond where leaves can fall or be blown in. A quantity of leaves decaying in a small garden pool will soon turn the water cloudy and often the leaves and the sides of the pond will turn masive with colonies of bacteria feeding on the organic waste matter.

Last winter after I had removed the netting from my own pond large quantities of leaves were blown into the pond by the north-easterly gales. Every leaf for a mile or so around seems to have made a bee-line for my pond, which now looks a sorry sight. Mr. Hall doesn't mention whether his pond has accumulated a large quantity of leaves or whether he has cleaned it out since he set it up. A small garden pond is far from "balanced", for the leaves and other rubbish that invariably collect in a small pool cannot all be coped with by the natural purification processes.

No, I do not think the tap water can be the cause of the trouble. I would subscribe to the view that the pond now having been set up for several years is possibly polluted.

Whilst on the subject of tap water may I remind readers that water authorities do on occasions increase the amount of chlorine added to their water. Personally I have never worried much over the chlorine in the water, for there never seems to be sufficient in my water to harm my fishes. However, during the severe weather that we have just had two acquaintances came to see me with a sorry tale of fish losses after topping up their tanks. Presumably the water board had increased the chlorine content of the water as a safety measure as there were so many burst pipes in the area.

P. F. CAPON,
Billericay, Essex.

Goldfish Standards

I WAS interested to read the article on "Standards for Shubunkins" by Johnson H. Hood in the January issue of *The Aquarist*. He asked for "more realistic show standards" or better still one agreed show standard for the whole of Britain.

All your readers may not know that the Goldfish Society

of Great Britain "singletail" covers the nacreous and matt groups, i.e. the shubunkin and also the metallic group, thus meeting the points made by Mr. Hood. The G.S.G.B. Standards cover the three groups for each variety recognised. The reasons for the G.S.G.B. Standards differing to some extent from other published standards is that this body of goldfish fanciers has striven always for standards which seem to be achievable and has rejected those which seemed to be impossible. Another very important guiding principle has been to try to strengthen and preserve each worthwhile special feature occurring in fancy goldfish, e.g. divided tail fins, hood on head, protruding eyes, by keeping down the number of varieties recognised and arranging the combination of features so as to discourage cross breeding. In 1950, Standards for four basic varieties were produced to cover the features then known in Britain. These were the "singletail" (a slender-bodied fish), the "twintail" (a deep-bodied fish like a "veil-tail"), the globe-eye (a deep-bodied fish with protruding eyes like a "telescope") and the "bramblehead" (a short-finned "lionhead").

With the passage of time other goldfish with other special characteristics became available. After very careful consideration and discussion with our members, it was decided to introduce Standards for four more basic varieties, bearing in mind the original G.S.G.B. principles. These were the "pearlscale" (domed scales), the "celestial" (upward protruding eyes), "bubble-eyes" (sacs under eyes), "pom-poms" (highly developed nasal septa). In all eight varieties heavy extra pointing is allotted for the special characteristic, e.g. 19 extra points for the "bramble" on the "bramble-head". This meets the point made by Mr. Boarder in *The Aquarist* (September, 1962) in his article on the oranda with reference to judging the hood.

At the same time, G.S.G.B. recognises that there are other popular varieties, for which as a specialist organisation it should provide Standards for the guidance of the hobby. These are the "oranda", the "fantail" and the "common goldfish", with its nacreous and matt groups which are known to the fancy as the "London shubunkin".

A new 36 pages G.S.G.B. Standards booklet incorporating these 11 varieties, with paintings and measurement proportions in addition to the diagrams, is published this month by issue to G.S.G.B. members. It will be advertised in *The Aquarist* and all goldfish fanciers will be able to obtain it. We trust that the Standards will be acceptable to them and that every judge in this country will use this handbook.

M. D. CLUET,

Chairman, The Goldfish Society of Great Britain.

Ultraviolet and Life

IN answer to Mr. P. W. Kavanagh's request for information on ultraviolet light (*The Aquarist*, March) there is so much to be said that in the space of a letter it is hard to know where to begin, and only the barest details must suffice.

Apart from its use in sterilising machines, as a germicide, and in weak, measured doses for restricted medical purposes, ultraviolet is best left alone by the aquarist. Most of the ultraviolet damage to living cells takes place at the molecular level. By bombarding chromosomes it can produce abnormalities and mutations, and can interfere with cell divisions. DNA (deoxyribonucleic acid) is the hereditary material of all living cells: the master substance of life. The giant molecule resembles a spiral ladder. The sides consist of long chains of alternating deoxyribose sugar and phosphate units. The rungs, attached to the sugars, consist of a right and left half of one of four nitrogen-containing compounds: thymine, adenine, guanine and cytosine, joined by a bond of hydrogen. These four "bases" always seek their same partners; thus adenine pairs with thymine, and cytosine with guanine. The essential differ-

ence between all species of plants and animals is a greater number of base pairs. The higher the form of life, the longer the "ladder". Nevertheless it apparently takes more DNA to make a lungfish than a man.

When DNA is exposed to ultraviolet radiation of 2,600 Angstrom units (1 Angstrom unit—one hundred-millionth of a centimetre) it is the bases which absorb most of the rays, cytosine and thymine being the most sensitive. About one 'packet' or quantum of ultraviolet energy in every hundred will change their molecular configuration. In the case of adenine and guanine it is one 'packet' in every 10,000 which will effect a change.

In some types of cells exposure to blue light will reverse the ultraviolet radiation damage, through light-mediated enzyme reaction. An enzyme is a substance that speeds biochemical reactions without itself being changed in the process. Some bacteria have gone a step further, and can repair DNA damage by enzymes manufactured without blue light. As the wavelengths in the electromagnetic spectrum increase beyond about 4,000 Angstroms the region of invisible ultraviolet 'light' is left behind, and the stimulation on the retina of the human eye gives the sensation of seeing violet light, then on through blue, green, yellow, orange and red. Beyond red light energy again becomes invisible as the infrared or heat waves part of the spectrum is reached.

As with pH and hardness, natural ultraviolet rays from sunlight (a powerful source) need not worry the aquarist. Fortunately the layer of ozone (a form of oxygen with three atoms to the molecule instead of two) in the upper atmosphere absorbs most of the ultraviolet radiation below 2,900 Angstroms. Otherwise all exposed life on earth would be killed.

JOHN BOURNOT,
San Salvador, C.A.

Glass Prison

RECENTLY, during the course of conversation at a neighbour's house, an interesting, baffling incident was related. Their little girl, while playing on the shores of the nearby loch, found a jar full of squeaking half-grown frogs. As the lid was a screw-on type, it is obvious they had not entered it on their own. If this was a prank by some one, it was a very cruel act. They had not been put in the jar in the spawn-stage, for there was a full grown frog at the bottom of the jar.

If anyone can give another explanation it would be interesting. The whole thing has us stumped, not surprising, really, as it occurred so close to even a greater aquatic mystery—the 'Loch Ness Monster', for the jar was found on the shores of Loch Ness!

A. MACDOUGALL,
Aldourie, By Inverness.

Unpublished Standards

THE item below was found among 32 years' accumulation of papers in our files. I found it amusing and hope that other readers will, too. Acknowledgements are made to its unknown authors.

R. U. F. HARRIS,
Secretary, The Croydon Aquarists' Society.

Recommended Standards for Tank Furnishings other than Fishes and Plants

1. *Decor* should be large-headed, big-footed and of heroic stature. Any sign of duck's disease will be penalised. Inclusion in the same tank as number 5 to be considered dangerous.
2. *Frogs*. Bubbles ejected from the mouths of terrestrial frogs shall be spherical, 1 inch in diameter, and released at regular intervals of 20 seconds. Bubbles passing out from the other end will be disqualified. The frog is to be highly coloured and of no known species.

(Continued overpage)

3. *Sunken pavilions* must be small enough to look ridiculous when compared with the accompanying fishes, and must not be shown in massive tanks, where they might appear more logical. It is recommended that they be placed *pois* over *spoil*. The *carinals* must always be visible, as a ship which steels without its captain will be penalized as unporting.
4. *Glass marble* set to be at least half an inch in diameter, the larger the better as more decaying food and other debris can be accumulated between them. *Colours* are to be visible and to clash with one another as much as possible.
5. *Mosses* will be judged in two parts. The upper half is to resemble as nearly as possible "B.B.", but with hair reaching to the waist. The bottom must be well developed and evenly balanced. The lower half should bulge attractively at the hips, then taper off disappointingly to end in a caudal fin unlike that of any known fish.
6. *Treasure chests* should have four sides and a lid. The lid may be permanently open, in which case the treasure should be sandy and glittering. When the lid is closed, but leaves open at servicing intervals to ensure a job of air that knocks the fishes sideways, no one will care whether there is treasure or not. Preference will be given to chests so overgrown with algae as to be unrecognizable.
7. *Submerged rocks* must give no indication as to why they are submerged. The highest part must be below water level; actual currents will be penalized. There should be enough room inside for dead fish to be unnoted. The architectural style recommended is Burton's *Pan Pan* early period.

	Scale of Points		
Whimsicality	POINTS
Quaintness	
Puttily	
Disproportion	
Tastefulness	
			100

Coldwater Fish-keeping Queries

continued from page 53

What is the best way to feed golden orfe?

Golden orfe are very active fish and need plenty of food. They prefer live food but will take anything that a goldfish will eat. During the summer months they eat voraciously and can be fed at least three times a day. The live foods include all the usual ones such as garden worms, white worms, maggots, flies, wasps and in fact almost anything moving that they can get in their mouths. As they grow they can take quite large meals and provided that they have plenty of space and a well oxygenated water they soon grow very large. A friend of mine used to feed his orfe on the entrails of chickens.

I have a couple of goldfish which have anchor worms. I have only had them and my tank a short time. How did the fish get infested with the anchor worms?

It appears fairly certain that the fish were attacked by the worms before you bought them. Once you get rid of them you may not be troubled again. The worms can be killed by keeping the fish in a net and reaching the worms with a strong disinfectant such as Milton or Dettol, dabbed on with a piece of cotton wool.

I have had a pond for some years and have now found some black-grey creatures like broad flat worms on the sides of the pond. What are they and are they dangerous to fish?

The creatures are leeches and they could harm the fish. They attach themselves to a fish, usually a sick or slow moving one, and suck the juices from it. Search for them with a torch at night when they are more active and destroy all these caught.

The AQUARIST Crossword

Compiled by M. W. SAUNDERS



CLUES ACROSS

1. Algae-eating fish that cannot stand heat losses (11)
6. Turns round to find the small and poorly specimens (5)
10. Tank accessories which multiply (spells) (6)
11. A limb part not usually associated with fish—except to check water temperature (5)
12. Her and Lisa are famous when together (4)
13. Going out? (8)
17. Colour of a shark's fins, marble (3)
18. Belonging to you (4)
20. Expresses motion to a point within (4)
21. The R.A.F. turns a long way off (3)
23. Would a fish catch a disease after eating this fly? (6)
25. Frozen over (4)
27. A school of fish (5)
29. Leaves no leaves (3, 3)
30. He and the gal get round the girl (5)
31. Occupying snakes which are rarely seen (3, 8)

CLUES DOWN

2. Accord many a branch (8)
3. Meetings in court (8)
4. Mineral from the forest (3)
5. Austen's *Sensibility* growth (4)
8. Still in the egg stage (8)
7. Note that it's not left untraced, turned (5)
9. Ducks walking off in long clothing? (9)
10. Is this water doubtless a bit of a hard nut? (9)
14. Bunches like we purchase the one close at hand (2, 2)
15. Descriptive of a squint—of a sparrow fish? (3, 5)
16. Gastro—postically speaking (4)
19. Native of West Indies (6)
22. Pains caused by leeches, partly (3)
24. On the ice—we under it (5)
26. Medieval tale about a gun transfusion (4)
28. Vague or Palmos (3)

Solution on page 58

News from AQUARISTS' SOCIETIES

Monthly reports from Secretaries of aquarists' societies for inclusion on this page should reach the Editor by the 15th of the month preceding the month of publication.

An enjoyable evening was spent by the Catford A.S. at their headquarters, with a number of invited Clubs including a strong contingent from the Midway A.S., who came all the way from Chatham. A film show on "Breeding Turbans" was held for the occasion and proved a very popular choice.

It has been decided to hold an open show next year and it is hoped that it will be even more successful than the two previous shows the Society has held.

Any aquarists wishing to visit or join the Society would be welcome any Monday evening at King Alfred School Evening Institute, Holford Road, Catford, S.E.8. For further details please ring HLT 9184.

The meeting place of the Crendon A.S. has been changed to: Stately Hall, South Newwood, S.E.25, 2nd and 4th Thursday each month at 7 p.m. The Secretary is R. V. F. Harris, 5, Leicester Road, Crendon, Surrey.

At a recent meeting of the Northampton and District A.S., members heard a talk by Mr. Ross of Catby A.S. on freshwater and show fish. Table Show results for the month (see columns) were: 1 and 3, Mr. L. Williams; 2, Mr. R. Memory; Juniors: 1 and 2, Miss L. Mistry; 3, Mr. L. Roberts.

The Regent A.S. first Open Table Show held at Derby, was an outstanding success and attracted a total of 397 entries to the sixteen classes.

The cup for the Best Fish in Show went to Mr. K. Riley, of Riddings, Derbyshire, an attached exhibitor who gained 90 points with a Checker Barb. Given by Mr. Don Taylor, a cup for the Best Fourth was awarded to Mr. L. Jerram, of the Regent Society, for a Red Fighter.

Class winners were: Guppies: 1, Mr. Mansfield (Bradford), 88 points; 2, Mr. Jinks (Bradford), 80; 3, Mr. H. Payne (M.A.P.S.), 78; Live-Nappers: 1, Mr. V. Smith (Newingham), Black Swindell, 80 points; 2, Mr. F. Fitts (Derby Regent), Belle Molly, 78; 3, Mr. Fitts (Derby Regent), Red Swindell, 68; Danos, Barbours, White Cloud Mountain Minnows: 1, Mr. Buge (Derby Regent), 80; 2 and 3, Mr. Berman (Poets, Tropicals), 76 and 75; Barbs, Daisies, Checkers, Cherry, Naggers: 1, Mr. K. Riley (Riddings), Checkers, 95; 2, Mr. Davis (Derby Regent), Daisies, 85; 3, Mr. Martin (Mansfield), Cherry, 78; A.O.V. Barbs: 1, Mr. F. Fitts (Derby Regent), Tinsel, 86; 2, Mr. Dainton (Workington), Schubert, 76; 3, Mr. Cassey (Bradford), Koby, 74; Dwarf Goldfish: 1 and 2, Mr. Davis (Derby Regent), 84 and 82; 3, Mr. Hines (Mansfield), Agostini, 76; A.O.V. Goldfish: 1, Mr. F. Fitts (Derby Regent), Olympia, 80; 2, Tropicana (Sunderland), Severon, 79; 3, Mr. Hayes (Mansfield), Angel, 78; Characins: 1, Mr. Fitts (Derby Regent), Nerymas, 82; 2, Mr. Williams (Wolverhampton), Lacopinus, 80; 3, Mr. Davis (Derby Regent), Merymas, 79; Fighters: 1, Mr. T. Jerram (Derby Regent), 79; 2, Mr. Williams (Wolverhampton), 77; 3, Mr. Cadman (Derby Regent), 76; Mr. T. Jerram 71; Amphipods: 1, Mr. Derison (Tipton), Thicklip Gizzard, 89; 2, Mr. J. Warren (Derby Regent), Dwarf Gizzard, 83; 3, Mr. S. Taitson (Derby Regent), Thicklip, 78; Catfish and Loaches:

1, Mr. Cassey (Bradford), Washer Loach, 79; 2, Mr. Denton (Wolverhampton), Leopard Cat, 88; 3, Mr. J. Warren (Derby Regent), Washer Loach, 84; A.V. Fairy: 1, Tropicana (Sunderland), Saffish, 86; 2, Mr. T. E. Smith (Notts.), Florida Swindell, 84; 3, Mr. T. Jerram (Derby Regent), Madagascar Rainbow, 80; Breeders Six Live-bearers: 1, Mr. Moorhouse (Bradford), Liberty Mollie, 76; 2, Mr. Woodard (Walsall), Black Mollie, 74; 3, Mr. Duffy (Notts. and Derby), Guppies, 72; Breeders Six Egg-layers: 1, Mr. F. Soles (Wolverhampton), Blind Cave Fish, 82; 2, Mr. Soles (Wolverhampton), Rosarus, 78; 3, Mr. C. Torr (Derby Regent), Black Mollie, 76; A.O.V. Tropicals: 1, Mr. Davis (Derby Regent), Flying Fish, 92; 2, Mr. Swain (Nottingham), Bradshander, 82; 3, Tropicana (Sunderland), Pencil Fish, 80; A.O.V. Coldwaters: 1, Mr. Moorhouse (Bradford), Shubunkin, 81; 2, Mr. G. Hobson (Derby Regent), Shubunkin, 76; 3, Tropicana (Sunderland), Shubunkin, 74.

RECENT meetings of the Newport A.S. have included a table show for A.O.V. Characins held at the home of chairman Mr. Ralph Harris. The entries were of a high order and awards were as follows: 1 and 2, Mr. J. Burgess; 3, Mr. J. Walker; 4, Mr. B. Reddy.

A subsequent meeting was addressed by Mr. John Trevelock of Newport, well known in South Wales and the West, who spoke on his experiences in breeding many varieties, with particular emphasis on anabantids. A discussion followed, during which a raffle was won by the youngest member, Master Owen Thomas. There are several junior members of the society and any interested young people should contact the secretary, Mr. T. G. Wall, 5, Wynonera Road, Newport.

At the Leeds A.S. open table show, the Yorkshire section of the F.G.B.S. were invited. F.G.B.S. prize medals went to Mrs. Cherry, Newark, Moorhouse, Moss, Whitlock, Higney. Other results were as follows: Live-bearers: 1, Mr. Lambson (Middleborough); 2, Mr. Wainner (Colton); 3, Mr. Fletcher (Bradford); Barbs: 1, Mr. B. Moss (Leeds); 2, Mrs. Gibson (Workington); 3, Mr. Reynolds (Leeds); Characins: 1, Mr. Dainton (Skepton); 2, Mr. Reynolds (Leeds); 3, Mr. Hunt (Tynedale); Carps and Minnows: 1, Mr. Smith (Tadcaster); 2 and 3, Mr. Greenall (Tadcaster); Fighters: 1, Mr. S. Hardy (Tadcaster); 2, Mr. Freshwater (Tadcaster); 3, Mr. Baxter (Tadcaster); Goldfish: 1, Mr. Hunt (Tynedale); 2, Mr. Gray (Thorne); 3, Mr. Whitlock (Tadcaster); Anabantids: 2, Mr. Duckert (Skipton); 3, Mrs. Gibson (Workington); 3, Mr. Gray (Thorne); Catfish and Loach: 1 and 3, Mr. G. Hobson (Bradford); 2, Mr. Hine (Leeds); A.O.V.: 1 and 2, Mr. Moorhouse (Bradford); 3, Mr. Faircliff (Tadcaster); Breeders Egg-layers: 1, Mr. Bower (Mansfield); 2, Mr. Fells (Sheffield); 3, Mr. Martin (Mansfield); Breeders Live-bearers: 1, Mr. Fletcher (Bradford); 2, Mr. Baxter (Tadcaster); 3, Mr. Hayward (Leeds); Coldwaters: 1 and 3, Mr. Borch (Bradford); 2, Mr. Moorhouse (Bradford); Junco Goldwaters: 1, Miss G. Wilkinson (Leeds); 2, Miss N. Wainwright (Bradford); 3, Miss Hampson (Leeds); Miscellaneous Freshwater Aquarists: 1, Mr. Boothford (Leeds); 2, Mr. Foster (Leeds); 3, J. Moss (Leeds).

The Manchester & District Section of the Fancy Guppy Association organized a visit to Chester Zoo and Aquarium and enjoyed a very interesting and happy day.

During the Coach trip a novelty Fish Show was held on the way, and it is believed to be the first time this has been attempted anywhere in the world. It proved very successful and it is pleasing to report that there were no complaints among the fish.

Mrs. Williams, the Curator of the Aquarium was extremely helpful and gave a conducted tour of the "Behind the Scenes" set-up, and judging by the questions she had to answer everyone found something to attract their attention.

The Section ran a photographic competition during the day and the results will be judged by popular ballot at the Open Show on 9th June.

The Stretford and District A.S. Open Show, proved to be an attractive event for competitors. In addition to prizes for the section winners, there were prizes for those whose entries were placed second in the sections. A superbly judged junior characins was won by Mr. C. Walker, of Ocean A.S., whose entry was judged to be the best in the show, and a silhouetted gold, which aroused great interest, was won by Mr. Singleton, of Ocean A.S., who received a "Miss Jim" flower for his effort.

The judges were Mr. F. Parington of Middleton and District A.S., and Mr. Jim Kelly of the F.O.A. and the prizes were presented by Stretford's President, Mr. W. Hartley, the well-known aquarist and dealer.

A distinguished guest was Dr. J. N. Cartwright, of the Liquify Co. Ltd., who attended privately but interested the many visitors who conversed with him.

The Reading and District A.S. has had a most satisfactory year, both financially and in attracting new members; and throughout the year the meetings that are held on the first and third Monday of each month at the Blagrove Arms, Blagrove St., Reading, have been very well attended.

This year Reading have agreed to stage the popular "Three Counties Show". This will be held at the Oak Social Club, Garskirk Rd., Reading, on the 27th-29th September starting up Thursday, 28th Sept. Schedules covering about 26 classes are being printed and may be obtained from the Show Secretary, Mr. C. Masters, 12, Patrick Rd., Caversham, Reading, judging by F.H.A.S. Judges.

At the May meeting of the Leeds and District A.S., Mr. B. Winterburn talked to the members about various ways of growing plants in the aquarium. An evening visit has been arranged for the 12th June to Mr. Foden's fish house at Huddersfield. On the table for judging were three classes: Anglers: 1, Mr. J. Moss; 2, Mr. D. Lee; 3, Mr. J. Smith; Live-bearers: 1, 2 and 3, Mr. J. Pedley; Plants: 1, Mr. J. Smith; 2, Mr. Stillson; 3, Mr. J. Moss.

An exhibition was held by **Workshop Aquarist and Zoological Society**, which was attended by many local people. Various aquarists were on show, giving a representative picture of different types of plants, fish and general setups. Small animals were another feature of the show.

One of the main attractions was a pond with a fountain, stocked with coldwater fishes. The pond was a simple structure, consisting of four planks nailed together as sides, and a sheet of blue polythene surrounding the pond. A rockery was constructed, with flowering plants and shrubs placed among the rocks.

Several people expressed interest in starting the hobby and it is anticipated that a few new members will be enrolled.

The first annual open show of the Nelson A.S. proved to be an outstanding success with a total of 193 fish entered. A number of minor faults crept up as it is usual with a first show, but exhibitors can be assured that there will be

travelled next year. The Best Fish in Show was won by Mr. Wooster of Colne with a *Melanotaenia* Yellowfin.

Mr. H. Loder and Mr. Taylor, both of Burnley, were the judges. The results were as follows: Livebearers: 1, Mr. Wooster (Colne); 2, Mr. Ingham (Astrington); 3, Mr. Housleworth (Colne). Guppies: 1, Mr. R. Tattersall (Astrington); 2, Mrs. Cherry (Bishopthorpe); 3, Mr. D. McCaslam (Astrington). Barbs (small): 1, Mrs. Cook (Nelson); 2, Mr. Puder (Liverpool); 3, Mr. Singleton (Nelson). Barbs (large): 1, Mr. Puder (Liverpool); 2, Mr. Lewis (Dunstable); 3, Mr. Greenwood (Oswan). Characins: 1, Mr. Duckett (Skipton); 2, Mr. Mellor (Marskeby); 3, Mr. Prazan (Burnley). Fishery: 1, Mrs. Cook (Nelson); 2, Mr. Lewis (Burnley); 3, Mr. Singleton (Nelson). Loaches: 1, Mr. Cullish; 1, Mr. Greenwood (Oswan); 2, Mr. Walker (Oswan); 3, Mr. Dickens (Nelson). Catfish: 1, Mr. Lewis (Burnley); 2, Mr. Hildrew (Bradford); 3, Mr. Dickson (Nelson). Breeders' Class: Egg-layers: 1, Mr. Moss (Astrington); 2, Mr. Ingham (Astrington); 3, Mr. Coats (Liverpool). Livebearers: 1, Mr. Ingham (Astrington); 2, Mr. Lewis (Burnley); 3, Mr. Ashburn (Nelson). Aquarists: 1, Mr. Duckett (Skipton); 2, Mr. Walker (Oswan); 3, Mr. Scott (Nelson). Sharks: 1, Mr. Casabar (Marskeby); 2, Mrs. Cook (Nelson); Mr. Rhodes (Nelson). Cyprinodontidae: 1, Mr. Ingham (Astrington); 2, Mr. Fletcher (Bradford); 3, Mr. Ingham (Astrington). Goldfish: 1, Mr. Puder (Liverpool); 2 and 3, Mr. Greenwood (Astrington). A.D.V.: 1, Mr. Lewis (Burnley); 2, Mr. Stampfer (Marskeby); 3, Mr. Walker (Oswan).

RECENTLY the Tipton and District A.S. held its first Table Show. The Class was for Livebearers and the Members, for this and for future Shows, were split into two Sections, i.e. Section A comprising the experienced aquarists and Section B the novice aquarists.

The results of the Show were as follows: Section A: 1, J. Dawson (Black Mollie); 2, W. Devcon (Moon Platy); 3, J. Frost (Marigold Platy). Section B: 1, G. Hawling (Green Swordtail); 2, D. Johnson (Black Mollie); 3, J. Turner (Green Swordtail). The Best Fish in Show was J. Dawson's Black Mollie with 94 points. The secretary is Mr. W. Devcon, 2, Shaw Road, Tipton, Staffs., and new members will be welcomed.

THE winners at the first of the season's Table Shows held by **Darwent Aquarist Club** were: 1, T. Ridgway's Livebearers; 2, Mr. Ridgway's American Flag Platy; 3, H. P. Finch's Red-tailed Shark; 4, T. Swainburn's Red-eyed Red Swordtail; Mrs. A. Turner judged. Mr. T. Ridgway, a fish-keeper and breeder since boyhood days, answered questions on breeding and keeping Parrotfish, Aplocheilichthys and similar species. Mr. K. Toomey (Chairman of the Club) presided.

MEMBERS of Workshop Aquarist and Zoological Society attended Sheffield Annual Open Table Show. Mr. F. Foster and Mr. G. Gibson obtained second prizes and Mr. L. Tye a third prize. Members were very impressed by the organization of the show, and the standard and numbers of entries.

IN view of the increasing interest in Tropical Fishkeeping shown in the Keytham area of Somerset, the **Helston Tropical Fish Club** have now formed a Branch Club at Keytham, and since the first meeting held in January this year, membership has been increased at every subsequent meeting. The Hon. Secretary is Mr. A. G. Houghton, 183, Park Road, Keytham (Som.), who will be pleased to receive applications for membership. Meetings are held on the 1st Friday of each month at the British Legion Hall, Clifton Road, Keytham, commencing at 7.45 p.m.

A very successful outing of members of the **Brund Tropical Fish Club** was held recently, when a visit was paid to the Derby Region A.S. Open Table Show at Darby. Although, owing to the distance travelled, none at the Show was

limited, everyone enjoyed the trip and came away impressed with the organization and efforts which had been put into arrangements by the Derby members.

At the Club's monthly meeting, Mr. V. Caspelli gave a Slide Show of slides made from films taken by him at various local aquatic events which have taken place during the last three years. The showing lasted for 45 minutes and everyone was greatly impressed with the excellent colouring and detail of the slides.

On Friday and Saturday, August 26th and 27th, the Club will be holding its third annual Open Show at the Congregational Church Hall, Newson Street, Boulton Road, Brund. Schoolchildren and Entry Events are available from the Show Secretary, Mr. J. D. Brown, 76, Paul Street, Brundwater, Brund, S.

THE election of officers at the Annual General Meeting of the **Bracknell A.S.** resulted as follows:—President, Mr. W. Murphy; Chairman, Mr. J. Norris; Vice-chairman, Mr. R. Dwyer; Secretary, Mr. S. Phillips; Treasurer, Mr. C. Dixon; Committee, Messrs. P. Detry, L. Jordan, E. Wilton, and Mrs. Jordan, F. Detry being show secretary. The "Jack Norris Challenge Cup" for the Aquarist of the Year was won by Mr. L. Jordan. The open show this year will be on July 27th, at Victoria Hall, Bracknell.

Meetings will still be held at the Red Lion, alternate Thursdays, and any amateur or beginner is welcome.

THE third annual open show of the **Middlebrough and District A.S.** was a financial success though the number of exhibitors was down. The judge was Mr. E. Chapman of Sheffield, and the Deputy Mayor of Middlebrough, Alderman M. Norman, presented the prizes.

Furnished Aquaria: 1, Mrs. S. Whittam; 2, Mr. B. Heath; 3, Mr. D. Clarke. Furnished Jars: 1, Mrs. S. Whittam; 2, Mr. J. Fenwick; 3, Mr. L. Collins. A.D.V. Livebearers: 1, Mr. R. Altham; 2, Mr. P. Pate; 3, Mr. J. Bowers. A.V. Aquari: 1, Mr. W. Ashby; 2, Mr. A. Arden; 3, Bracknash Technical School. A.V. Dwarf Catfish: 1 and 2, Mr. D. Lancaster; 3, Mr. L. Hoy. A.D.V. Catfish: 1, Mr. R. Adams; 2, Mr. D. Porter; 3, Mr. H. Laidler. A.V. Guppy: 1, Mr. H. Middleton; 2, Mr. Skayler; 3, Mr. W. Payer. A.V. Swordtail or Platy: 1, Mr. L. Collins; 2, Mrs. S. Whittam; 3, Mr. J. Herring. A.V. Mollie: 1, Mr. F. Harrison; 2, Mr. L. Collins; 3, Mr. W. Payer. A.V. Barb: 1, Mr. R. Adams; 2, Mr. D. Bell; 3, Mr. E. Bond. A.V. Rainbow or Doria: 1, Mr. S. Brown; 2, Mr. H. Bradburn; 3, Mr. D. Clarke. A.V. Characin: 1, Mr. D. Arden; 2, Mr. E. Metherell; 3, Mrs. V. Coulson. A.V. Garfish or Loach: 1, Mr. Pate; 2, Mr. Coulson; 3, Mr. D. Porter. A.V. Goldfish: 1, 2 and 3, Mr. W. Coulson. A.D.V. Egg-layer: N.P.C.: 1, Mr. A. Arden; 2, Mrs. L. T. Treverton; 3, Mr. Bell. A.V. Breeding Pair: 1, Mr. W. Coulson; 2 and 3, Mr. D. Arden. Breeder's Class: Egg-layers: 1, Mr. D. Bell; 2, Mr. L. Collins; 3, Mr. W. Coulson. Breeder's Class: Livebearers: 1, Mrs. C. Jackson; 2, Mr. A. Ransom. Club Special: 1, Middlebrough Secondary; 2, Middlebrough Junior; Schoolchildren's Class: 1 and 3, Miss A. Lyche; 2 and 3, Miss G. Whittam; 4, Miss S. Bell. Best Fish in Show: Mr. R. Altham's Clashing Perch. Best Fish Shown by a Lady: was a tetra won by Mrs. J. Treverton and Miss V. Coulson.

AT the last meeting of the Harze Section of the **Fancy Guppy Association** held at Radlett, a Brite and Bony Sale was held, and also a Table Show. The results of the latter were as follows: A.V. Male: 1, 2 and 3, Mr. Sumner. A.V. Female: 1, Mr. Hale; 2, Mr. Sumner; 3, Mr. Powell. The section meets the second Sunday in the month at the Girl Guides Hut, Watling Road, Radlett, Harze, at 3 p.m., and new members will be welcomed.

AT the annual general meeting of the **Lawrence and District A.S.**, the following office-bearers were elected: President, H. Bottom; Treasurer,

J. Clark; Secretary, J. A. F. Hale; 42, Dunelm Road, Inverness; Asst. Secretary, Mrs. Bain; Commodore, D. McDonald and S. W. Stoney. The following awards were also presented: Characin Cup, J. Clark; Livebearer Cup, H. Bottom; A.D.V. Cup, J. A. F. Hale. Overall winner in Table Shows, H. Bottom. Member of the Year Trophy, J. A. F. Hale.

A NEW section of the **Fancy Guppy Association** is now being formed in Hatfield. Meetings are held on the third Thursday of the month at 23, Bridge Close, off Carverhatch Road, Hatfield, Middx. Full details are available from the Secretary, Mr. J. Hyle, 42, Sandal Road, Edmonstone, N.18, and new members can be assured of a warm welcome.

RECENT activities of the **Unbridge and District A.S.** have included a number of closely fought table shows. The last table show was held at the end of April, and was particularly interesting inasmuch as the first, second, and third awards were retained by only 2 points, and that none of the fish on the bench received less than 87 points. Also, this was the first time that F.D.A.S. stars were used since the relaxation in the F.H.A.S. rules governing the award of Federation stars.

IN the March issue we published a paragraph in our Club Notes in which the Society was shown as the **Marskeby A.S.** This was an error on our part as the Society should have been the **Midway Aquarist Society.**

THE results of the monthly table show of **Leith Aquarist Club** was as follows:—Egg-layers: 1, G. H. Wilson; 2, D. Patterson; 3, H. Foster. Livebearers: 1, D. Patterson; 2, J. Evans; Guppies: 1, A. Halliday; Juniors: 1, G. Melville; 2, F. Stuart; 3, D. Shale. The other three meetings this month were lectures on breeding barbs, characins, etc. The most interesting was one on the care and breeding of goldfish. This was given by Mr. K. Brown of the Alton Society.

THE **Wycombe A.S.** is holding its Annual Open Show on Saturday, 7th September. This year a new and additional Breeders' Class is being introduced. This will comprise a team of 6 fish either Tropical Egg-layer or Livebearer. Two of this team of 6 must be the parents of the other 4. The show committee will supply 2 tanks for each entry in this class on request. This special class is additional to the schedule and does not take the place of usual Breeders' class which are being held in the normal way. Applications for schedules and entry forms which will be available in the near future should be made to the Show Secretary—D. Chadborn, Plumcroft, Marlow Hill, High Wycombe, Bucks.

THE results of the table show of the **Loyne Aquarists** was as follows:—Best Fish in Show, Mr. T. Whalley; Best Livebearer, Mr. J. Goodger; Best egg-layer, Mr. T. H. Mordock; Second egg-layer, Mr. F. Avenard. Mr. Senari, the Society's new President, gave a talk on tropical aquarium plants and covered this important subject from every aspect.

At the May meeting Mr. D. Jones of Morecombe spoke about marine life, and Mr. Preston of Kettle, Lonsdale, featured an breeding Siamese Fighting Fish. Members of the Society are always willing to help anyone interested in the hobby and new members or visitors are welcome to the meetings. The secretary is Mr. J. H. Mordock, 15, Parkside Avenue, Lancaster.

AT the last meeting of the Yorkshire section of the **Fancy Guppy Association**, the winners of the Table Show were: Guppies: 1, Mr. T. A. Schofield (Silver Star); 2 and 3, Mr. Smith, A.O.V.; 1, Mr. F. Rutherford.

RECENT news from the **Peterlee A.S.** indicates that there has been plenty of activity. A good entry in the Middlebrough A.S. open show resulted in Peterlee obtaining three firsts, two seconds, two thirds and two fourths. The results of this show are given in the *Melton-*

through Show reports. Members also had a talk and discussion on home aquaria. The chairman, Mr. J. G. Having showing some coloured slides. A competition in two classes—baths and vichals—resulted as follows: Bath: 1, Mr. R. Alderson; 2, Mr. F. Harrison; 3, Mr. D. Scaze. Vichals: 1, Mr. D. Parry; 2, Mr. R. Alderson.

At the last meeting it was suggested that a junior section should be formed. Mr. F. Harrison, 89, Houghton Road, Heron-in-Hole, Co. Durham or any of the other Society officials may be contacted. Arrangements are also proceeding with the organization of the second annual show on the 5th and 6th July. Schedules are available from Mr. F. Harrison, mentioned above. The competition for the best breeding pair of tropicals was won by Mr. C. Robinson, the second being Mr. F. Harrison.

The results of the monthly meeting Table Show of the Bradford and District A.S. were as follows: 1, Mr. A. V. Ford; 2 and 3, Mr. C. B. Wilson; 4, Mr. A. Holmes. Novice A.V. Class: 1 and 2, Mr. H. Fletcher; 3, Mr. A. V. Ford. The Society had a colour slide lecture from Mr. B. Pengilly and also a talk by Mr. B. Winterburn on various electricity problems. In the Don Valley A.S. show Bradford finished third with 14 points. Don Valley were first with 22 points, second being Tadcaster A.S. with 15 points.

The Preston and Bury A.S. held their monthly meeting recently when an enthusiastic gathering enjoyed an open discussion on "Fish Breeding". Questions were asked and experiences related and everyone must have been enlightened in some way at the end.

There were also some tentative proposals regarding the annual show and it is more than likely that this will take place on 28th September to Blackpool when the local Society hold their open show. The Table Show results were: Figures 1 and 2, Mr. Buckley; A.V. Single Fish Bred by Owner: 1, Mr. Kearney; 2, Mr. Jennings; 3, Master Mackland.

SECRETARY CHANGE
STHEFTORD and District A.S. (E. Whitaker, 7, Haysom Avenue, Salford, Manchester).

AQUARIST CALENDAR

15th June: Basingstoke & District A.S. Open Table Show; Enquiries to Show Secretary: Mr. T. Fryer, 34 Oxbridge Road, Basingstoke.

16th June: Skipton & District A.S. Annual Show; Secretary, Mr. K. Barlett, 29 George Street, Skipton.

4th, 5th, 6th July: Peterlee A.S. Second Annual Open Show at Eborhall Community Centre, Peterlee. Details can be obtained from Mr. F. Harrison, 89 Houghton Road, Heron-in-Hole, Co. Durham.

27th July: Bucknall and District A.S. Open Show at Victoria Hall, Bucknall.

6th-10th August: Portsmouth A.S. Open Show at Portsmouth Community Centre. Details and show schedules are available from Mr. W. Ryder, 403, Commercial Road, Mile End, Portsmouth, Hants.

20th-21st August: Midland Open Aquarist Show, Prince's Hall, Bingley Hall, Birmingham. Full details from Mr. J. Edwards, 4, Arsey Terrace, Osler St., Ladywood, Birmingham, 16.

30th-31st August: Bristol Tropical Fish Club Annual Open Show, Congregational Church Hall, Newton Street, Stapleton Road, Bristol. Schedules obtainable from Mr. J. D. Brown, 76, Park Street, Bedminster, Bristol, 1.

7th September: Blackburn & District A.S. Annual Show. Schedules obtainable from Mr. G. Smith, 773 Whalley New Road, Blackburn.

7th September: Wycombe A.S. Particular and schedules from Show Secretary, D. Chadborn, Flatcroft, Marlow Hill, High Wycombe, Bucks.

14th September: East London Aquarists and Pondkeepers Association. Closed Annual Show to be held at Ripple School, Ripple Road, Barking. Entries, Open Class, for Breeders and Freshwater Aquaria. Schedules from Mr. W. Burman, Show Secretary, 91, Boundary Road, Barking, Essex.

15th September: Nottingham & District A.S. Open Show at Drill Hall, Derby Road,

Nottingham. Apply to Show Secretary, Mr. A. Lindley, 65, Selwick Street, Jacksdale, Notts.

15th-21st September: Leeds & District A.S. Annual Open Show. Details from B. Moss, 19 Elton Road, Harrogate, Leeds 9.

27th-28th September: Three Counties Show. Gas Social Club, Gasworks Road, Reading. Schedules from Mr. G. Masters, 12, Patrick Road, Caversham, Reading.

28th September: First Annual Dinner of the British Ichthyological Society in Glasgow. Information from the Secretary General.

28th September: Kington and District A.S. Inter-Club Show.

28th September: Blackpool and Pyddle A.S. Open Show at 67 Station Road, South Street, Blackpool.

16th-17th November: B. A. F. Show, Belle Vue, Manchester. Schedules are now obtainable from Show Secretary, Mr. G. W. Cooke, "Spring Grove," Fieldhill, Barley, Yorkshire.

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PREPAID ADVERTISEMENTS continued from page xviii

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Klear King External Filters	£1 2 6
Ornamental Rock Filters	17 6
Michael's Undergravel Filters	8 6
Hykro Bottom Filter	13 6
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Windmill Regent Internal Filters	10 0
Windmill Consort External Filter	19 6

ANGLE IRON TANKS

18 x 10 x 10 in. ..	£1 10 0
18 x 12 x 12 in. ..	£1 18 0
24 x 12 x 12 in. ..	£2 7 4
24 x 15 x 12 in. ..	£2 12 4
30 x 15 x 12 in. ..	£3 7 4
36 x 15 x 12 in. ..	£4 0 0
36 x 15 x 15 in. ..	£4 15 0
48 x 15 x 12 in. ..	£5 10 0

STANDS

18 x 10 x 36 in. ..	£1 12 4
18 x 12 x 36 in. ..	£1 15 4
24 x 12 x 36 in. ..	£1 17 4
30 x 12 x 36 in. ..	£2 7 6
36 x 12 x 36 in. ..	£2 15 0
36 x 15 x 36 in. ..	£2 19 0
48 x 12 x 36 in. ..	£3 12 4

PRESSED STEEL

10 x 7 x 7 in. ..	10 0
12 x 6 x 6 in. ..	10 0
14 x 8 x 8 in. ..	14 0
16 x 8 x 8 in. ..	17 6
16 x 10 x 10 in. ..	£1 8 0
18 x 10 x 10 in. ..	£1 8 0
18 x 12 x 12 in. ..	£1 10 0

VICTOR ALL OVER BACK LIGHT SHADE

18 x 10 in. ..	£1 1 0
18 x 12 in. ..	£1 3 4
24 x 12 in. ..	£1 5 0
30 x 12 in. ..	£1 10 0
30 x 15 in. ..	£1 12 4
36 x 13 in. ..	£1 16 0
36 x 15 in. ..	£1 17 6
48 x 12 in. ..	£2 8 0

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Underwater Banana Plant

The thick swollen upper parts of the roots
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