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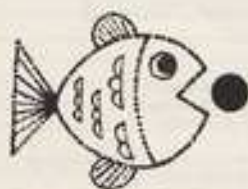
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Leave the poor fighters alone!

*or . . . Let's not be
beastly to the Betta*

by T. G. Wall

MY first title for this article was "Don't Buy a Siamese Fighting Fish," but with thoughts of irate correspondence from all over the world, I withdrew it. My main reason for writing is to bring to the attention of humanitarian aquarists, not to mention the R.S.P.C.A. and the P.D.S.A., the awful plight of thousands upon thousands of ill-treated "Bettas." No—this is not an appeal for prohibition of staged contests between the males of the species as held in the Far East, but rather a cry on behalf of those kept in community tanks by well-meaning owners.

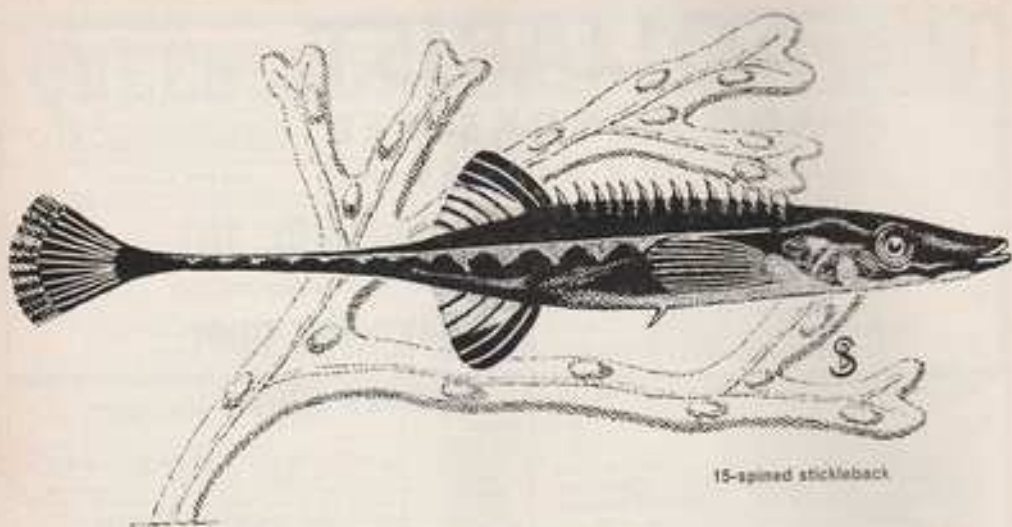
How many of us have set out to purchase something similar to these gorgeous creatures illustrated in the coloured pages of books and magazines? Having done so, sometimes at considerable expense, we are sadly disillusioned some time later when our pride and joy has been reduced to a ragged "stamp" by more boisterous companions.

Not a community fish

How is it we ask, particularly at Open Shows, that some of the exhibits in the Fighter class are so magnificent? The answer is, in my humble opinion, that the Fighter is not a community fish. To see Bettas in all their glory the males must be kept in single compartments *viewing right* of each other through glass. Females can be kept in "flocks"—they have not the finery of their mates and therefore stand to suffer less disfigurement.

An ideal method of keeping, say, four males of different colour (there are five colour varieties recognised by the

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The variable sticklebacks

*Freshwater and
 marine species—
 and all
 ferocious!*

by Bill Simms

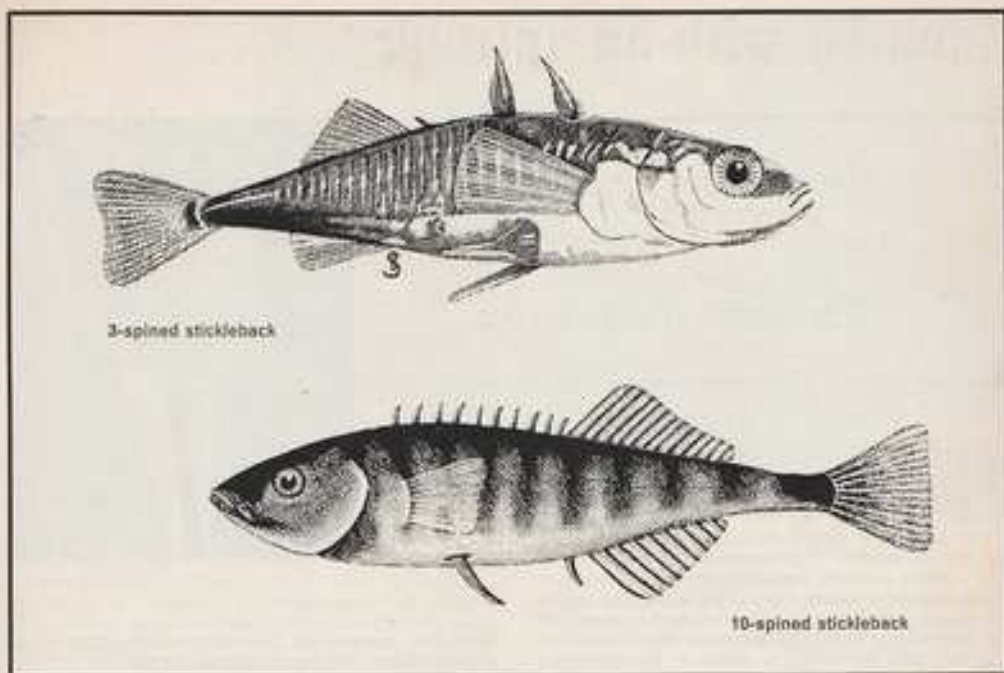
STICKLEBACKS have always attracted the attention of naturalists because they are so easy to study, and because they are so numerous. At one time they were divided into seven species in this country, but it is now considered that four of these so-called species were really only varieties of the Three-spined Stickleback.

Like many other species, the sticklebacks have suffered from changes in their names. At one time all seven kinds were called *Gasterosteus*—followed by their specific name. For instance, the fifteen-spined was called *G. spinachia*, but more recent authorities name it *Spinachia spinachia*. Similarly the ten-spined was *G. pinnatus*, and is now *Pygosteus pinnatus*.

The three-spined stickleback is so variable that it is not surprising that it was once divided into four species. The number of spines varies between two and four, and also in length. In addition there are ridged plates along the side of the body that vary considerably in their positioning.

Gasterosteus aculeatus is the name under which these variable types are now grouped, but there is reason (in my opinion) to separate one from the others. This is the variety with four spines, that was named *G. spinulosus*. In addition to having four spines, these spines are longer and more evenly spaced than those of the three-spined fishes. Also the plates on the sides are more regular in their placement. However, for the moment it is grouped with the others, and should be considered as just a variety.

It is not always realized that the three-spined stickleback, the most common one in our streams and ponds, is not entirely a freshwater species. Many can be found in



3-spined stickleback

10-spined stickleback

brackish water, and some actually in the sea. And it is in this variety of habitat that the variations stand out more clearly.

Those that are almost entirely freshwater are without many of the ridged plates along most of the body. The kinds that are found mainly in salt and estuarine waters have these ridged plates right along the body. In addition these marine types are more often found in the northern parts of Britain.

When considering the Ten-spined Stickleback matters are much more simple. It is smaller than the three-spined, for it rarely exceeds two inches, whereas the three-spined can be four inches long. This smaller stickleback also can be found in brackish water, but much more rarely than its large cousin.

There is one other difference about the ten-spined that can be confusing, though. When in breeding dress—at the time when the three-spined male acquires a red breast, and the female a yellow one—the ten-spined male may be red, or blue, or a muddy colour somewhere between these two.

In this tendency towards a blue breast as its breeding dress this small fish approaches the colouring of its very much larger marine cousin, the Fifteen-spined Stickleback, which is resplendent in a vivid blue colouring in spring.

Because I frequently use a hoop net and a small trawl to find specimens in the sea, I have occasionally found

fifteen-spined sticklebacks. These are quite dissimilar to the stream sticklebacks, being much more like the pipefish at a superficial glance. They are long and slender, and the blue of the male in spring suffuses the under parts.

This larger stickleback—I have frequently caught specimens reaching 7-8 inches long—is essentially a sea fish. Though here again there is a slight variation, for when kept in an aquarium this fish will be found to tolerate brackish water very well. I have even known it survive for long periods when kept in entirely fresh water.

Therefore it is possible that it may well live in estuaries as well as in the sea, though I have never found one in other than salt water.

All three kinds of sticklebacks make nests in which to hatch their eggs, and always it is the male that carries out the nursery duties. The procedure has been described too often to require repeating here, but it can be mentioned that the marine stickleback uses the finer kinds of seaweed for its nest construction, usually anchoring it to the base of stronger plants.

If you do decide to keep some sticklebacks in an aquarium remember that they are extremely fierce creatures, and that no other fishes should be kept with them. The pike is normally considered to be a dangerous fish, but for its size the stickleback far exceeds it in ferocity, for it will attack, and kill with its spines and teeth, fishes more than twice its own size.

Aquarist with an aptitude

Mr. Thomas John Horeman
of
"Tachbrook Tropicals Ltd."



A YOUNG laboratory assistant in a London hospital lecture hall was operating the slide projector for a group of experts prominent in the field of tropical diseases. Not for the first time he realised that he was able to identify at sight many specimens of which the distinguished audience of professors and lecturers were in doubt. More extensive studies followed, and led him to an appointment as college senior technologist in biology in 1945, but it was from that realisation in the lecture hall that there came the urge to go deeper into the subject, and from that beginning the world of aquaria gained another authority—one who is today widely recognised for his knowledge and original work, as much as for his commercial success.

Mr. Tom Horeman is today a man of many interests and activities. His well-known retail business in Vauxhall Bridge Road, Victoria, under the sign of "Tachbrook Tropicals," is only one section of an enterprise that includes an extensive supply service to the aquaria trade, a plastics manufacturing business, and a tropical plant house (with an additional house built on for future experiments) situated in the grounds of his home in Surrey and the result of many years of planning and effort. In this field alone he has produced some revolutionary ideas and put them into practice, ideas that have proved successful to the extent of attracting world-wide attention.

His humble and often difficult beginnings and the scanty opportunities for education stimulated rather than stifled the initiative and drive to better himself and to mould the strength of character he has today. He has read widely and avidly, built up a library of books and added steadily to his store of knowledge. At no stage in his life, he insists, has he really planned; but he obviously has the foresight to challenge any opportunity that might arise. One such opportunity was that of the retail pet shop in London that he was asked to manage in the owner's absence for a number of years. Tom eventually acquired these premises and set out to improve the poky little shop as it then was in 1952. It had been severely damaged during the war, involving immense building operations and the modernisation of the shop and offices on the three floors above. On the top floor is a modern pent-

house flat where Tom takes pleasure in entertaining overseas visitors and anyone sharing his wide interests.

That shop is the one in Vauxhall Bridge Road that today attracts aquarists from all over the world and which takes its name from Tach Brook, a tributary of the Thames which flows almost under the shop and which caused some flooding problems in the basement before Tom applied his practical mind to overcoming them. This capacity to not only see a problem but to set about solving it is a part of Tom Horeman's make-up, and is apparent in the many inventions and adaptations he has brought to the industry. He is the inventor of the biological under-gravel filter and several innovations in cleaning apparatus for which he holds patents, and he is still in the process of improving the plastic accessories with the opening of enlarged factory premises in Southampton.

Circumstances again presented an opportunity with the chance to acquire two acres of scrub land on the wooded slopes in Surrey. No easy decision this, since he had no desire to possess this kind of property, but, the decision made, he went about the formidable task of clearing the ground himself. He battled with the heavy growth which included many big old trees and a tangle of hawthorn, resulting in scars which he bears to this day. Out of this wilderness he has wrought a beautiful garden with three ponds, a small stream, and an alpine rockery, surrounding a neat modern split-level bungalow of personal design, perched comfortably amidst old beech trees and overlooking a valley.

He was fast realising the pressing need for more knowledge on aquatic plants and he set out to make a study of them. The 100-ft. long tropical plant house in the garden is the result of that decision and one that is a

The tropical plant house and, in background, the bungalow, in the spacious garden in Surrey, which even in winter presents an attractive scene



subject in itself. It houses a great variety of specimens including many rarities, and incorporates several of Tom's own innovations in the construction of the corrosion-proof tanks and special equipment. The installation is well planned and has a very efficient method of heating with an alternative system should one fail. It has attracted much attention in this country and overseas, and many of the ideas that originated in this Surrey plant house have

now become established practice.

It is natural that a man as absorbed in his subject as is Tom Horeman would wish to see for himself, rather than be content to read and listen. He has travelled extensively in seeking new horizons of knowledge and in helping others with their specialised researches. Two years ago he travelled the West Indies, calling at all the islands on

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Tom with his dog in the garden fronting the bungalow

Herpetological notes

by M. Peaker B.Sc.

American Specimens

Many herpetologists have difficulty in identifying specimens they receive from different parts of the world. Sometimes, it is necessary to check the identity of a species purchased from a dealer or to investigate the habits of a reptile or amphibian in the wild to correlate them with their care in confinement. It will therefore, be of some interest to collectors to know that to deal with almost all of North America in two volumes, a companion volume by R. C. Stebbins to Conant's field guide to reptiles and amphibians of eastern north America to cover the western regions, was published in 1966. Like the other volume, it is in the Peterson Field Guide Series.

Whilst there is perhaps a good deal more information available on north American species than on those from other parts of the world, I find Conant's volume particularly useful (although expensive at 40s.) for simple identification and concise resumés of the habits of the herpetofauna of this region.

South American Testudines

If, like I was until a few weeks ago, you were under the impression that *Testudo denticulata* and *Testudo carbonaria* were one and the same animal—the Jaboty tortoise of South America, it may come of a surprise to know that these are once more regarded as two separate but closely related species and that they are now called *Gochelone denticulata* (Linn.) and *Gochelone carbonaria* (Spix). The original morphological differences were described in 1960 and some biochemical differences between the two forms have recently been elucidated by Drs. Newcomer and Crenshaw of the University of Maryland.

Basilisks

Small basilisks (*Basiliscus*) are sometimes imported from northern South America. I once kept a ten-inch female which refused all food and had to be force-fed for months until it eventually accepted food voluntarily. Basilisks are noteworthy in that they are often adorned with dorsal crests and bizarre extensions in the skull region. They have always fascinated the herpetologist by their ability to run on the surface of water. Normally arboreal, when alarmed they run rapidly only on the hind-limbs and continue from land onto the water. The speed of this surface running has recently been measured by two workers in Panama and found to be approximately five and a half miles per hour*. It is likely that they run on, rather than swim in, that water to avoid aquatic predators which lurk beneath the surface.

And Iguanas

Although I personally have never had any trouble in persuading young common or Linnéan iguanas (*Iguana iguana*) to feed, I know that sometimes newly-arrived specimens give difficulty. A tip I once received was that to present yellow-coloured food almost invariably tempted the specimens to feed for the first time. After that they are said to take all the items of diet usually given to these species. Iguanas seem to appreciate a large vivarium—

ours were housed in an enclosure 3 ft. x 4 ft. x 7 ft. high, well-supplied with large branches and a pool. Although I have heard of them living (perhaps surviving would be a better word) at English room temperature, this is not really sufficient and the air temperature is best maintained at a temperature of at least 80°F.

Ptyas

Several weeks ago we received a four-foot snake which was quickly identified as the common Indian rat snake (*Ptyas mucous*). Another species, *Ptyas hirtus*, the Indo-Chinese rat snake also occurs in Hong Kong but is not so common. Our specimen has accepted mice to eat although on reading the relevant pages of the third volume of the late Dr. Malcolm Smith's *Fauna of British India* I find that he considered frogs to be the main item of its diet in India. I shall try this one with the Chinese Bull frog *Rana rugulosa*.

*Rand and Mark, *Copeia*, 1967 No. 1, 230-233.

Aquarist with an aptitude

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a busy tour when getting on a plane seemed just like waiting at a bus stop! He called in at British Guiana (as it then was), visited fish farms, and a world-famous plant man in the Everglades in Miami, Florida, and finally to New York to see how American aquarists applied their ideas.

Recently he has returned from a seven-weeks expedition through Brazil and Paraguay in his quest to discover new plants. Brazil is the home of a vast number of aquatic plants, including the famous "Amazon Sword." The journey of some 13,000 miles took him through the Maro Grosso area, notorious for its dense jungles and with dangerous hazards at every turn. He and his companions, Dr. Joachim Schultz of West Berlin and Michael Biber, a plant collector of Brazil, worked under severely trying conditions, but the discomforts and dangers were forgotten in the excitement of discovering new plants. All the specimens collected have been pressed for a herbarium collection.

From this journey and others, Tom has assembled a wonderful collection of colour slides and cine film, and at times he felt that he was on location for shooting a film "epic" with so much photographic equipment to carry. Between the rigours of travel, the lack of food and the weight of this equipment, he lost a stone in weight on this expedition.

Tom Horeman is a man of many capacities—aquarist, biologist, inventor, researcher, businessman—but he has never lost touch with the basic qualities that underlie his career: a natural sympathy and kindness for those in need, a desire to find out what makes a person "tick", and an inexhaustible patience and curiosity in seeking for knowledge. He is at his best in adversity, which brings out a rare strength of character.

He is still learning—still following that bent that came into being in a hospital lecture room many years ago and which continues to give him the real values in his life.

W.J.V.

Our experts' answers to your queries

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

TROPICAL queries

What sort of conditions and food suit *Glyphisoma petersi* best?

Generally speaking, the elephant-nose fish flourishes best when given very clean, well-oxygenated water, a temperature of about 75°F. (24°C.), some retiring places in the form of rockwork or thickets of plants on a fine sandy floor, and foods such as whiteworms, tubifex, Daphnia, and the like. Any other fishes placed with them must be inoffensive and quiet-living.

I introduced some duckweed from a pond into my tropical aquarium, and now I wish I had never set eyes on the stuff. It is all over the surface and I just cannot get rid of it. Please tell a newcomer to aquarium keeping how to deal with this problem.

Obviously your tank does not house any greenstuff-eating fishes. Therefore introduce some as soon as you can. Mollies, golden barb, rosy barb, and kissing gouramis soon make short work of duckweed.

A rather knowledgeable friend told me that lung-fish are not true fish at all but amphibians. Is this correct?

It is not correct. The lung-fishes do, indeed, possess breathing-organs that bear some resemblance to those of the higher vertebrates, but this is only because lung-fishes are more primitive, anatomically speaking, than, say, the carps or cichlids. Lung-fishes have altered very little from the days 300 million years ago when their ancestors wallowed in the swamps.

I should like to know why prepared carbon for use in a filter is said to rank higher as a filtering agent than ordinary bone or wood charcoal?

The specially prepared carbon sold by dealers is infinitely more porous and absorbent than ordinary charcoal. In a word, it permits much more water to pass through it and not around it before its pores become clogged. And it deals with noxious by-products of animal and vegetable wastes more efficiently than ordinary charcoal.

Does the pH value and texture of the soil have any effect on the cultivation of whiteworms?

The answer is yes. A very crumbly or loose soil kept alkaline by the addition of some crumbs of chalk or plaster of Paris seems to suit whiteworms best.

Do greyish-white patches scattered over the body of a black molly indicate that the fish has contracted some disease?

No, not unless the patches are linty-looking. Rather poor quality so-called black mollies often show grey patches on the body and/or fins. Lack of black pigment is the cause of this and not disease.

Can the rockgarden trailer called moneywort or creeping jenny be used as a water plant in the tropical aquarium?

Provided this plant is given an abundance of bright light it will grow on for quite a while in the tropical aquarium. Eventually, however, it will grow leggy and dwindle away. Do not expect stems of moneywort pulled from the garden to survive any great change of temperature. It is best tried out in the late spring or summer.

Is it true that mains water in a new house is likely to prove more harmful in an aquarium than water piped into an old house, and why?

New pipes contaminate water more rapidly than old pipes because the minerals in the water have not had time to settle in them and provide a protective sheath or coating. The softer the water, the slower will mineral deposits form. But in any case it is always advisable to run mains water for several minutes before using it to top up or fill an aquarium.

Recently, I bought some young angel fish. Two have become paper-thin on the sides, show richer colours, and show little interest in food. I have been told they are diseased. May I have your opinion, please?

Angel fish that show very thin, pinched-in sides, and go off their food are usually suffering from bacterial disease. Live food from foul ditches or unwholesome-looking ponds, overcrowding, a neglected aquarium (dirty and ill-lighted) will sometimes bring on this disease. A cure may sometimes be effected by giving the fish clean water having a neutral (pH) reaction, and supplying gentle aeration. No dried food or dirt should be allowed to remain on the bottom.

I intend setting up my first tropical tank this week-end and I have been advised to add salt to the water to guard against the fish contracting disease. Do you recommend this practice?

We have never heard of salt being added to an aquarium to prevent disease. Seasalt is sometimes used to treat certain diseases, but only after the sick fish have been placed in a shallow dish or hospital tank. To add salt to an aquarium could spell trouble for the plants and some of the fish. Do not introduce any salt into your tank before you have gained more knowledge in the art of fishkeeping.

Do fishes suffer if they are kept under artificial light for more than 14 hours a day?

Long days do not harm fish. But it is reasonable to believe that all our aquarium fishes benefit from some rest. Therefore it is advisable to switch off the light for a few hours daily. Excessive swimming about and eating (if several meals are provided) will shorten a fish's life.

Would ordinary window glass be strong enough to glass a 24 in. by 12 in. by 12 in. aquarium?

You would be well advised not to use ordinary window glass for tank construction. For a frame measuring 24 in. x 12 in. x 12 in. you will need 42 oz. heavy drawn glass or, better still, 1/2 in. thick polished plate.

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I have a large plant of *Apocynum distachyon* growing in an outside pond. If I cut away a piece of the rootstock in the late spring and planted it in my tropical aquarium would it grow away satisfactorily?

Although *A. distachyon* came originally from South Africa, the plants cultivated in ponds in Europe and America are quite unsuited to growing indoors. For one thing, *A. distachyon* soon weakens and dies in a tropical temperature. For another thing, it needs more space and mud for rooting in than the aquarist can possibly afford. Equally important, it needs a very strong overhead light.

The grit along the front glass of my aquarium always turns black however often I change it. Is there any way I can discourage this ugly discoloration?

Discoloration of the compost is usually brought about by pollution. The roots of dying plants will cause it; so, also, uneaten food left to go mouldy on the bottom. Or even several dead snails. But the black that shows along the front of the glass is not always a sign of pollution. It is often nothing more serious than a coating of felty algae. A razor blade in a holder will shave it off the glass in a jiffy. Then rake over the compost to freshen it up and siphon the algae and stirred up dirt away.

COLDWATER queries answered by A. Boarder

Some of my fish rub themselves against plants and the side of the tank. Is this because they have flukes?

The actions of the fish may not be caused by flukes. Some fish like to rub against plants, etc., when there is nothing fundamentally wrong with them. If flukes are attacking fish some other signs are usually present. Flukes such as *Gyrodactylus* or *Dactylogyrus* are more often found on very young fish. The fish then become listless, mooth at the surface and later show blood streaks on the body. The latter stages are that the fish become emaciated and eventually die. There are other small parasites which may worry older fish and sometimes the rubbing by the fish indicates that the water is over-charged with minerals or most of the water needs changing. It should be possible to see flukes on a fish with the aid of magnifying glass of about 12x. They look like small transparent worms which can move about by a looper-like caterpillar action. An immersion in a solution of a quarter teaspoonful of Dermal to a gallon of water will kill the flukes. The time of the immersion depends on the size and age of the fish. Obviously one cannot give exact times but if the fish are watched and removed as soon as they turn over it will be long enough. In any case the fish should not be left in for more than a minute.

Is it possible for dying vegetation in a garden pond to pollute the water?

It is not only possible but very probable that decaying vegetation will pollute pond water very quickly. One of the worst offenders is the water lily. Although so handsome when in flower it is a fact that when their leaves die and start to decay they can pollute the water considerably. If such a leaf is pushed under the surface there will be a quantity of oil left on top. I once put a piece of water lily in a large tank and in a short space of time the water stunk terribly. Most of the dying leaves and flowers should be removed as soon as they start to decay.

I have had trouble with fish lice on my pond fish. I have emptied the pond twice and dried it out but can still find lice on the fish. What else can I do?

The fish lice leave the fish to lay their eggs on stones, etc., and the young must swim around and find a host to survive. It is generally thought that the lice and eggs will be killed if the pond is allowed to dry up and remain so for a few days. When you emptied your pond it is possible that some moisture remained round the waterlily leaves and stems. Eggs could have stayed in such positions and hatched out when water was added. You state that you would be prepared to make a fresh pond with plastic sheeting to remove the fish to whilst further treatment was given. This would be a good idea but you will have to examine the fishes carefully to make sure that any lice are removed first. A strong solution of permanganate of potash can be put in the water once the fishes are removed. Dissolve the chemical in water before adding it to the pond. Make the water beetroot colour and leave for a few days. Then empty the pond and allow it to dry out. This should get rid of the lice. I once had a bad infestation of fish-lice from an introduced Tench, but cleared them from the fishes by two or three immersions in a solution of a half-teaspoonful of Dermal to a gallon of water, for two minutes only.

We wish to make some experiments with breeding hybrids from carp and various varieties of goldfish such as crossing varietals with fantails, etc. Have you any advice on the procedure?

If you breed from different varieties of goldfish the resultant young will not be hybrids. They all come from the carp stock originally and so they will all breed together easily and would not produce hybrids. It is very easy to get crosses from any types of goldfish and even if the ones you particularly wished to breed from should show little inclination to pair you could get any crosses you liked by hand spawning. The hand spawning should only be resorted to when other means have failed and then only when the fishes are actually spawning naturally. With hand spawning it is possible to take eggs from one female fish and use milt from a number of males in succession to fertilise batches of eggs and so get varied results more quickly.

I have a large tank with Moors, Orandas and Fantails and they spawned in November and have done so ever 14 days since. Will this late spawning prevent them from spawning next season?

It is probable that this will make no difference to the fishes spawning next season. You must have kept your fishes too warm to bring them into spawning condition at that time of the year. It is far better to gradually reduce the temperature of the water where such fishes are kept as the winter approaches, and then the fishes will get a good rest and be ready for a renewed tendency to breed the following spring. When goldfish varieties spawn it is usual for only some of the eggs to be laid at one spawning. I have noticed that it is rare that all the eggs in a female fish are laid at the one spawning. In an outdoor pond spawnings can take place once a month through the warmer days but it is almost certain that after each one there will be many eggs remaining in the female.

I am having trouble with rearing goldfish fry. Every year I have plenty hatch out but never seem to be able to rear many. Where do I go wrong?

It is possible to rear practically every fish hatched out but to do so, many conditions are necessary. I do not think that it would be probable that a beginner could do this as there is no doubt that plenty of experience must be gained before one could be sure of such a result. The chief conditions necessary for success are plenty of swimming space, the right food, but not too much of it, and

freedom from pests. Fry can be killed with fresh tap water if it is run straight from the tap and contains a large quantity of chlorination. During the summer many water companies introduce this into the water to kill harmful bacteria and so if it happens to be rather stronger than usual it could kill the fry. Water should be allowed to mature for a day or two in the open air before being used for fry. Sometimes there are very many fry hatch from a spawning and unless they have plenty of swimming space they will soon go wrong. The next point to watch is the feeding. If the fry were in a fair sized container with plenty of growing water plants they would find plenty of food among these plants and the addition of a little Liquifry each day would keep them going for about ten days. It is when dry food is given that trouble can start. It can be seen that if the fry are feeding well one day, and extra food is given in consequence, the following day the fry will not be feeding. This is because the water has become foul. This condition will be more evident in warm weather. Just one day's extra feeding can spoil the whole set-up as goldfish will never eat at their maximum unless the water is fairly pure with a good oxygen content. Make no mistake about this point, once the water lacks oxygen in sufficient quantities the fish will go off their food. Change most of the water for fresh and the fish will be on the feed again as well as they ever were the following day.

I cleaned out my goldfish pond at the beginning of the winter and now wonder how much food the fish should have before the spring?

As long as there are some water plants in the pond it is probable that the fish will go through the winter with no extra food from you. If any is given it should not be dried food but on mild days a few broken garden-worms can be given. Goldfish could go right through the winter with no artificial feeding if they were in a good condition in the autumn. The colder the water the less will the fish need to eat.

I am interested in fish and would like to know how to keep Carp, Pike and Perch?

Get the book, "Coldwater Fishkeeping" as advertised in *The Aquarist and Pondkeeper*. This will give you all the information you require and which could not be included in a letter. The Carp feeds like the goldfish and needs the same conditions but the Pike and Perch are carnivorous and must have live foods. They would eat any other fish small enough to get in their mouths.

Can you recommend a paint with which to treat a concrete pond which has developed leaks?

Any good bitumastic paint should answer your purpose. However, if the cracks are large enough to be seen it would not be sufficient to use paint. Any cracks should be scratched out and filled with a mixture of Prompt cement and an equal portion of fine, sifted sharp sand. When damp, force this into the crack. This dries in half an hour when the pond can be refilled. If you do use a bitumastic paint you will have to make certain that the concrete is quite dry or the paint will not adhere to it.

Can you tell me how thick glass should be for a large tank?

For any large tank some wired plate should be used for the base and toughened plate glass of perhaps half-an-inch in thickness will have to be used. If the tank is long it should have strengthening bars to prevent spread.

Is it advisable to keep a circulating water-fall pump working during the winter or will it disturb the fish?

There is no reason why you should not keep the pump working if it is possible. It would help to keep the water from freezing but would not disturb the fish as long as too much of it was not moved around.

I bred 100 goldfish last year and only one survived. This year I bred 255 and have only 22 left up to the present. Is there a good book to help me to rear more fry?

You certainly should have reared more of the goldfish fry. I think where many people go wrong is that they do not realise how much swimming space such fish require. With the correct conditions there is no reason why every fish hatched should not be reared. With a small hatching this is often done but with a large hatching it is probable that there are so many fry that one has not the tanks to spare in which to accommodate them. To get a hundred fry to an inch in length, in good health, would need ten tanks 24 in. x 12 in. x 12 in. Get the book "Coldwater Fishkeeping" from *The Aquarist*, and if you follow the instructions given you should have more success.

One of the goldfish in my pond has become unusually fat, both sides the same and his eyes are very bulging. The scales on its body stick out. It does not sound like a known fish disease, what is it?

From your description it appears that the fish is suffering from Dropsy. All the symptoms you describe indicate this disease. It has often been recommended to insert a syringe under the skin to withdraw the fluid as a cure. I do not think this is any good at all, as even if some fluid was removed the germs which cause the disease would still remain. I am sure the best thing will be to destroy the fish. Dash it smartly on a hard surface. I know of no surer or quicker way.

I have a goldfish whose tail is turning black, it swims near the surface. What is the matter with it?

Black will often form on a fish when there has been some damage to the part. It may be from a slight attack of Fungus or even a nibble from another fish could have caused the damage. It is quite probable that the black will soon fade.

I wish to take up breeding fancy goldfish after a number of years from the hobby. Where can I get some good quality fish?

I can only suggest that you watch the advertisements in *The Aquarist*. I see so few really good fancy goldfish at the shows these days that it is not possible for me to recommend any good stock.

Some goldfish were bred in my pond and I have now found a large frog in the pond. Will this eat the young goldfish?

I do not think the frog will do any harm in the pond. Frogs often spend the whole winter at the bottom of a pond and do not eat during that time. I have never found that a frog will eat under water.

Back in the summer I bought some fish which were packed in oxygen. They were all right when they arrived but died soon afterwards. Where can I get small amounts of oxygen?

I think that you have rather misunderstood the use of oxygen. When fishes are despatched some water is placed in a plastic bag and some oxygen blown into the

Continued on page 353

The Junior Aquarist

Hitch-hiker of the seas

by R. T. F. Gantes

EVERY summer now sees the return, along our highways, of this long, lean, lank creature standing beside its bag of belongings and waving a limp thumb in the direction in which it wants to go; the hitch-hiker.

Rarely have we ever encountered a parasite so maladapted to its way of living. To stop the car and get the lift it needs all it displays is this pitiful beckoning sign. Its weakness is, in fact, its only strength; it is so disarmed that it becomes disarming. And one feels almost ashamed to be related to such a piteous being, especially when one compares it to its so efficiently designed marine *alter ego* the suckerfish.

The suckerfish (*Remora remora*, *Echeneis remora*) can be considered as the hitch-hiker of the seas. It has the same long lean lank familiar air but differs in that it never needs to beg for a lift thanks to a smart and powerful sucker it wears like a crown on the top of its head and that it uses to stick itself onto other marine animals passing by to get from one place to another. It usually chooses large and comfortable ones; why ride in a Morris Minor instead of a Rolls-Royce since, in any case, the trip is free? Whales, sharks, manta-rays often have several of these uninvited guests clinging to them and sharing their meals.

Had it not been for this malefic sucker, the sucker-fish would have probably been an honest fish like so many others, earning its living by the sweat of its brow instead of

being a social burden, a lazy cheeky parasite whose very existence is a scandal, an insult to all the hard-working sea-dwellers. This makes us entertain some doubts as to the statement that every function tends to create a specific organ; on the other hand it seems obvious that the presence of a specific organ influences the general behaviour of the bearer¹. In any case this situation could not last without shocking our ethics that want the sinner to be punished where he sinned.

This is exactly what has happened to the suckerfish. The hand of justice, the Elliot Nesses that now pitilessly track the faulful beast are the modest fishermen of the tropical seas. They use its curious sticking habit to catch turtles. This is how they proceed.

When they have managed to capture a healthy vigorous suckerfish, they tie it by the tail to a long, long line, put it back into the water and let it fix itself to their boat in which they then sail out to sea. As soon as they see a turtle drowsing on the surface, they detach the suckerfish from the boat. This is done by seizing the animal by the head and pushing it forwards; the sucker is so constituted that the adhesive power diminishes when pushed forwards whereas it increases, on the contrary, when pulled backwards. They then carefully get as close as possible to the turtle, and as soon as it opens a dreamy eye, they throw the suckerfish at it. The terrified turtle dives immediately, but it is too late; the fast-swimming suckerfish soon catches up with it and promptly sticks to it. All the fishermen have then to do is to haul in the line; the suckerfish is at the end of it, clinging firmly to the turtle.

This is how one of the laziest fish in the world has been made to slave like a convict.

★

¹ Following a recent theory, however, the sucker should not be blamed for the suckerfish's laziness; he made it himself by transplanting and modifying his first dorsal fin!

Find the fish

by D. Thiel

The first is in WATCH and also in CLOCK,
The second is in STOCKING and also in SOCK,
The third is in KERNEL but not in NUT,
The fourth is in INCH but not in FOOT,
The fifth is in FRESH and also in STALE,
The sixth is in WALRUS and also in WHALE,
The seventh is in ELEVATOR as well as in LIFT,
The eighth is in FLOAT but not in DRIFT,
The ninth is in LAIR but not found in DEN,
The tenth is in CHICKEN but not in HEN
The last is in ALSO and also in LAST.

Solution on page 343

THE AQUARIST

Breeding goldfish—effects of warmth

by A. Boarder

Some conclusions

WITH reference to my two previous articles on the effect of warmth and aeration on the rate of growth among young fantails it is now possible to sum up the experiment and to draw a few conclusions. All the eighteen fish hatched are alive and very healthy. Those on a cold test have hardly grown at all whilst those with warmth and aeration have grown so fast that at fifteen weeks old they are quite as large as fantails I have reared in the past at two years of age.

Colour change

Of the fifteen fish in warmth nearly all are fully coloured, not yet the deep red of my breeders but paler orange which is normal with young fish. A few still have a little black on their backs and dorsal fin but this should all clear in a week or two. The cold reared ones are still the original bronze and show no sign that they are likely to change for at least a year. When breeding with normal conditions I have found that only a few of the early hatched fry would start the colour change during the current season and most were over twelve months old before they changed completely. Under my normal method the eggs would be transferred to a tank in a large garden frame which was only warmed by the sun. Cable heaters and a thermostat prevented the temperature from dropping below 40°F.

The fairly quick colour change obtained by the present experiment indicates that it is the warmth of the water and is not due to the sunshine as I had previously thought to be the case. The fry in question were not hatched until September 7th, and since then there has been little actual sunshine. September was less sunny than usual and October only had a few sunny days. November had many more dull days than sunny ones and December, so far has not provided enough sunshine to be able to say that it could have made much difference to the fish. The conclusion can then be drawn that it is the warmth of the water which hastens the colour change in scaled types of goldfish and not the actual sunshine.

Rate of growth

The fry which were placed in cool water were already fairly well advanced as they were hatched with the others and had the same conditions for about four weeks. Since then they have fed little, mostly on white worms and Algae they find in the tank. Although quite healthy they are still only an inch in body length. The fifteen in warm conditions are at least four inches long at fifteen weeks of age and some, no doubt the females, already show the very pronounced swelling of the belly which indicates the presence of eggs well developed. These fish are already as big as any I have previously reared under normal condition which were two years old. I shall be very surprised indeed if these fishes are not spawning quite early in the year. None seeing the two

batches of fish would ever believe that they came from the same spawning.

Type of food given

The appetites of the fish in the warm water can only be described as voracious. When the frame is opened they gather at the feeding ring and grab at the food as it leaves the jar. White worms appear to be the favourite food as they will leave any other to take the worms as soon as they are introduced. Flake food is their next best as it is readily taken at any time of the day. To eke out this expensive food I try to fill them up with other types, such as Bemax and soaked shredded wheat, in fact any type of food I can obtain. Garden worms are now scarce in my garden and so I have not been able to fill them up with these.

There is one important point with regard to the feeding of these fish and that is the short days which we experience at this time of the year. I am writing on the shortest day of the year and normally feeding of the fish only takes place between 9 a.m. and 4 p.m. It can be noted from this that during a normal breeding season the fry would have had almost double the daylight hours in which to feed. With a longer feeding day it is quite probable that the fish would have grown larger than they have already done.

Effects of aeration

Although I have kept coldwater fish for many years I did not start my specialised breeding of scaled fantails until 1937, and in the past thirty years I had never used any form of aeration. With fish in tanks, especially coldwater ones I consider that to have to resort to aeration is a sign that the tank is over-crowded. I have always been able to keep fantails in tanks with no aeration or heaters. During my present experiment I have been able to take special notice of the effect of aeration. Undoubtedly the fish eat better when there is a good oxygen content to the water. Also in normal cold tanks the fish will spend most of the time at or near the surface. With my aerated rearing tanks I see that the fish are most at or near the bottom of the tank. When I used to feed my fish in cold tanks I noticed that they would go to the bottom to pick up food but would immediately swim up to near the top to chew and swallow it.

The conclusion from this experiment inclines me to the belief that the use of aeration is beneficial in rearing fry, and although they can be grown on without it there seems little doubt that the better oxygenated water improves the appetites of the fish.

Costs of this method

The cost of rearing goldfish under the conditions I have described will be far greater than if the fry had been reared under colder conditions. Apart from the cost of heaters and aerators there is the constant cost of electricity. In my case I have been using three tanks each with a heater and aerator and with the outside temperature in the forties

Continued on page 338

Barbus fasciatus

by Jack Hems

BARBUS or *Barbodes fasciatus*, a fish first seen by tropical aquarium keepers some thirty-five years ago (I bought my first pair from a dealer in Stoke Newington in 1937) has never gained the popularity it so richly deserves.

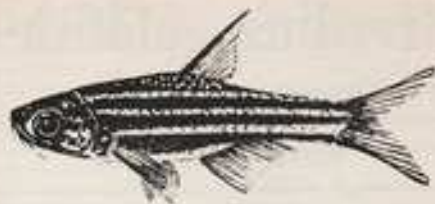
First and foremost, it has three attributes that make it ideally suited to a decorative community tank: a peaceful nature, a pleasing combination of colours, and little or no interest in the higher plants as food. It grows quite large, but not too large—a sleek 3½-4 in. (slightly larger in the wild state)—to become a problem. It is a dashing, flashing swimmer, always on the go, and will live for upwards of three years if given the right conditions. These, in brief, are a tank large enough to accommodate it in true comfort, clean, well-aerated water (soft rather than inclining to hard) and plenty of plants along the back and ends. A temperature of 75 F. (24 C.), with a range of five degrees either way, suits it well.

It is commonly called the striped barb and is found, according to reliable reference books, in Sumatra, Borneo, and the Malay Peninsula. There is, however, in Johore, a fish almost identical to it in body shape, size and colouration known as *B. lineatus*. This fact has given rise to the view (not held in all quarters) that *B. lineatus* may not be a distinct species at all, but a mere form of the type. But it must be pointed out that there is one external feature that *B. fasciatus* has that is not shared by *B. lineatus*, and that is the possession of two pairs of hair-fine barbels.

The ground colour of *B. fasciatus* is a sort of tarnished silver, with four blue-black stripes on the sides. The scales above the topmost stripes glisten and glitter (under a strong light) like polished copper. The scales on other parts of the body reflect a violet to greenish-gold sheen. The forked caudal fin, and the paired fins, are clear. The dorsal fin and the anal fin are tinged with rust-red, the dorsal fin with some blue-black on the leading rays. The eyes are large and very beautiful; the pupil like highly polished jet; the iris silver marked steely blue. The sexes are similar in appearance, but in mature fish the male is slightly smaller and slimmer and his colouration is more intense than that of the female. The striped barb, like most cyprinids, takes dried food readily. But to keep it in tip-top condition it should be given most or live food as often as possible.

The breeding procedure is typical of barbs. The male assumes brighter colours and chases the female into and around the plants. During these chases, eggs are deposited. Therefore, a tank for breeding this species should be large enough to permit vigorous driving. For the rest, bunched plants such as milfoil or nitella anchored to the bottom, a temperature of about 78 F. (26 C.), and a strong overhead light. Clean, soft water is of paramount importance.

When spawning is over, or about over—that is, as soon as the fish begin to punctuate their dwindling ardour with eager nosings in the plants—they must be removed from the aquarium without delay; for a falling of most



fishes is that they have an insatiable appetite for fish eggs, their own included.

The fry that hatch from the eggs in about two days are raised on such things as Infusoria, micro-worms, brine shrimps, and flour-fine dried food (there are some excellent dried foods for fry on the market). It is, however, necessary to keep a close watch on the bottom for uneaten food; for this soon leads to poisonous conditions. When a dip-tube is used, see that no fry are sucked up along with the debris.

As the species is a shoaler, a score or more of the fry in a planted tank will make a pretty picture, that is when they begin to show their colours at about six weeks.

Breeding goldfish

continued from page 337

it must have used quite a fair amount of electricity to keep the tanks at about 72 F. Therefore for anyone to try to make a living by rearing fancy goldfish with such methods would be very precarious. A lot would depend on the quality of the fry. I had, out of the 18 fry, three useless single tailed ones. The rest appeared to be quite good, only one has a single anal and all have a divided caudal. Whether many will be exhibition specimens it is rather too early to say, but the chances look good that several will be well worth including in my breeding stock.

Introducing to the pond

I have always tried to include in my strain fantails which not only change colour early but also those which can go through a winter in the garden pond. The fish under experiment will have to spend the next winter out of doors. They are quite large enough already as I have had fantails winter out of doors a third their size. The only point to watch is that they are gradually cooled down to the outside pond temperature before they are moved. I intend to keep them inside for this winter but shall make a start at reducing the temperature of the water in the new year.

By altering the thermostats two or three degrees each week it should not be difficult to get the fish used to a lower temperature. At the moment I have two thermostats in series so that if one stuck the other would cut out. This reduces the risk of over-heating.

I hope to be able to report at a later date what the ultimate results will be and whether my surmise of early breeding by the fish will materialise.



Preparing for the

“Champion-of-Champions” Contest

THE premier award for fish-keepers will be contested for the second time at the British Aquarists' Festival to be held on 26th and 27th October at Belle Vue, Manchester. The preliminaries for this exciting event are already under way, and we wish to make a special request to Club Secretaries for full co-operation in notifying us promptly of their Open Show date.

This is most important to ensure the smooth running of the national contest, and to avoid disappointing delays in awarding the gold-plated pin to winners of “The Best Fish in the Show” competitions. It is these winners who qualify as entrants for “The Champion-of-Champions” Contest at Belle Vue, and it will greatly assist the organisers if Secretaries will forward the entry form for “The Champion-of-Champions” Contest **within five days after the Show date.**

Secretaries who have not received this entry form are urged to advise us promptly, and a copy will be sent, together with details of the Contest and the gold-plated pin for presentation. Forms have been sent to Secretaries where the Show date is known, but there are many Clubs still to be covered. The closing date for “Champion-of-Champions” entries is 30th September, 1968, but it is important that we have prompt advice of “Best Fish in the Show” winners on the completed entry forms without delay.

To summarise; will Secretaries please advise us of the date of their Open Show. We will send entry form, full details, and the gold-plated pin for presentation to “Best Fish in the Show” winner.

Complete the entry form when winner is known,

and send it within five days to “Champion-of-Champions,” *The Aquarist and Pondkeeper*, Half Acre, The Butts, Brentford, Middlesex.

One important point that should be made clear: to qualify for entry in the “Champion-of-Champions” Contest, the “Best Fish in the Show” award must have been won at an Open Show (and by this is meant a show open to any member of the public and not by invitation only), and also where show schedules are available. Winners at Table Shows and Open Table Shows are not eligible to enter the “Champion-of-Champions” Contest.

The “Champion-of-Champions” Contest, sponsored by this magazine and launched last year, met with a very enthusiastic reception and set a challenging goal for enthusiasts. Linked as it is with Open Shows throughout the country, where “Best Fish in the Show” winners qualify for entry in the national contest, it has a continuing interest that reaches its climax with the final judging at Manchester.

The winner of the “Champion-of-Champions” receives a commemorative plaque, a solid gold pin, and a cash prize of 20 guineas. For the runner-up there is a plaque and 13 guineas, and the third place winner receives a plaque and 7 guineas.

But by far the most rewarding aspect of the Contest for the winner is the pride and satisfaction of taking the highest honour against the country's best.

We wish all competitors the best of luck, and look forward to sharing in the excitement and enthusiasm when the “Champion-of-Champions” is named for the second time at Belle Vue.

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

Breaking the Ice

FURTHER to the article by A. Boarder, "Coldwater Fishkeeping—Winter Care."

A polythene container is partly filled with gravel to keep it in an upright position when afloat in the pond, and the stopper or lid is replaced.

When the pond is frozen over it is a simple matter to pour boiling water into the container and after a few



seconds it can be withdrawn leaving a neat hole allowing air circulation. The size of the container may vary from a liquid washing up bottle to a one gallon wine jar.

If the pond is very large it would be a good idea to secure the jar to prevent it floating away from the edge.

Yours faithfully,

A. ARMSTRONG,
Edgware, Middlesex.

Cheaper Glass

I HAVE noticed that when you recommend glass for large tanks you always quote 1 in. plate. This comes rather expensive and myself I would recommend 1 in. drawn. I think this is just as good for fish tanks and much cheaper. It can be purchased at any glass merchants cut to size.

Yours faithfully,

K. C. MUMFORD,
Leicester.

Pen Friend Required

I AM a fond reader and direct subscriber of *The Aquarist*, and I wonder if you can publish the following in "Our Readers" column.

I am very interested in tropical fishkeeping, and I would like to correspond with some of your readers in English, Italian or French language.

I would like someone of either sex between 20 to 25 years old.

There are few aquarists in Italy, so I would like to know more about fishkeeping with someone in England. I thank you very much.

Yours faithfully,

BLAGIO FONTANA
via Paolo Amato 10,
90138 Palermo, Italy.

Demand for Speakers

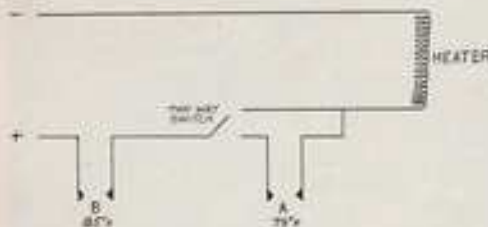
ONCE again a club secretary speaks about the difficulties of obtaining good speakers. (J. W. Clarke, Rotherham and District A.S. letter of January issue). Provided there is sufficient response I hope to produce a booklet showing details of speakers available, programme aids, etc., and this will be made available to interested secretaries. Can club secretaries let me have the names and addresses of speakers who have spoken at their clubs and I will contact them to ascertain whether or not they will consent to their names, programme aids, etc., being published. May I also appeal to anyone who is prepared to provide a programme to drop me a line mentioning name, address, subject of talk, title of film shows and any other relevant particulars. If such a booklet can be produced it would obviously benefit societies and I appeal for everyone's co-operation in this project.

Yours sincerely,

RON TIVEN,
(Former Secretary Warrington A.S.)
288 Manchester Road,
Warrington, Lancs.
Telephone 31635

Safety Circuit

AS a very new addict to the hobby of fishkeeping I was interested in the letter of Mr. Sawed in the October issue of *The Aquarist*, describing a circuit used to raise the temperature of a tank to combat whitespot. I have since learned that it is possible for a thermostat to fail with the contacts closed, and for fish to be killed because of the excessive temperature. Two thermostats can be used in series, so that if one fails in this manner



the other will control the temperature. If a two-way switch is added as shown, a dual purpose circuit is obtained. With thermostats in series, if thermostat "A" controlling normal temperature fails, when the temperature reaches 85°F, thermostat "B" opens, preventing an excessive temperature. If the switch is moved to cut out thermostat "A" the temperature will rise to 85°F and be controlled by thermostat "B". This means that prompt action can be taken at the first signs of white-spot without the trouble of adjusting thermostats in a hurry.

Yours faithfully,

G. TROTH,
Bournemouth, Bournemouth, Wex.

Barbus schwanefeldi

SOME of my observations about tin-foil barbys may be of assistance to your reader P. I. Day of Sheffield. I have been keeping "gold-foil" and "tin-foil" varieties of *Barbus schwanefeldi* since last August, and although this is not long, I have had no casualties.

Taking the reader's queries in order: (1) Sterber gives the mature size as approximately 13 in., so the size of tank required is anyone's guess. I have six 2½ in. × 3 in. in a 4 ft. × 18 in. × 15 in. tank. (2) Several other fish share the same tank, i.e., rosy, tiger and nigger barbys, red-tailed black shark, *Acanthopoma amatum*, *Gyrinocheilus yunnanensis*, plecostomus and doras cat fish. The large barbys do not molest any other fish. This may be due to the fact that there are several of them to play together. They sometimes use the *amatum* as a rubbing post, but he doesn't object! The shark soon breaks up any fighting between the smaller barbys. (3) These fish will eat almost anything. To date they have eaten lettuce, mashed peas, baked beans, cooked porridge (no milk), cooked egg, raw beef-heart, ox liver and beef, raw and cooked white fish, hard roe, pilchards in tomato sauce, "Kit-e-kat" in vast quantities, as well as the usual dried foods. They will also eat soft plants and duckweed. I have only Amazon swords in with them now! They eat ravenously, and I usually feed them three times a day,

giving as much as they will eat in about ten minutes. (4) At the 1967 Midland Open Show were three large true pairs of *Barbus schwanefeldi*. The only difference to a casual observer between the sexes is the coloration of the orange fins. One fish in each pair had much stronger colored orange fins, and this I presumed to be the male.

I hope that this information will be of help to your reader.

I also have a query. Please can someone tell me what is a *lunar-finned barb*?

Yours truly,

MARY LANE.

P.S.—Before anyone says my tank is overcrowded, I know! Four Oaks, Sutton Coldfield, Warks.

Pro-Tubifex

IN spite of all the talk about tubifex worms harbouring parasites and diseases, I find them excellent food for all adult fish. I feed tubifex to my fish regularly and my fish keep in very good health. All my fish (about 95 per cent. of them adult at the time of purchase) have lived for at least eighteen months. I have established my tropical aquarium for about two years and I have only had one disease in my tank—an outbreak of mouth fungus which I managed to stop spreading to other unaffected fish.

I have found tubifex worms very simple to keep. I keep mine in a bucket with enough water to cover them, when they are in a cluster. They breed as quickly as I use them and one ounce lasts about two months feeding them about every third day! Apparently they cannot stand heat for they thrive in our freezing garage! I feed them through a live feeding bowl and they are eaten ravenously by the fish, especially by the guppies, mollies and swordtails. I don't think much at all about the freeze-dried tubifex worms!

I am a keen reader of *The Aquarist* and I find the contents varied and interesting.

Yours faithfully,

A. G. BARKER (age 12),
West Kirby, Wirral, Cheshire.

A Big Hand for *Badi badi*

AFTER reading your article on the *Badi badi* in the January issue, I think it only fair in helping this most interesting fish to become more popular, in saying that since I aquired two *Badi* two months ago I have found them to be all I hoped of them. I have a 36 in. × 19 in. × 12 in. tank with all small species, i.e., *Gilfish chanae*, *Copeina arnoldi*, *Rasbora arochthalis*, *Nannostomus marginatus*, *Corydoras hastatus*, etc. and find this fish unaggressive; in fact rather shy. The only live food they get is daphnia. Perhaps less live food make them less aggressive; anyhow, I am more than satisfied. One other point being that since I bought the pair they have not grown and stay at approximately one inch. All in all the *Badi badi* is a fish that I am glad to say that I have.

Yours faithfully,

B. FOORN,
100 Cranford Way,
Twickenham, Middx.

Started 11.30 a.m. Saturday, finished 4 p.m. Sunday; and here's the result of a busy and rewarding weekend for the author, who is a member of the New Forest Aquarist Society



A Pond in a week-end

by Andrew Williamson

MY wife and I were having our elevenes in the garden one sunny Saturday during a pause in gardening when she remarked to me, "when are you going to build your fish pond, and get rid of the pile of stones you have in that coener?"

"To-day would be ideal", I replied, "the ground is soft enough to dig, but hard enough on the surface for the wheelbarrow not to mark the lawn."

"Right!" she said, "hand me that cup and off you go".

Time check: 11.30 a.m., Saturday 29th April, 1967.

I had been planning this pond for some time and scrounging material all over the place so I was fairly well prepared.

After checking the levels and finding them good, a kidney shape 12 ft. x 4 ft. was marked out on the lawn; this size was determined by the 15 ft. x 7 ft. piece of heavy gauge P.V.C. backed fabric (ex-swimming pool) which I had been successful in getting from a friend at a nominal cost (Plastolene or similar material will do just as well). I dug the hole 18 in. deep leaving a 9 in. shelf right round the outer curve and pressed the earth hard and removed all stones. The bottom and edges were covered with four thicknesses of newspaper.

The P.V.C. sheet was then stretched over the hole and large stones placed round the perimeter. The hose was connected to the tap and filling commenced.

Whilst it was filling I dashed up to a friend's house and told him I would be ready next day, Sunday, for some plants and fish he had promised me as he was going to clean up his pond.

Co-operation again; my friend said they would be ready for 12 noon Sunday.

Back home in time to shut the water off at the 9 in. level. A row of well weathered concrete bricks were placed on the shelf and the space behind them filled with good garden loam. The pond was then filled to the top and left over night.

Hurrah, no leaks!

The P.V.C. sheet was trimmed about 9 in. from the pond's edge and the grass lifted about about 2 ft. 9 in., then stones of various sizes were laid round the edge of the pond on top of the 9 in. border of P.V.C. leaving approx. a 2ft. border from stones edge to lawn edge which lets the mower and edging shears do their job.

An extra loop of border was made at one end of the pond and was made into a little semi-rock garden with my wife's bird table on a seven foot larch pole at one corner (that is if you can have any corners in a curved area).

Whilst this work was going on the pond was being emptied by a Stuart-Turner No. 10 pump; two pieces of 10 in. dia. Asbestos flue pipe 10 in. deep were then placed in the pond at each end part filled with loam. *Labelia*, *alysum*,

geraniums, nemesis, peronias, tagettes and argeretum were all planted in the garden section.

It was now 12 noon and I dashed off again in the car to my friend's house which, fortunately was only five miles away. He was a pal—nine mixed size goldfish and shubunkins from 6 in. to 2 in. were in the plastic bag that I had left him; a root of *Iris kaempferi*, a cutting of *Escarboucle* (that lovely red water lily with the yellow centre), a portion of yellow water iris and a white water lily (ex one of our local forest ponds) with a huge bunch of *Elodea canadensis* for oxygenating were in plastic sheeting. A cup of coffee was also ready and although I was eager to be off I stayed to enjoy it and listened to my friend's experiences with his pond which is in concrete and much larger than mine; a lovely piece of work.

After thanking my friend and his wife I returned home and started planting. The water lilies were planted in



Mr. Williamson busy in the pond

the two pieces of asbestos pipe, the *elodea* in plant pots on the bottom and on the marginal shelf. The *Iris k.* was planted at one end of the border, and the P.V.C. sheet lowered to make an overflow, this was hidden by stones and keeps the *Iris k.* in moist ground.

The yellow iris was planted in the marginal shelf along with bits and pieces from the local pond (after they had been well washed in permanganate of potash). A root of reed mace (wrongly called Bullrush) which I had in an old sink at the top of the garden was then planted in a small wooden box and placed beside the lily; all pots, boxes, asbestos pipes, and the marginal shelf were well covered with washed builders' gravel to keep the fish from nosing into the loam.

The hose was again connected and the pond filled to the overflow mark. The 9 fishes and 11 of my own were floated in the pond for about 30 minutes whilst the hose, spade, and wheelbarrow were put away and the

Continued in next column

Leave the poor fighters alone!

continued from page 327

Federation of British Aquatic Societies) is to partition a small tank (about 18 in. by 10 in. by 10 in.) with three pieces of glass, allowing each male a space of approximately 4½ in. by 10 in. by 10 in. This is ample room for any small anabantid, and the resultant display will more than compensate for the extravagance of a special tank. Each male can see at least one other and will "flex his muscles" continuously at his "next door neighbour," resulting in fine growth of finnage. A word of warning here, however—when using the orthodox heaters and thermostats *do not* put the heater in a compartment remote from the thermostat since, by the time the water in the "thermostat compartment" has reached cut-off temperature, that of the "heater compartment" will have risen very high. Placing heater and thermostat in the same compartment means that the other compartments will, for a short time after "cut-off," be slightly cooler than the heated area. This small difference is soon equalised and means much less discomfort than the over-heating resulting from the "wrong" method. Better still, use the long flexible heaters now on the market.

Kept in congenial surroundings the Betta is indeed "Splendid" and deserves far more consideration than is usually given to him.

A pond in a week-end

continued from previous column

sunlounger chair again brought out. Time 6 p.m. Sunday.

The garden flowers have now bloomed as have the *Iris k.* and the water lilies; the stones have weathered, the water greened and the whole effect admired by many.

To-day, Sunday, August 27th, 1967, I see the fish have spawned and there are plenty of youngsters swimming about.

More marginal plants such as Parrott's Feather, *Primula Japonica*, *Zebra Rush* are now on my list to improve my little oasis. I also intend fitting a Hippo water fountain next spring.

I appreciate I was very fortunate in having most things ready as well as a generous friend, when my wife, as you might say, fired the starter's pistol but even I was amazed at the result of so little effort and time and can't think why I didn't do it sooner.

FIND THE FISH (See page 336)

Answer: COLISA LALIA

Some common seaweeds



*Suggestions
for providing
cover and
decoration in
the tanks*



By Bill Simms



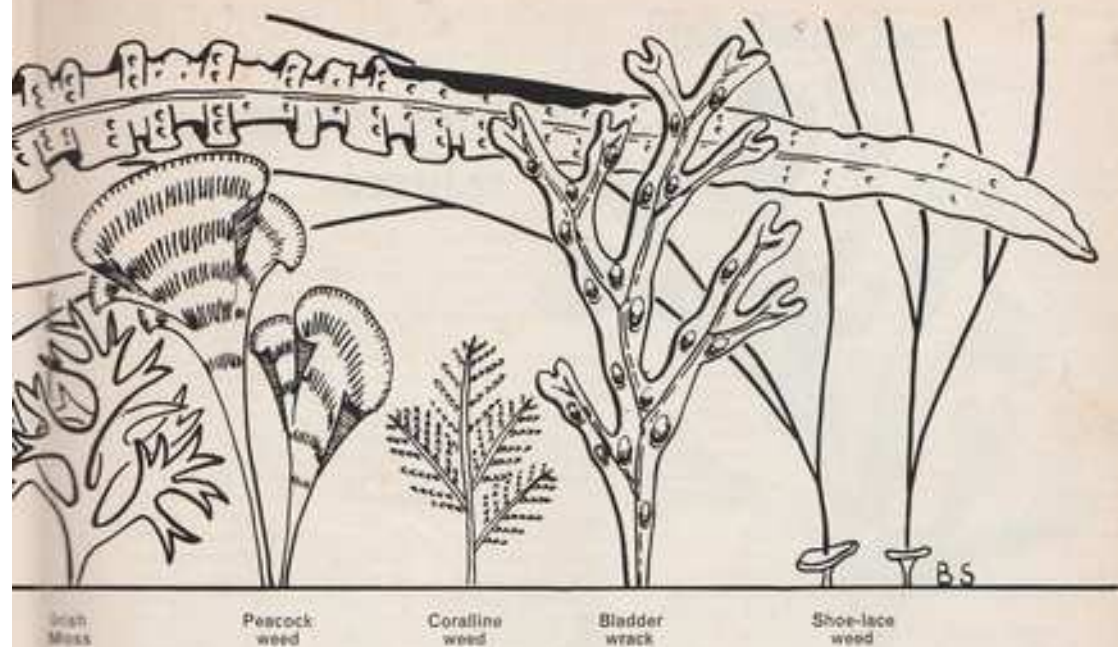
Sugar
weed

Sea
lettuce

THE increased popularity of marine tropicals has inspired a few aquarists who live near enough to the coasts to make an occasional trip there to try some species from our own seas; and most successful in cold sea-water aquariums some of these have turned out to be, for the smaller sea fishes, crabs, and anemones are perfectly easy to keep and many of them have lovely colours. One of the main difficulties, however, is that of furnishing the tank. Stones and rocks are all very well, but those of us who are more used to fully planted aquariums often feel that the effect is somewhat bare and our thoughts turn to seaweeds; not in the hope that they will aerate the water, but for purely decorative purposes and to give the inmates some cover.

There are so many kinds of seaweed—some far too big for any aquarium—that deciding which to try is quite a problem. First of all, however, is the task of finding out what they are called so let us tackle that point and in the process we may find a little help towards the problem of selection. We will take them in the order they appear in the drawing.

The Leather-weed, *Laminaria saccharina*, is that very long and broad strip of leathery weed usually found just around the lowest tide mark. It is sometimes 12 feet long, and a foot wide. This single-frond seaweed has a wavy edge, and is anchored at the bottom by a "hold-fast" that is branched. Incidentally, seaweeds do not have roots (which are the land-plant's means of obtaining food and water, as well as a grip on the earth). They



have instead merely an anchorage that grips the rock or sand on which they grow. The seaweed's sustenance is obtained from the water around it, and absorbed through the fronds.

There are other laminarias something like the sugar weed. One, *L. hypoberea*, has the broad frond divided into many strap-like branches. It reaches a length of 4-5 feet, and is about half that amount wide. *L. digitata* is similar, but the individual strap branches are as much as 10 feet long. All these three have similar anchorages.

With a different hold-fast, one that is round and nobbly instead of branched, is a similar weed to the last one. This is *Saccorhiza polychides*, which has a frilled stalk below the 6 feet long branched fronds. Similar to the sugar weed in having just a single frond is *Alaria esculenta*. The branched hold-fast is large, and on the stalk just above it are some leaf-like fronds. Above this rises the long strap-like brown frond, somewhat paler in colour than all the others.

Sea Lettuce, *Ulva lactuca*, because of its light green colour, may attract the aquarist giving some hope, perhaps, that it will do some acrating. This could be so if specimens already attached to stones can be obtained, and these could be tried. I have found this weed somewhat delicate and liable to die quickly in which case it soon rots and can cause trouble. When transporting it home it is very easy to bruise beyond hope of recovery. Nevertheless it is a good possible for the tank for it remains fairly small.

Another green weed is *Enteromorpha intestinalis*, which

has narrow tube-like fronds partly filled with gas. This one is extremely delicate and during summer can be seen dead and bleached white on all our coasts.

A green weed called Sea Grass (wrongly, I think, because there is another species with the same common name)—is *Enteromorpha compressa*. This one is a little more hardy and I have kept it alive in a strongly-lit aquarium for a couple of months. It has long, narrow green fronds, branched from near the ground. My specimens were all attached to rocks, and a hammer and cold chisel was needed to cut off the section of rock. It lives all around our coasts, particularly where fresh water runs into the sea so will live in brackish water.

Irish Moss, or Carrageen (*Chondrus crispus*) is a low plant with good aquarium possibilities, being but 3 to 4 inches high. Its brownish-red fronds are beautifully branched and under water the whole plant has a glittering quality that makes it particularly attractive. The disc-shaped hold-fast can be found attached to individual stones, but usually these are so well embedded that a lot of force is needed to move them.

The Peacock Weed, *Padina pavonis*, is another very pretty weed for an aquarium. It is found only on our south coasts, however, and therefore may not be of easy access to everyone. This southerly distribution shows that it favours slightly warmer water, and it may be worth trying with tropical marines. This one, again, is found mainly near the lower tide marks, in pools and rocky

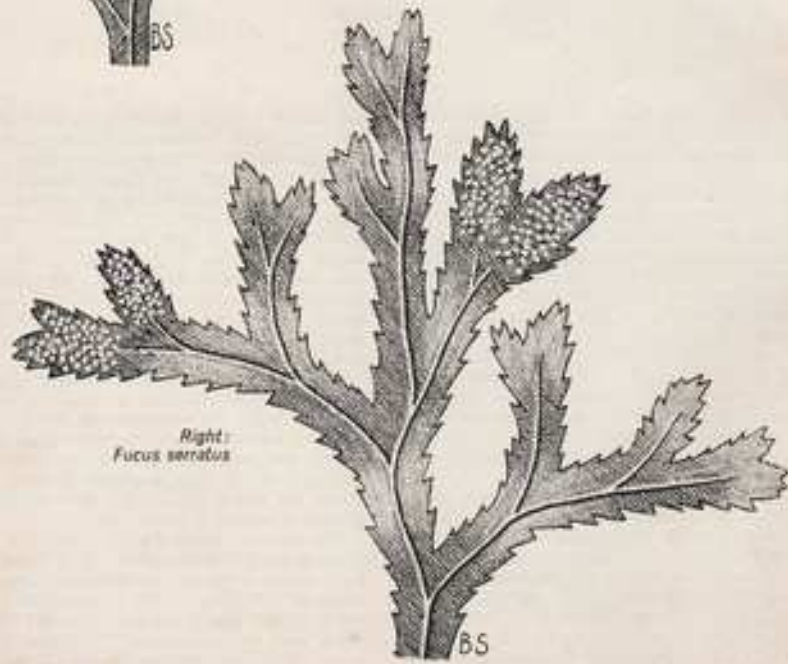
Continued on page 346

Some common seaweeds

continued from page 345 ▶



Left:
Membranoptera alata



Right:
Fucus serratus

clefts. It is rarely more than six inches high, usually dark brown on the base, lightening through pale brown to greenish at the top, and banded with white concentric strips.

A distinctly different pink-red colour is found in the Coralline Weed, *Corallina officinalis*, for it carries a skeleton-like coating of limestone on all its fronds. This rather stiff seaweed is many-branched, though smaller than six inches, and can be found in rocky pools in shady places. This shadiness indicates that it does best without too much sun which means that aquarium conditions might well suit it. The limey coating, however, should be viewed with caution. I have made no experiments with this seaweed and it may well be that it could affect the pH of the water. Certainly in too acid a water it could lose its coating of lime and might easily become unhealthy. The plant warrants a little research.

The name of Bladder Weed, or Wrack, covers many species of varying sizes but most of them are without the characteristic air bladders. All of them are extremely common all around our coasts, and usually hang in festoons from the rocks when the tide goes out. Not always do we notice that some have no air bladders, for their characteristic grouping tends to conceal individual features. *Fucus vesiculosus* is the kind with prominent air bladders. It is fairly fast growing, but I have used it for short periods in cold sea-water aquariums housing anemones and shrimps. It is essential, however, to secure it attached to a piece of rock, and this necessitates the use of a cold chisel and hammer. I choose young, six-inch fronds, and these always fare well in the aquarium, but of course I keep the water well aerated. Grouped in one corner of the aquarium four of these smaller bladder wracks make a nice little tangle of dark brown.

A seaweed something like the bladder wrack but without any bladders and with a serrated edge, is *Fucus serratus*. This one lives in the same places as bladder wrack. The frond illustrated here shows the fruiting bodies at the tip of two branches.

Being somewhat smaller, though similar in appearance to the previous two, the Flat Wrack, *Fucus spiralis*, is rather more suitable for the aquarium. It is quite common and rarely grows above one foot long. There is a decided twist to the bladderless fronds hence the name spiralis, and a small clump of this weed can add interest.

The smallest of this group is the Channel Wrack, *Pilayella canaliculata*. This also has no air bladders, and rarely grows above six inches long. It is a dark greenish-brown in colour and lives on the highest parts of the tidal zone. It is exposed to the air and sun for much of its life, and specimens I used in an aquarium soon sagged. Without the twice daily exposure it appears to die quickly.

Although not belonging to the bladder wrack family, there is a similar plant called *Mesobryopsis alata*, which I have illustrated here. This is forked and ribbed like the wracks, but is without any air bladders and has the peculiarity of living underneath other seaweeds in partial shade. It seems to be suitable for aquariums but I have not tried it yet. It is small, dark brown, and quite ornamental in shape.

Often to be found in the same low tide zones as are the laminarias, is the Shoe-lace, or Thong Weed, *Himantalia elongata*. This leathery, string-like seaweed grows from

Continued on next column

Fish Nutrition

Two recommended foods
from U.S.A.

TUBIFLAKES, a product of Miracle Plastics Corporation, New Jersey, U.S.A., is one of the latest developments in the field of aquarium fish nutrition. It is a mixture, in the correct proportions, of freeze-dried tubifex, fish liver, salmon eggs, brine shrimps, chlorella algae and yeast. To this blend of substances, rich in the qualities necessary to provide for good growth, normal activity, and proper development of colours, has been added various trace elements and vitamins—in particular vitamins of the vitamin B complex, including folic acid and nicotinamide—which are so essential for the maintenance of good health and resistance against disease.

Tubiflakes softens on immediate contact with water and is eaten avidly by all omnivorous fishes. As a matter of fact, fish like it so much that little, if any, reaches the bottom. Which is a good thing. Because the flakes weigh so little and are packed with goodness, Tubiflakes is most economical in use. Tipped on to a clean sheet of writing paper, the flakes, even when shaken to and fro, leave no dust. It follows, therefore, that in feeding this food the aquarist runs no danger of clouding his aquarium with floating particles. Tubiflakes retails at 6s. 6d. for a full ounce, and is packed in a strong snap-lidded plastic container.

From the same source comes Fry Treat. This is a fine-milled dried food chock full of many of the flesh-, bone-, and muscle-making ingredients found in Tubiflakes. The tinniest squeeze applied to the sides of the flask-like plastic container will puff sufficient of the food to feed, at one meal, a whole lot of fry. Some of the particles will sink to the bottom almost immediately, but the rest will stay suspended in the water for a long time. This new fry food should prove of inestimable worth for the breeder of oviparous or viviparous fishes. Enough to feed several batches of fry costs only 4s. 6d.

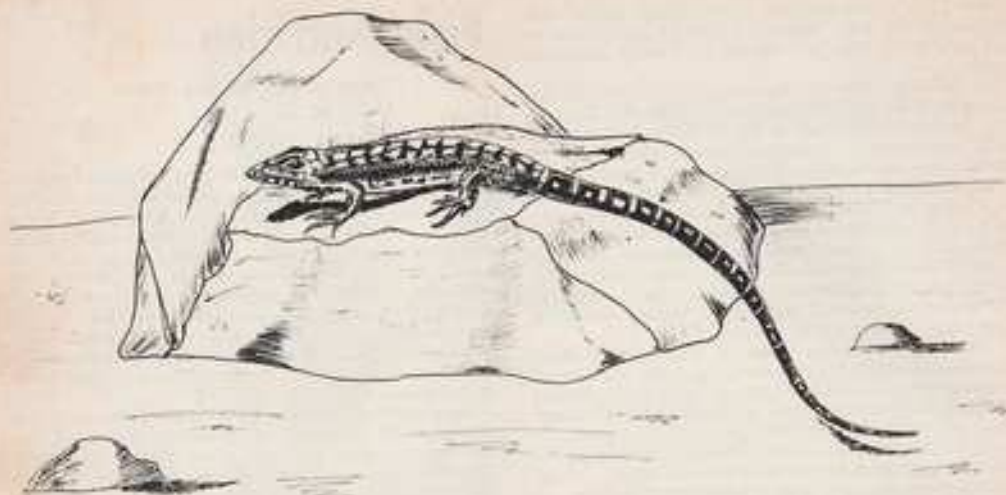
J.H.

Some common seaweeds

continued from previous column

a cup anchored to the rock by a short stem. It is of little use in an aquarium, for it grows to many feet in length, and only in a great mass could it look effective.

There are, of course, very many more seaweeds than those mentioned, but perhaps sufficient has been written to indicate the great scope for investigation that exists. Probably many seaweeds are being used to decorate aquariums at the present time, and notes from our readers about their successes, or otherwise, would be helpful to other aquarists. Who knows, if sufficient becomes known about their aquarium possibilities, we may soon have establishments all around our coasts prepared to despatch suitable seaweeds to those unable to fetch them. Such a service could fill a need.



The wall lizard

(*Lacerta muralis*)



by H. G. B. Gilpin

THESE lizards are widely distributed amongst the warmer European countries, islands in the Mediterranean and Asia Minor and occur in a great number of geographical varieties. They are commonly imported into this country and their small size, slender shapes and lively habits make them ideal inhabitants of a vivarium. They have the further recommendation of being inexpensive to buy.

The overall length of the males is about seven and a half inches and that of the females six and a half inches. The somewhat elongated head surmounts a slightly flattened body which continues into a gracefully tapering, finely pointed tail, approximately twice the length of the body.

The upper parts of the body vary in colour from grey to brown, handsomely reticulated with black in the males. The female is striped with lines of black patches along the back and has a brown band bordered with paler stripes along the sides. The under parts are white, yellow or sometimes brick red, occasionally brightened with blue spots along the outer row of abdominal scales.

These animals, being diurnal, are particularly suited to vivarium life as, although they retire occasionally to some hidden retreat, most of the day they are constantly in view. An added advantage is the rapidity with which they settle down. Most of those I have kept have disliked being actually handled and have been reluctant to take food from the fingers but otherwise they have become extremely tame and shown no signs of alarm when they, or their quarters, have received attention.

It is perfectly safe to confine Wall Lizards with other lizards of the same size. They ignore those of other species and although a social hierarchy develops when

Wall Lizards are kept together in a group, I have never known any actual damage to result from their occasional sparring matches which rarely amount to anything more than expressions of mutual defiance.

I have frequently seen it stated that these European lizards will live comfortably in this country at room temperature but, as with Geckos, I have never cared to expose them to the rigours of the English winter, even when they are kept indoors. They will survive quite satisfactorily when given the comparative freedom of an unheated greenhouse providing it contains a bank of soil of such depth as to allow them to bury themselves safely below danger level and so hibernate throughout the colder months. In the house where no such facilities are available they are all the better for a little extra heat. That afforded by the installation of a 25 watt electric light bulb in their quarters is entirely adequate and the obvious enjoyment of the lizards as they bask in its warmth more than justifies its presence.

They are not troublesome to feed and will take winged insects up to and including the blowfly in size. It is true these insects are not always available but during most months of the year maggots can be obtained from shops supplying anglers' requisites or from firms catering for ariculturists requiring regular deliveries of bird foods. Some of the maggots will be eaten directly by the Wall Lizards but most will pupate and very soon develop into the adult flies. With a little care it is possible to stagger the hatchings so that a fairly constant sequence of the insects can be maintained. A single hatching will content the lizards for several days.

Wall Lizards, like most animals, do best on a varied diet and this can be achieved by ringing the changes with newly hatched locusts—Wall Lizards cannot cope with locusts much more than a week old—woodlice, young stick insects, crane flies when in season, and spiders. The latter are great favourites with my Wall Lizards and appear to be particularly beneficial. I have been told that Wall Lizards will eat small earthworms. These creatures cannot long tolerate the warm, dry conditions of the vivarium and if not eaten immediately would soon shrivel and become a nuisance. Consequently I have no personal experience of their value as an article of diet for this species of lizard. Mealworms, especially the small ones, are an unfailing standby and can always be used to fill a gap in the feeding programme.

Unless hungry, Wall Lizards show the utmost indifference to the presence of insects and it is not uncommon to see one of the lizards draped across a rock with a trio of young locusts perched on its back, utterly oblivious of the insecurity of their prospects. When a Wall Lizard is hungry, however, its behaviour undergoes an abrupt change. On sighting an insect it remains poised, immovable as a stone statue, for some seconds and then, suddenly galvanised into action, leaps towards its prey and seizes it in its jaws.

Wall Lizards require water and will drink from a pot. This should be small and so placed as to prevent the lizards from sliding through it, which they will do if permitted, during one of their not infrequent hurried excursions around their quarters. The water in itself would do them little, if any harm, but sand sticks all too readily to their

wet skins. This, apart from any possible ill effects it might cause, is unsightly and best avoided.

Although active, the small size of these lizards enables one to keep them satisfactorily in a comparatively small vivarium. One two feet by eight inches by eight inches is quite adequate and if suitably furnished will supply them with all the exercise they need.

In the wild these lizards inhabit dry, rocky country and are also frequently found in sparse woodland where very little water is available. They occur on walls, old buildings and ruins and I have seen them scampering over the thatch hovels of the Spanish peasants where no doubt an abundance of insects was to be found. This type of terrain can be simulated in a vivarium by covering the bottom with an inch or so of dry sand and building a background of large stones. At least one of these should have a flat surface facing the electric light bulb as the lizards will enjoy sprawling across its surface and basking in the heat. Sunken pots containing small cacti improve the appearance of the vivarium and I have never known them, in spite of their armour of spines, to affect the lizards adversely.

Wall Lizards are fond of climbing and a small gnarled branch with several short outgrowths, laid slantwise across the vivarium will enable them to indulge their proclivities in this direction thereby benefiting themselves and adding to the interest of anyone watching them.

Beginning in May or June the females start to lay their eggs, from two to eight to a clutch. A second or even third clutch may be produced before the end of the summer, each clutch being buried in the ground in holes dug by the female.



Precious as gold

The Siamese Fighter is a joy to behold,
He is fancy, fearless and fantastically bold,
He comes from Siam and places like that;
And is ready to fight at the drop of a hat.

In attracting attention he never fails;
He just opens his fins like billowing sails,
His colours include the yellows and blues;
And reds and greens of various hues.

He's not very big and not very little;
He builds his home from bubbles and spittle,
When courting a female he's very aggressive;
And when he's got fry, very possessive.

In a book index to find the fish I prefer,
To the name "Betta Splendens" you'll have to refer,
He'll bring to his owner pleasures untold;
And to the person who owns him he's precious as gold!

A. BEASLEY

Sex determination in fishes

by Dr. M. Sage

HAVE you ever wondered how it is that almost all fish seem to grow up as either male or female? Only rarely do we find something in-between. Once, when breeding a wild strain of guppies from Guyana, I had a run of in-between fish whose sex was uncertain and an occasional one still turns up. Many aquarists must have come across swordtail fish that have apparently changed from females into males. How do these abnormal fish arise and how are the sexes normally kept distinct?

The genes that determine the characteristics of an organism are carried on pairs of chromosomes. Those special genes concerned with the sex of an individual are normally on one pair of sex chromosomes. The sex chromosome with female genes is called the X chromosome and the Y chromosome contains male genes.

In mammals and many fish, such as the guppy, the female has two X chromosomes and the male has one X and one Y. Since only one of each pair of chromosomes passes into the sperm or ova, it is easy to see (Fig. 1) that there will be equal numbers of male and female offspring.

Another type of sex determining mechanism is seen in some strains of platy (*Xiphophorus maculatus*). In most platy fish the mechanism is the same as in the guppy but in some strains the male has two Ys and the female one Y and a W. This system will also result in equal numbers of male and female offspring (Fig. 2). But if strains of platy with XX and XY are crossed with other strains having YY and YW, some odd results can occur. The young will either be all males or half will be males and half females, depending on which way the cross is made (Fig. 3a and b).

Some of the guppies that I have found with appearances intermediate between male and female had no gonads and some of the others had abnormalities such as thyroid tumours or parasitic infections which may have accounted for their changed appearance. In other cases the result may have been due to the presence of extra sex genes on chromosomes other than the normal sex chromosomes. In rare individuals these extra sex genes may upset the balance so that an XX guppy with many extra male genes may develop as a male, even though its sex chromosomes are of the female type. When such an abnormal male is crossed with a normal XX female, the offspring are usually all female (Fig. 4). Only if the female used also had some extra male genes are any further XX males likely to occur.

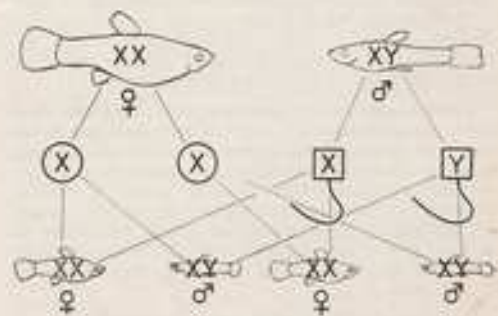
At least some strains of one of the mollies (*Mollisoma formosa*) appear to consist of only females. These will mate with males of related species but the young produced are all like the mother and are all females. Clearly something very odd is going on. The probable explanation is that *Mollisoma formosa* is a hybrid in which the sex genes are so out of balance that only females can occur. When these fish mate, the sperm enters the egg and initiates the development of the embryo but the chromosomes from the sperm are not incorporated into the embryo. The X chromosome of the egg divides to produce an XX pair of chromosomes and the resulting fish are all female (Fig. 5).

This means that the offspring are genetically identical like identical twins and grafts of skin or even internal organs can be transplanted from one individual to another in the same way as is possible between human identical twins.

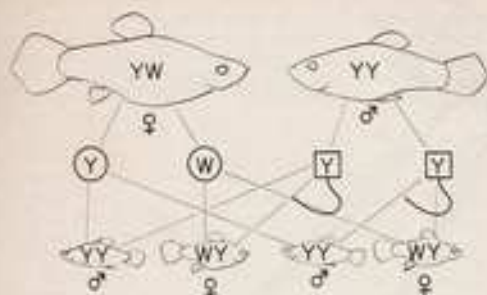
This mechanism is very similar to parthenogenesis, which has been reported to occur in the guppy. In parthenogenesis, the egg develops without fertilisation, the chromosomes dividing to produce the pairs of chromosomes found in adult cells.

Apparent sex reversal with age is often seen in swordtails. The red swordtail is derived from a hybrid of *Xiphophorus helleri* and *X. maculatus*. Since sexual abnormalities are common in hybrids the apparent reversal is not so surprising but sex reversal has also been reported in the green swordtail, *Xiphophorus helleri*. In fish, the young have rudiments of both testis and ovary but only one of these rudiments normally develops. It may be that in the swordtail the testis rudiment remains dormant in some females and then develops as the hormone balance changes with age. Something like this must happen in true functional sex reversal. However, when I dissected a group of red swordtails that had apparently changed sex, I found no gonads at all. These fish, which had a male appearance, must have had a functional ovary when young as most of them had produced normal offspring.

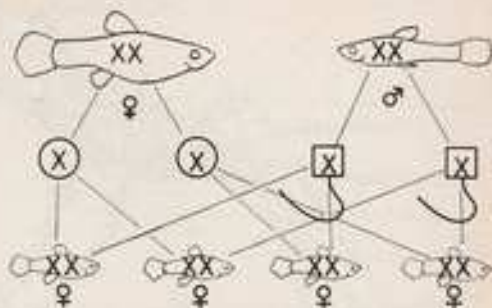
Why should animals go to so much trouble to maintain two distinct sexes? The answer lies in the variations possible in the young when an assortment of genes from two parents come together. These variations are the raw material of evolution. So, in spite of the occasional exception, most fish and other animals will continue to grow up as either male or female.



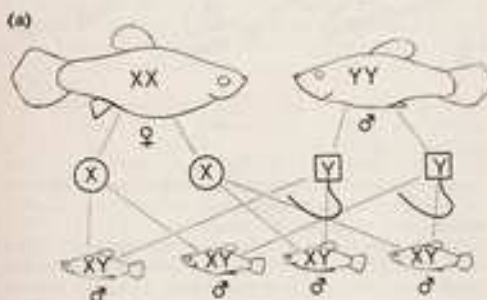
1. Cross between normal male and female guppies resulting in equal numbers of male and female offspring. Top row: parents; centre row: eggs and sperm; bottom row: offspring.



2. Cross between a YW female and YY male platy.



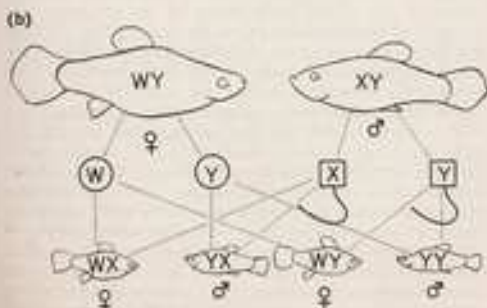
4. Cross between a normal female and an abnormal XX male guppy.



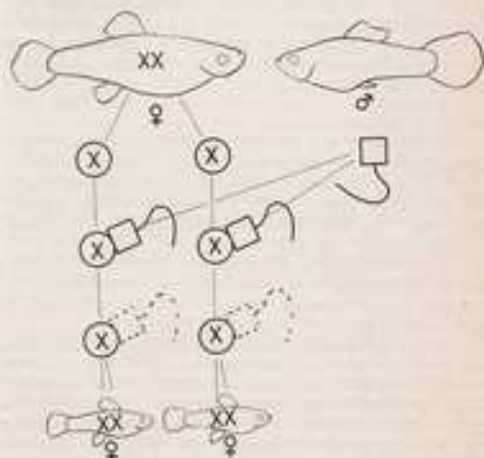
3. Results of crossing platys from strains with different sex-determining mechanisms.

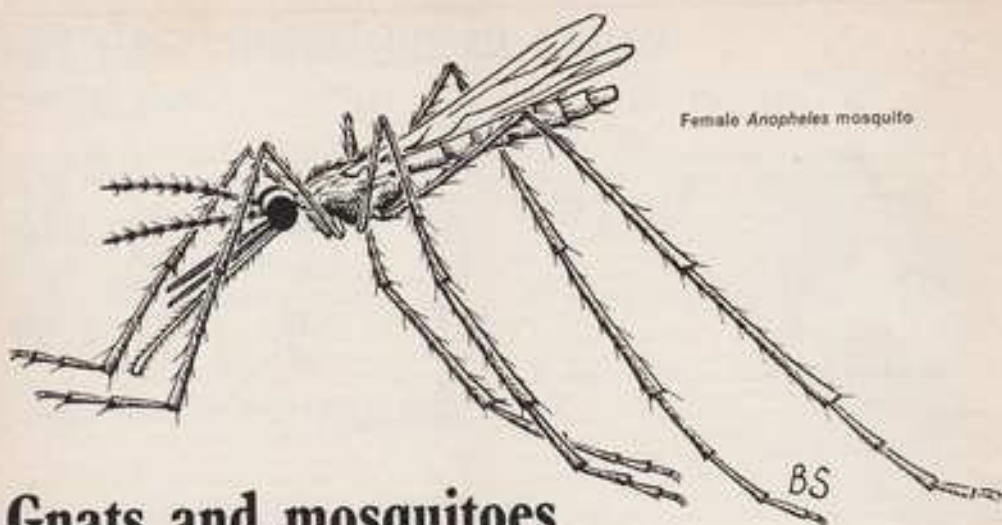
(a) cross between XX female and YY male.

(b) cross between WY female and XY male.



5. The results of mating a female *Mollinesia formosa* with a male of a related species. The sex chromosome of the sperm is not shown as it does not contribute to the offspring. The sperm merely initiates the development of the egg.





Gnats and mosquitoes

by Terry Jennings

WHEN the cold rays of winter sunshine pierce the chilly mists, even when the snow lies deep or the ground is hard with frost, gnats and mosquitoes are about. They dance in the shelter of the hedge or wall, indulging in bouncing aerial leaps, which suggests they are suspended by invisible elastic threads.

Little in these dances suggests nuptial excitement, but in fact all these sparrows are likely to be males, doing their very best to advertise their presence. Stimulated by the warmth which brought them from the pupal cases, they dance, each species in its own column, trying to attract the attention of any females that care to wake from their slumbers and take notice.

This is one of the few occasions when male gnats and mosquitoes exert themselves. Most of their relatively short life is spent harmlessly sucking at the juices of plants. In every other aspect of life the females are the superior sex, and it is they that are responsible for the blood-letting habits of the species.

Rather surprisingly, although a gnat or mosquito (there is no real distinction between the two) has about 8,000 lenses to each of its compound eyes, the antennae are used to seek a blood meal, and not the sense of sight.

These antennae are less than an eighth of an inch long on a malaria-carrying *Anopheles*, and still shorter on many other species, but they can detect extremely small quantities of radiant heat coming from a hot surface. The mosquito's travels may take her on a tortuous route over an area two miles across, and she obtains the sustenance for these flights mainly from sugar in the nectar she sips from flowers on the way. Yet as she stops for refreshment, she remains constantly alert for a warm-blooded animal. Her choice

of a victim includes a good many species from among the birds and mammals of the region, including any unlucky humans that happen to be around.

The insect's feelers are situated very close to each other on her head but even so, she can tell from which side of her body the heat is coming, even though it may be radiating through the glass of a bedroom window from an unsuspecting slumberer inside. The gnat or mosquito orientates herself so that both antennae are receiving the same amount of heat, and then steers a course directly towards its source.

With almost imperceptible lightness, the insect lands on her victim. Her four lancets, long enough to penetrate even thick woollen socks, are thrust downwards carefully protected and guided by a groove in the underlip. An injection of anti-coagulant saliva, the cause of the irritation that later develops, flows down into the wound and the insect sips her victim's blood. The whole operation takes about three seconds, and then the mosquito goes off to digest her meal in some convenient resting place.

It is a well-known fact that not everyone receives the same degree of attention from gnats and mosquitoes in summer, and the reason for this is quite simple. Some people radiate more heat from their skin than do their fellows, and it is only those who glow with this inner warmth that are visited by these blood-sucking insects.

If a warm-skinned person happens to walk along a river bank or past a pond where swarms of gnats and mosquitoes are to be found, the insects will be attracted to him and whir around his head. The warm-skinned person has generally learned by bitter experience what this swarm of admirers means, and so he flaps angrily

at them with his hands. The more angry or flustered he is, the better his skin becomes, with the result that all the gnats and mosquitoes from many hundreds of yards around leave their less interesting tasks and descend upon the victim, whose skin is only a degree or two higher than that of his companions. For their part, his companions usually stand by unmolested, wondering what all the fuss is about.

The female gnat or mosquito proves herself just as skilful at raising a family as she is at surgery. After mating, in the spring and summer months, she seeks some sheltered backwater or stagnant pool, albeit in a hollowed-out tree stump, where she deposits about three hundred eggs, each an ingeniously devised unsinkable buoy with no less than three protective shells. To make doubly certain that the eggs do not sink or become scattered, the female mosquito glues them all together into one compact raft.

From each egg emerges a small transparent larva, which at once begins to swim actively through the water, with the rapid contortions of body that have earned it the name of "wiggler", by which it is known to children. This larva is a remarkable piece of biological engineering capable of descending and surfacing like a miniature submarine and able to cope with quite rough water. It breathes air through a hairy tube that terminates in five small valves which can be closed immediately a squall develops, also enabling the larva to crash dive in an emergency.

In about two or three weeks there is a further development to the pupa—a mermaid-like creature that swims tail first with two paddles. The pupa is less dense than water, so to keep submerged it must swim. As soon as it stops wriggling it automatically floats to the surface.

At the end of the short pupal period the winged fly inflates itself with great gulps of air, until it bursts its pupal covering. The water pressure outside squeezes the body of the insect to the surface like a squirt of toothpaste from a tube. The next few minutes are the most critical in the life of the gnat or mosquito because it rests on its old skin using it as a life raft, but the least breath of wind can send it scudding across the water, and may upset it and drown the fly. However, once its legs and wings are strong enough, it runs along the water surface and becomes airborne.

Book review

Your Book of Freshwater Life, by John Clegg
Published by Faber & Faber at 15s.

It is always satisfying to pick up a textbook whose author has a sound reputation for accuracy and attention to detail. This introduction to one of the most fascinating realms of study will afford that satisfaction. Profusely illustrated with Mr. Clegg's own splendid photographs, the coverage is practical as well as academic for there are sections dealing with collecting apparatus, suppliers thereof, and societies to join. While being a broad outline of life in the self-contained world of water, a great deal of information has been packed into 50 pages.

COLDWATER queries

continued from page 335

top. This keeps the water safe for the fishes in transit. Normally water takes in oxygen from the atmosphere. As long as you do not overcrowd the tanks the fish should be all right.

I have a kind of Bitumastic paint and wonder if it will be safe to use to make the pond waterproof?

The material should be safe. A well constructed concrete should hold water with no treatment. I have concrete tanks made with concrete and although only half-an-inch thick, hold water safely.

To what age does a Dace usually live?

In a natural water it is doubtful if a Dace would live more than five or six years. It is possible for such a fish to live for many years if it was away from natural predators including Perch and Pike. If such fish lived for many years the waters would soon be filled with them. Providing the fish is given plenty of swimming space and well oxygenated water it could live much longer than a Dace in natural waters.

What is the best time of the year to clean out a pond to do less damage to fish and water lilies?

The winter is the best time as the water lilies will have died down and the fishes will be very quiet needing little if any food and not moving around much. In any case do not leave the cleaning out until after about the middle of March.

I have constructed a rather large pond and am worried about a number of Elm leaves which fall into the pond. Will these do any damage?

If too many leaves are allowed to sink to the bottom they may rot and cause some pollution. However, the amount of damage will depend on the amount of water in the pond and the number of leaves left in the pond. Net out as many as you can before they sink and then clean the pond out once all the leaves have fallen.

I have made a concrete pond and would like to know how long to leave it filled with water before it is safe for fishes?

A lot will depend on the depth of water, in other words the amount of concrete in contact with the water. Freshly made concrete will give off free lime in the water and so the more shallow the water the stronger will the concentration of free lime be. After the pond has been filled for some days empty it, scrub it round well, refill and repeat the tank after a few more days. The pond should then be safe.

Please could you tell me the best way to clear an aquarium of white spot disease as my fish have been plagued with it for six weeks?

One certain way is to have a spare clean tank. Move the fishes to this and sterilise the old tank. Then change the fishes over every day or two to a clean tank. If you can warm the water up to 85° F, this will hasten the development of the parasites and the period to clear the fishes would be lessened. By changing the fish it is possible to wash away all the cysts or young parasites before they could find a fresh host.

News from AQUARISTS' SOCIETIES

THE Stockton-on-Tees A.S. held its annual Championship Show on 28 January, and the results were as follows: A.V. Livebearer; 1 and 3, L. Collins; 2, J. Chamberlain; A.V. Egglover; 1, L. Collins; 2, J. Chamberlain; 3, R. Caygill; 4, R. York. A film of the last annual show taken and presented by members of the Billingham Caw Club concluded the evening.

AT the Salisbury and District A.S. annual general meeting the following officers were elected. Chairman, J. West; Vice-Chairman, M. Sambury; Hon. Secretary, L. Goddard; Hon. Treasurer, Mrs. S. Brown; Show Secretary, B. Bowen. It was also decided to hold the annual Open Show again this year on Sunday, 23 June. Meetings are held on the first Monday of the month and any new members who are interested in the hobby may obtain particulars from the Secretary at 95 Fisherton Street, Salisbury.

THE South Staffordshire Society of Aquarists held their fourth annual general meeting at the beginning of January and the members elected to office were as follows: President, H. Clarkson; Vice-President, Mr. Pickering; Chairman, J. Bodey; Vice-Chairman, C. Wernham; General Secretary, P. Ash, 292 Hardin Road, Coalport, Walsall, Staffs; Assistant Secretary and Treasurer, G. Law; Assistant Treasurer, N. Wetherer; Service Secretary, P. Sanders; Show Secretary, T. Miles; Assistant Show Secretary, F. Boretti; Social Secretary, Mrs. Wernham; News Letter Editor, G. Pickett. Any further information about the Society may be obtained from the Secretary, Mr. P. Ash.

AMONG the activities of the **Mid-Herts. A.S.** during January was a talk by Mr. Keith Parkin of Hemdon A.S., on the Keeping of Boros, and a table show for supplies the result being as follows: A.V. Males; 1, B. Bradshaw; 2, B. Rumsey; A.L. Water; 1, A. Adams; A.V. Female; 1, L. Walter; 2 and 3, B. Bradshaw; 4, T. Timms. Breeders: 1, B. Rumsey; 2, L. Walter.

THE March convention of the **Federation of Scottish Aquarist Societies** will be held on 3 March in the National Engineering Laboratories, East Kilbride. The lecturer for this convention will be Dr. Carrington whose subject will be "Modern Techniques in Fish-keeping".

THE officers elected at the first meeting in February of the **Ramsgate A.S.** were as follows: V. Robinson (Chairman); P. Cairns, 1, Manchester Road, Ashford, Middlesex (Secretary); J. Terry (Treasurer); K. Smith (Show Secretary); J. Marchant (P.R.O.); Mr. Sweeney (Committee member). The second meeting was a social and dinner in connection with the presentation of awards won in table shows last year, and was considered a very good evening by all members and friends who were able to attend.

THE following officers were elected at the **Enfield and District A.S.** annual general meeting. Chairman, J. Coleman; Vice-Chairman, C. Cansley; Secretary, E. G. Whitaker, 26 Shirley Road, Enfield, Middlesex; Show Secretary, B. Senior; P.R.O., I. Young; Treasurer, C. Gray.

AT the January meeting of the **Ilford and District Aquarists' and Pondkeepers' Society** three films were shown which were a departure from the usual feature—a selection from British Railways excellent film library, namely, The Scottish Highlands, The Lake District and Between the Tides. Those portrayed many annual aspects of wildlife

in sound and colour and in particular "Between the Tides" included brilliant underwater shots of marine life on the west coast, all of special interest to aquarists.

The awards gained by members during last year were presented by one of the Society's Vice-Presidents, Mr. Jack Nott. The details were as follows: Home Aquaria competition; 1, L. Smith; 2, J. Hattam; 3, P. Shorham. Food competition; 1, Mr. and Mrs. D. Woodley; 2, M. Bell; 3, M. Beahm. Table Show competition (Highest number of points during year); 1, J. Hattam; 2, M. Bradham; 3, H. Berger. All Classes Table Show; 1, P. Shorham (best livebearer); 2, W. Rowe (best egglover); 3, R. Sampson (best junior).

The forthcoming programme is as follows: Monday, 11 March, programme of films, including the subject of furnished aquaria; Monday, 8 April, Auction of fish and plants for members; Monday, 13 May, Coldest yet fish and garden pools. Talk and slides. Further information concerning the Society may be obtained from the Secretary, Mr. R. Roth, 13 Denmark Road, Dagtham.

THE International Marine Study Society has announced a reorganization of its Council effective from 1 January, 1968. Council members are now as follows: Membership Secretary, K. Martin, 8 Lamson Drive, Swindon, Wilt., Eng.; Public Relations Officer, M. J. Parry, 45 Western Drive, Guballa, Cardiff, Wales; Exchange Journals Librarian, T. W. Beard, 20 Mary Greeny, Conway, Caerns, Wales; Hon. Treasurer, T. G. Sore, 177 Harwin Road, Bedford, Middx., Eng.; Chairman of Fellowship Committee, A. S. Metzger, 112 Brook Drive, London, S.E.11, England. The Discretion remains the same.

THE January meeting of the **Horsforth A.S.** was not so well attended as the weather was very bad, with a heavy downfall of snow, but a quiz which was held was enjoyed by everyone who attended.

The results of the January table show were as follows: A.O.V.; 1, Master P. Kirby; 2, Mrs. J. Dickinson; 3, Mr. Pollard, J.A.O.V.; 1, Master J. Galsley; 2, H. Piers; 3, A. Kirkright. Best in show; Master J. Galsley with a Red Fin Shark.

AT the January meeting of the **Hastings and Beachill A.S.** members were given a most unusual and original talk by Mr. Barry Pinnell whose fishkeeping experience dates back to the early 1930's.

Fish photography has recently been taken up by one or two members, particularly Mr. Les Lufford who is a member of a local photographic Club. Two evenings have been devoted to slides showing members' own fish, and recently a photographic evening was held at the home of the Treasurer, Miss Valeria Rogers where despite appalling weather conditions there was a good attendance and an instructive evening was enjoyed by all present.

At the December General meeting Mr. Roy Goldup the club secretary gave a talk on his impressions of the British Aquarist Festival which he had attended, and at the October meeting Mr. Jack Stewart from the London Transport Society gave a practical demonstration of how to set up a furnished aquarium for a furnished aquaria competition. Results of the Club's annual home aquaria competition were: 1, A. McCormick; 2, Master A. Martin; 3, Mr. R. Goldup. Best plants: A. McCormick, best Junior aquaria, A. Martin.

ATTENDANCE by members has been extremely good at two meetings of the **Brighton & Southern A.S.** held in January. The

best included a tape-wide lecture hired from Horsforth A.S. which was a series of recordings from aquarist societies the world over. These proved to be very interesting, particularly a section from America explaining the set-up of the terraria box for live breeding fishers.

At a table show held later in the month for laboratory fisher entries were received and the club welcomed Mr. Dave Ellis from Kingston to officiate. The awards were as follows: 1 and 2, L. Ainsworth, Thick-lipped gourami; P. Pavey, Kingfisher; 4, D. Soper, Comets. Any person interested in joining the Club will be welcome at the fortnightly meetings or may contact the Secretary, Mr. R. Shelton, 45 Coventry Street, Brighton.

THE President, J. Brockhurst and Vice-Presidents, Mrs. J. Curry and W. Fors, were among the first members present at the January meeting of the **Barry A.S.** Mr. Young of the Glamorgan Education Authority was kind enough to come along and show three narrated colour films called "The Sea-shore", "Setting up an Aquaria" and "The Great Canal Reef". The Society is once again to enter an exhibit in the Barry Horticultural Show in July.

AT the **Brent A.S.** meeting in January a lecture was given by the Vice-President, Dr. R. O. B. Liu, Ph.D., on many aspects of the Aquarist hobby. A very successful competitive Table Show was held also and judged by L. Smith of the Bethnal Green A.S. the results being: Pair of egglovers; 1 and 2, P. Shorham; 3, M. O'Connell; 4, T. D. Smith; Pair Livebearers; 1 and 3, J. Lane; 2, C. Fitzgibbon; 4, C. Fitzgibbon. Best in Show, P. Shorham.

THE members of the **Pontriffract and District A.S.** were entertained at the January meeting with a slide-show entitled "The British Aquarist Festival 1967" which was given by Mr. R. Hampson of Horsforth who also judged the Table-show the results of which were as follows: Birds; 1, P. Gares; 2, Goodall and Pever; 3, D. and B. Cohen, Goldfisher; 1, 2 and 3, T. and J. Turner, A.O.V.; 1 and 2, D. and B. Cohen; 3, Pever and Goodall. The newly-formed society library was launched at this meeting and a great deal of interest was shown. The "Award of the Month" was won by Mr. and Mrs. Cohen.

A NEW Club has been formed in Essex, i.e., **The Blackwater Aquarist Society** with a membership of 27. The following officers have been elected: Chairman, E. N. Gray; Vice-Chairman, E. Kaine; Treasurer, Master R. Mills; Secretary, Mrs. E. N. Gee, in filling an temporary and the post will be taken over by Mr. D. J. Kempen in the course of the next couple of months. It was agreed to meet on the third Wednesday of the month at The Royal Oak at Hazeleigh as the room has been offered free of charge to help the Club. A Perpetual Trophy and replica for the winner of the year's table shows on points, have been donated.

THE annual general meeting of the **Belgrave & Hadfield A.S.** was held recently when the committee to serve the society this year was elected and the policy for this year debated. The committee elected was: Chairman, G. Bass; Vice-Chairman, A. Barley; Secretary, Mrs. P. Whittington, George, Colindale; Bookishill Road, Hestley, Surrey; Treasurer, W. Bookishill; Show Secretary, I. Stamp, 10 Barkham Drive, Hestley, Surrey; Assistant Show Secretary, N. Pickens; P.R.O., P. Young; Committee members, R. Whittington and S. Preston. It has been decided that the society's annual Open Show will be held on 15 September.

AT the third annual general meeting of the **Glossop A.S.** the following officers were elected: Chairman, M. Fuller; Vice-Chairman, I. Ingram; Treasurer, D. Crook; Secretary, Mrs. M. Beazley; Show Secretary and Advisory Committee, R. Toothington and Mr. and Mrs.

Alan Newell, Magazine and Bulletin Editor, L. McCourt, Publisher, G. Macdonald.

It was most gratifying to see a large turn-out of members, many of whom had travelled distances to be present. The number attending represented about 90 per cent, of the total membership of the Society. Members were particularly pleased that live-water Chairman, Mike Fuller, had agreed to stand for re-election, as it was at first thought that business commitments would stop him from taking office. Mr. Fuller in his summary of the previous year thanked the retiring officers for their efforts in a very successful 1967, and he felt sure that 1968 would be the Society's best season ever.

The Society has a very full programme arranged, open shows, auctions of fish, introductory courses, jungle sales, hectic drives, coffee evenings see just some of the events that have already been arranged. The Society also plans to extend its facilities for newcomers and reviews by giving optional, informal courses on all aspects of fishkeeping. Anyone wishing to join the Society or have further information about it, can do so by telephoning Glossop 2348 or by writing to Mrs. Brunt, Seaview Dry Cleaners, Sheffield Road, Glossop.

The January meeting of the Warrington A.S. was held at their new headquarters, The White Hart Hotel, Sankery Street, Warrington and despite bad weather over 60 enthusiasts turned up to hear Vic Partridge talking about "Marine Fishkeeping". Those who did attend certainly found the programme extremely interesting and the excellent colour film introduced after the interval was fascinating and represented superb ichthyography.

Fish of the Month, matched pairs, saw T. Whitney carry off the trophy for the first time with a beautiful pair of thick-lipped gouramis with Brian Bewick (royal barb) and Bernard Werrall (guppies) coming second and third places.

The new venue is ideal and the Club look forward to welcoming members old and new at future meetings. Arrangements are well in hand for the Club's first Open Show due to be held on 8 September and schedules will be available shortly. Further details of club activities can be obtained by telephoning Warrington 31635.

The Annual Open Show of the Association of Yorkshire Aquarist Societies will take place on Sunday, 12 May. The venue for this event will be the College of Technology, Leeds, Yorkshire.

In the past, confusion has arisen in regard to this annual event and many Societies have been under the impression that this show is open to member Societies of the Association only. Actually this show is an open event to all aquarists. The A.Y.A.S. Diploma will be awarded to any exhibitor whose entry gains the Best Exhibit in Show award.

The Association now comprises twenty-six member Societies and it is hoped that the remaining five non-member Societies in Yorkshire, will soon join.

The final show results for the 1967 annual award were as follows: Swillington 185 pts; Bradford, 139 pts; Tadcaster, 132 pts; Huddersfield, 99 pts; Airedale, 86 pts; Pottersfract, 76 pts; Hall, 63 pts; Mirfield, 57 pts; Halifax, 54 pts; Sheffield, 49 pts; Keighley, 48 pts; Clapham, 43 pts; York, 43 pts; Thorne, 37 pts; Leeds, 29 pts; South, 24 pts; Burnley, 13 pts; Gole, 9 pts; Dewsbury, 8 pts; Middleborough, 7 pts; Skipton, 7 pts; White Rose 6 pts; Garsforth, 1 pt; Harlow, nil; Harfield, nil; Scaththorpe, nil; Wakefield, nil.

The newly formed Stockbridge and District A.S. first open show will be held on 7 April in the Victory Club, Manchester Road, Stockbridge, Nr. Sheffield.

Meetings are held fortnightly on Thursday evenings in the Sportsman Inn, Manchester Road, Droyden, Sheffield.

Will the Secretaries of local Societies please forward schedules of their open shows to the Secretary, G. Horsfield, 36 Haggroove Road, Capthorpe, Sheffield, S26 3AP, Yorks.

RECENT events in the programme of the Mid-Herts A.S. have included a talk by Mr. Kavanagh of Sekoy Tropicals, Hitchin, on the setting up and keeping of tropical marines. This was very well received by the club members, especially as Mr. Kavanagh brought, with the exception of fish, a complete marine set-up.

At a following committee meeting, amongst other things discussed, there was a proposal to try and form a league comprised of clubs from Hertfordshire North and N.W. London and Bedfordshire. Interested show secretaries should write to: C. Withers, 15 Charnmouth Road, St. Albans, Herts.

There has been also a show for Youthclubs, Charnouth, Baberham, Danos and W.C.M.M., judged by Mr. K. Nutt.

The results being as follows: Youthclubs: 1, T. Timms; 2, 3 and 4, C. Withers, Baberham, Danos and W.C.M.M.; 1, T. Mubony; 2, P. Bernard; 3, T. Timms; 4, A. Withers; Charnouth: 1 and 2, P. Bernard; 3, C. Withers; 4, T. Timms. Best fish in show was a Black Wahoo owned by P. Bernard.

of every month at the Clubroom of "The Albert", Chipping Hill, Wilton, and new members, or visitors from other societies will be most welcome.

The annual Home Aquarist competition was won by Bob Baldwin with Don Walls second. The Shield awarded annually to the member gaining most points in the monthly table shows was won by John Warren. During the year members have exhibited at some open shows and have won a number of awards. The Society has also been successful at two inter-club quizzes. Mr. A. V. Gull, 26 Riverside, Braintree, is Show Secretary, and will be glad to receive details of open shows within a reasonable distance.

RESULTS from the Bletchley A.S. table shows: Laboratory: 1 and 2, Mr. and Mrs. Sargent; best fish in the show: 29 and 77 pts; 3, Mr. Perry, 16 pts; any other variety: 1, Mr. Bagley, 79 pts; 2, Mr. and Mrs. Sargent, 77 pts; 3, Mr. and Mrs. Stagg. Leading the race for the most points in the year is Mr. and Mrs. Sargent with 24. Mr. Perry is second with ten. Other placings: Mr. Bagley and Mr. Warner (six each); Mr. and Mrs. Stagg (four); Mr. Chilton (three); and Mr. Townsend, Mr. Childs and Mr. D. Barnes.

The Secretary is Mr. D. M. Clarke, Flat 1, Ropley House, Denbigh Road, Bletchley.

At the annual meeting of Coventry Pool and Aquarium Society the following officers were elected: Mr. P. O. Smith, president; Mr. J. H. Stanton, Mr. W. T. Oliver, vice-president; Mr. E. Sherry, chairman; Mr. B. Beunfield, vice-chairman; Mr. C. J. Grant, secretary; Mr. B. P. Mann, assistant secretary; Mr. R. Thomas, treasurer and Mr. E. Leggett, show secretary.

A REQUEST has been received from the secretary of Newport A.S. for the address of the secretary of the Hereford A.S. Would be please contact I. O. Phillips, 24 Brangwyn Crescent, Newport, Mon.

NEW SOCIETIES

The North Devon Aquarist and Pond-keepers Society has been formed for several months and has about thirty members. The meetings are held on the third Wednesday of the month and further details can be obtained from Mr. A. Easton, c/o County Police Station, South Street, South Molton, North Devon.

On the 8 January The Priory Aquarist Society was inaugurated and numbers 25 members. The meetings will be held once a fortnight on Mondays at 8 p.m. in the "Piercy Arms Hotel", Priory Street, Tynemouth, Northumberland. The secretary is G. E. Lowman, 111 Tynnot Terrace, North Shields. New members will be welcome.

The Ipswich and District A.S. with to contact old and new members in an attempt to re-form a society and those interested should contact Mr. K. H. A. Pellingham, 33 Pencreff Road, Ipswich, Suffolk.

The founder meeting of the Chippenham and District A.S. has been held and officers appointed. Meetings are to be held on the first Monday of the month, at the Sir Auldrie Arms, at 8 p.m., where all interested are welcome. It is hoped that at future meetings to have side shows and lectures from experts. Further details of the society may be obtained from the Hon. Secretary, D. Gough, 7 Shaldon Road, Chippenham, Wiltshire.

SECRETARY CHANGES

Dewsbury and District A.S. Mr. Gerald Whitely, 17 Lower Hall, Highbury, Liversidge, Yorks.

Leamington and District A.S. Mr. R. Sharp, 33 Fairlawn Close, Leamington Spa.

Alfreton and District A.S. Mr. A. Dobson, 169 Birchwood Lane, Sossington, Derbyshire, DE5, 4NF.



The Aquarists' Badge

PRODUCED in response to numerous requests from readers, this attractive silver, red and blue substantial metal emblem for the aquarist can now be obtained by all readers of *The Aquarist*. The design is pictured here (actual size). Two forms of the badge, one fitting the lapel button-hole and the other having a brooch-type fastening, are available.

To obtain your badge send a postal order for 3s. 6d. to *The Aquarist*, The Burns, Hill Lane, Becclesford, Middlesex, and please specify which type of fitting you require.

At the last meeting of the Brent Aquatic Society it was decided that in view of the tremendous enthusiasm within the Society, future meetings will be held every Tuesday. Results of the Table Show held were as follows: Danos, Baberham, W.C.M.M., 1 and 2, C. Swainstam; 3, M. O'Connell; 4, P. Mubony; Carlisle: 1 and 2, T. D. Smith; 3, R. Fox; 4, M. O'Connell; Best in Show: T. D. Smith.

The annual general meeting of the Witham & District Aquarist Society was held recently, but the officials remain unchanged. Chairman is D. Malins, Vice-Chairman, D. K. Wilton and Secretary, D. Walls, 9 The Avenue, Witham.

The Society has had a very successful year, with quite an influx of new members during the past few months. This was partly due to an Exhibition of Hobbies and Leisure Activities put on by the local Council and the Rotary Club, in which the Society exhibited two furnished tanks and a small pond. The Society meets on the second Wednesday

AQUARISTS' CALENDAR

3rd March: Federation of Scottish Aquarist Societies convention to be held at the National Engineering Laboratories, East Kilbride.
10th March: Huddersfield Tropical Fish Society 6th Open Show will be held at United Commercial Travellers Club, Manchester Rd., Huddersfield. Booking: 12.00-2.15 p.m. Schedules may be obtained from Mr. P. Bunn, 1 Bradshaw Drive, Howley, Huddersfield.
12th March: Knaresborough and District A.S. Annual Open Show at the Temperance Hall, Knaresborough.
17th March: Tropical Aquarium Breeders' Annual Open Show at Switghage and Cowan Social Club, Alderfield Road, Chorlton, Manchester.
22nd March: Tottenham and District A.S. Open Show. All enquiries to: Mr. S. Moore, 44 Cassington Road, Mowell Hill, London, N.10.
26th March: Bradford and District A.S. Open Table Show at Switghage and Cowan Social Club, Alderfield Road, off Hage Lane, Salford, Manchester.
7th April: Valley A.S. Third Annual Open Show at Civic Hall, Ramsbottom. Schedules are obtainable from Mrs. M. Thomson, Secretary, 55 Summerton Lane, Holcombe Brook, Ramsbottom, via Bury.
7th April: Stockbridge and District A.S. First Open Show, Veterinary Club, Manchester Road, Stockbridge, nr. Sheffield.
14th April: Nelson A.S. Annual Open Show at Nelson Civic Hall, 2 pm. Details from E. Tate, Assistant Secretary. Tel: RL.Y 21050.
20th April: Thurrock A.S. First Open Show at Gypsy Lane, Grays, Essex. Show schedules can be obtained from D. C. M. Durrant, 22 Kingman Road, Stanford-le-Hope, Essex.
21st April: Stockton-on-Tees A.S. Third Annual Open Show at St. Joseph's Church Hall, Norton. Schedules are now available from Mr. J. Chamberlain, Show Secretary, 15 Terrace Street, Stockton-on-Tees.
27th April: Winchester A.S. First Annual Open Show, venue to be announced later.

Show Secretary, Mr. R. Hatcher, 254a High Street, Eastleigh, Hants.
28th April: York and District A.S. Annual Open Show. M. H. Cooper, Show Secretary, 2 Hawthorn Spenser, Stockfield Park, Hunnington, York.
4th May: Trowbridge and District A.S. Open Show.
5th May: Oram A.S. Annual Open Table Show, Oram Recreation Hall, Retage Street, Shaw, Oldham. Further information and Schedules may be obtained from Mr. J. E. Sweeney, 33 Retage Street, Shaw, Oldham.
12th May: Workshop Aquarist & Zoological Society Annual Open Show. Venue to follow.
18th May: Bridgford and District A.S. First Open Show.
19th May: Merseyside A.S. Open Table Show at Moorhouse Athletic and Social Club, 5 Richmond Terrace, Liverpool 6.
26th June: Llantrisi Moor A.S. Annual Open Show. Details available from Show Secretary, J. Sanders, 26 Sandfield Road, Abernethy, Bridgford, Lincs.
12th June: Bracknell and District A.S. (cont.) Three Counties Annual Open Show, Victoria Hall, Bracknell. Show Secretary, Mr. K. Phillips, 40 Poadmore Road, Bracknell, Berks.
15th June: Yeovil and District A.S. First Open Show at Grass Road School, Yeovil. Details from Show Secretary, Mrs. T. Gillard, 42 Crofton Ave., Yeovil.
16th June: Brighton and Southern A.S. Annual Open Show, Marnham Centre, Marnham Road, Here.
16th June: Lytham A.S. Annual Open Show to be held at Levenshire Pavilion, Levenshire Gardens, Lytham, Lancs.
23rd June: Alfreton and District A.S. Annual Open Show. George Hotel, Charnfield Road, Alfreton. Schedules may be obtained from Mr. S. Hill, Show Secretary, 35, South Street, Riddings, Derbyshire.
23rd June: Salisbury and District A.S. Annual Open Show.
23rd June: Cambridge & District A.S. Open Show. Details later.

27th-29th June: Bristol Tropical Fish Club. Further details available shortly.
7th July: Chatterham & District A.S. Annual Open Show, Ambulance Headquarters Hall, 56, Gloucester Road, Chatterham.
14th July: Midway A.S. Second Open Show at St. John Fisher School, Charlton. Secretary, Mr. K. Brown, 3 Allison Avenue, Gillingham, Kent.
14th July: Bournemouth Aquarist Club Annual Open Show at Kinson Community Centre, Puhama Park, Kinson. Show schedules and entry forms available after 1st May from Show Secretary, Mr. J. V. Jeffrey, 30 Braemar Avenue, Southbourne, Bournemouth.
27th July: Croydon A.S. Open Show to be held at the Stanley Hall, South Norwood, London, S.E.25. Further information may be obtained from the Secretary, Mr. D. H. Crowley, 180 Harrington Road, South Norwood, S.E.25.
2nd-10th August: Portsmouth A.S. Open Show at the Portsmouth Community Centre, Tuford Avenue. Schedules available from Mr. W. Hyler, Show Secretary, 493 Commercial Road, Portsmouth.
14th-17th August: Midland Aquarist and Pool Society Annual Open Show, Bagley Hall, Birmingham.
7th-8th September: Rushampton A.S. First Open Show in conjunction with Wandsworth Borough Council.
7th September: High Wycombe A.S.
7th September: Yate and District A.S. Open Show.
8th September: Warrington A.S. First Open Show.
21st September: Newport A.S. Sixth Annual Open Show at the Dudley Junior High School, New Hill, Newport. Details from the show secretary, Mr. M. J. Parry, 45, Western Drive, Gabaith, Cardiff.
26th September: Hockley and Butwell A.S. Annual Open Show.
26th-27th October: British Aquarist's Festival Belle Vue, Manchester.

BURGLARY!

Have You Seen these Items?

Burglars have been busy lately, and the assistance of our readers is sought in tracking down the missing fish and equipment.

Just before going to press we learned from Shirley Aquatics of Solihull that their store had been burgled, and Mr. C. D. Roe, director, has requested that we advise readers and ask them to keep a watch for the missing items, which include a cabinet of distinctive appearance.

Mr. Roe writes:

"The burglary consisted of fish and equipment, details of which are listed below:—

Cabinet and stand	Eheim filters
3 ft. aquarium	Ozonizers
Fish foods	Thermostats
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Coloured coral	Heaters
3 pairs Discus fish	Fish remedies

Freeze dried brine shrimp

African Cichlids—bright blue in colour

"In the case of the aquarium cabinet stolen, this is the only one of its type in the country, apart from some we ourselves have in stock, so that if the thieves attempt to sell it, or should it be seen in the possession

of somebody at home, it is very easily recognisable. A photograph can be provided as taken by the police.

"The cabinet in question is 44 x 14 x 18½ in., and it is made of chipboard covered with white plastic on the inside of the lid (which is hinged), and blue plastic at the back. The outside is again plastic covered with imitation walnut graining. It is fitted with a twin fluorescent light holder and sockets and space for filter, heater, thermostat, pump, etc., and contains a 34 in. stainless steel aquarium which is seen through a cut-out panel approximately 31½ x 11½ in., and surrounded by metallic gold beading. It is not of British manufacture and some of these were displayed at the Manchester Exhibition by us.

"The fishes stolen were three pairs of Discus ranging from 3 in. to 5 in., and approximately 20 of the blue *Pseudotropheus* species (Malawi Cichlids) advertised by us in *The Aquarist* in December, January and February. Only about four pairs of these have been sold by us so far and anyone offering these for sale will obviously be offering the stolen stock. No one else in Great Britain has these fish."

If any reader can assist with information, they are asked to communicate urgently to the police, or to Mr. Roe, Shirley Aquatics, Stratford Road, Monks-path, Shirley, Solihull, Warwickshire. Telephone: Birmingham, Shirley 1300.



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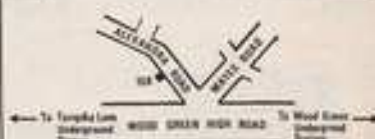
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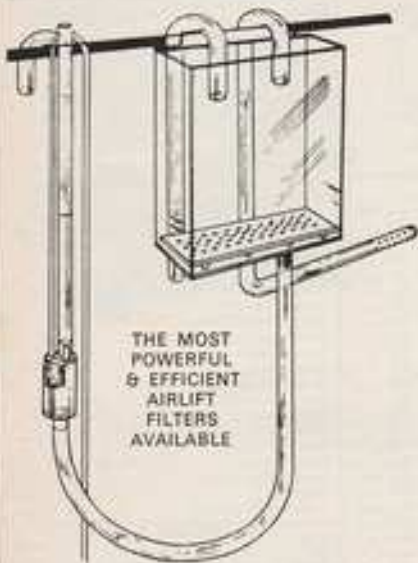
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BERKSHIRE

The Reading Aquarist
64, King's Road, Reading
Telephone: Reading 53632
E.C.D. Wednesday. R. C.T.P.A.A.

BUCKINGHAMSHIRE

Walk-Around-Pet Stores Ltd.
5, Temple End, High Wycombe
Telephone: High Wycombe 21357
E.C.D. Wednesday. R. C.T.M.P.A.A. R.&A.

CHESHIRE

Grassby, Joe., F.R.H.S.
"The Glen" Fisheries, Mobberley, Nr. Knutsford
Telephone: Mobberley 3272.
W. C.T.P.A.A. R.&A.

CORNWALL

Marine Facilities Ltd.
Commercial Buildings,
Custom House Quay, Falmouth
Telephone: Falmouth 88
E.C.D. Tuesday (in winter only). WR. T.P.A.A.

Truro Aquaria & Pet Shop
23, New Bridge Street, Truro
Telephone: Truro 2506
E.C.D. Thursday. R. C.T.P.A.A. R.&A.

DEVON

Plymouth Tropicals
North Hill Nurseries, Tavistock Road, Plymouth
Telephone: Plymouth 62663
Closed Wednesday. R. C.T.P.A.A.

DORSET

Noah's Ark Aquarium
Swannery Car Park, Weymouth
Telephone: Weymouth 3038
Open Daily (Summer).
Open weekends (Winter). R. T.P.A.A.

DURHAM

The Fish Bowl
Burdon Road, Sunderland
Telephone: Sunderland 71026
E.C.D. Wednesday (all day).
WR. C.T.M.P.A.A. R.&A.

Metcalf, G. R.
187, Northgate (near Minorities Garage)
(On original A.1 road) Darlington
Telephone: Darlington 5991
E.C.D. Wednesday. R. C.T.P.A.A. R.&A.

ESSEX

Goodmayes Aquaria
70, Grove Road, Chadwell Heath
Telephone: Goodmayes 2594
E.C.D. Thursday. R. C.T.P.A.A.

Skilton, C. J., Aquarist
139, Galleywood Road, Chelmsford
Telephone: Chelmsford 0245-56878
E.C.D. All Day Saturday. W. C.T.P.A.A.

Stan's Aquarium
466, Southchurch Road, Southend-on-Sea
Telephone: Southend 67859
E.C.D. Wednesday. R. C.T.P.A.A. R.&A.

GLOUCESTERSHIRE

Cheltenham Aquatics (Prop. Mr. B. R. James)
10 & 11, Suffolk Parade, Cheltenham
Telephone: Cheltenham 24949
Open Monday to Saturday.
R. C.T.M.P.A.A. R.&A.

HAMPSHIRE

Arundel Aviaries & Fisheries (Taylors)
241/243, Arundel Street, Portsmouth
Telephone: Portsmouth 20047
E.C.D. Wednesday. R. C.T.P.A.A. R.&A.

Portsmouth Pet & Aquatic
119, Portsmouth Road, Southampton
Telephone: Southampton 56595
Open Monday to Saturday
R. C.T.M.P.A.A. R.&A.

Wingate
7, Market Street, Winchester
Telephone: Winchester 2406
E.C.D. Thursday. R. C.T.P.A.A. R.&A.

HERTFORDSHIRE

The Pet Shop (R. S. Colton)
68/68b, London Road, St. Albans
Telephone: St. Albans 55507
E.C.D. Thursday. R. C.T.P.A.A. R.&A.

KENT

Gillingham Pet & Aquatic Centre
(Proprietors: F. & E. Alderman)
125, Canterbury Street, Gillingham
Telephone: Medway 52049
Closed Wednesday. R. C.T.P.A.A.

Kingfisheries Aquarium
308, Croydon Road, Beckenham
Telephone: 01-650 3716
E.C.D. Wednesday (all day). R. C.T.M.P.A.A.

Sherwood Pet Stores
(Proprietors: Fairbairns Aquaria, Ltd.)
252, Sherwood Park Avenue, Sidcup
Telephone: Bexley Heath 7217
E.C.D. Thursday. R. C.T.M.P.A.A. R.&A.

Buyers' Guide

The June, September and December issues of Buyers' Guide are now being prepared. Instructions for insertion in these numbers should be received at The Aquarist offices by 1st May, 1968.

Forms available on application to:
**The Advertisement Manager,
The Aquarist and Pondkeeper,
The Butts, Brentford,
Middlesex**
Telephone: 01-560 6221

LANCASHIRE

Aqua Hobby Ltd.
8, Bridge Road, Blundell Sands, Liverpool 25
Telephone: 051-924 7947 R. T.M.P.A.A.

Deane Aquarium
308, Deane Church Lane, Deane, Bolton
E.C.D. Tuesday. R. C.T.P.A.A.

Hornby's
Trafford Bar, Old Trafford, Manchester, 16
Telephone: Trafford Park 2989
E.C.D. Wednesday. R. C.T.P.A.A.

Liverpool Aquaria Company
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Telephone: Central 4891
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R. C.T.P.A.A. R.&A.

LONDON (East)

Wade Aquatics
333, High Street North,
Manor Park, E.12
Telephone: Grange Wood 6333
E.C.D. Thursday. R. C.T.M.P.A.A. R.&A.

LONDON (North)

Asiatic Aquatics
13, Cricklewood Broadway, N.W.2
Telephone: 01-452 4875. WR. C.T.M.A.A.

Philip Castang Ltd.
75, 91, 95, Haverstock Hill, Hampstead, N.W.3
Telephone: Primrose 1842 and 9452
E.C.D. Saturday. W. AA.

LONDON (South)

Fairbairns Aquaria, Ltd.
15, Well Hall Parade, Eltham, S.E.9
Telephone: Eltham 5859
E.C.D. Thursday. R. C.T.P.A.A. R.&A.

South Western Aquarists
2, Glenburnie Road, Trinity Road,
Upper Tooting, S.W.17
Telephone: Balham 7334
E.C.D. Wednesday. R. C.T.P.A.A. R.&A.

Tachbrook Tropicals Ltd.
244, Vauxhall Bridge Road, Victoria, S.W.1
Telephone: Victoria 5179
(Open all week except Sundays). R. C.T.P.A.A.

Windmill Products
244, Vauxhall Bridge Road, London, S.W.1
Telephone: Victoria 5179
(Open all week except Sundays). W. AA.

LONDON (West)

Aquapets
17, Leeland Road, West Baling, W.13
Telephone: 01-567 2748
E.C.D. Wednesday. R. C.T.P.A.A. R.&A.

Chiswick Aquaria
136, Chiswick High Road, London, W.4
Telephone: 01-994 6549
Cables: Chisagua, London, W.4
WR. C.T.M.P.A.A. R.&A.

NORTHAMPTONSHIRE

The Aquarium
192, Wellingborough Road, Northampton
Telephone: Northampton 34610
E.C.D. Thursday. R. C.T.P.A.A. R.&A.

The Pet Shop
120, Kettering Road, Northampton
Telephone: Northampton 38841
E.C.D. Thursday. R. C.T.P.A.A.

OXFORDSHIRE

The Goldfish Bowl
188, Cowley Road (Retail)
9, East Avenue (Wholesale)
Oxford
Telephone: Oxford 41825. WR. C.T.P.

SURREY

Aquapets
1, Grand Parade, Tolworth
Telephone: 01-399 0678
E.C.D. Wednesday. R. C.T.P.A.A. R.&A.

Egham Zoo (D. L. Rumsey)
61, High Street, Egham
Telephone: 4607
E.C.D. Thursday. R. C.T.P.A.A. R.&A.

Thameside Tropicals and The Pet Shop
Brassy House, New Zealand Avenue,
Walton-on-Thames
Telephone: Walton 24076. R. C.T.P.A.A. R.&A.

SUSSEX

Dowding, Conrad A.
1, St. John's Terrace, Lewes
Telephone: Lewes 3970
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Preston Aquarium
44, Beaconsfield Road, Brighton
Telephone: Brighton 681602
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Regency Pets Aquaria (Prop. R. A. Bassett)
23, Surrey Street (outside Brighton Station),
Brighton
Telephone: 29940 R. C.T.P.A.A. R.&A.

WARWICKSHIRE

The Coventry Aquarist
45, Melbourne Road, Coventry
Telephone: Coventry 72772
E.C.D. Thursday. WR. C.T.P.A.A.

WORCESTERSHIRE

The City Aquaria, Bird and Pet Supplies
Mrs. M. Hemming
34/36, Friar Street, Worcester
Telephone: Worcester 22005
E.C.D. Thursday. R. C.T.P.A.A. R.&A.

YORKSHIRE

Kennedy's Pet Store & Aquarium
175, Dewsbury Road, Leeds, 11
Telephone: Leeds 77073
E.C.D. Wednesday. R. C.T.P.A.A.

Pets & Aquaria Ltd.

18/19, Grand Arcade, Leeds, 1
Telephone 23743
E.C.D. Wednesday. WR. C.T.P.A.A. R.&A.
The Corner Shop (Prop. J. Wilde)
526, Abbeydale Road, Sheffield, 7
Telephone: Sheffield 54172
E.C.D. Thursday. R. C.T.P.A.A. R.&A.

SCOTLAND

Kynoch's of Falkirk
53, Manor St., Falkirk, Stirlingshire
Telephone: Falkirk 21921
E.C.D. Wednesday. WR. C.T.P.A.A. R.&A.
P. N. Greening
176, Blackness Road, Dundee, Co. Angus
Telephone: Dundee 66409
E.C.D. Wednesday. R. C.T.P.A.A.

NORTHERN IRELAND

Castle Aquatics
80, Castlereagh Road, Belfast 5
E.C.D. Wednesday. WR. C.T.M.P.A.A. R.&A.
Grosvenor Tropicals
88, Woodstock Road, Belfast, BT6 8AJ
E.C.D. Tuesday. WR. C.T.P.A.A.
Pet Shop & Aquarium
30, Stone Row, Coleraine, Co. Derry
Telephone: 2228
Sundays by appointment. R. C.T.P.A.A. R.&A.
Ulster Aquatics
15, Montgomery Street, Belfast
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