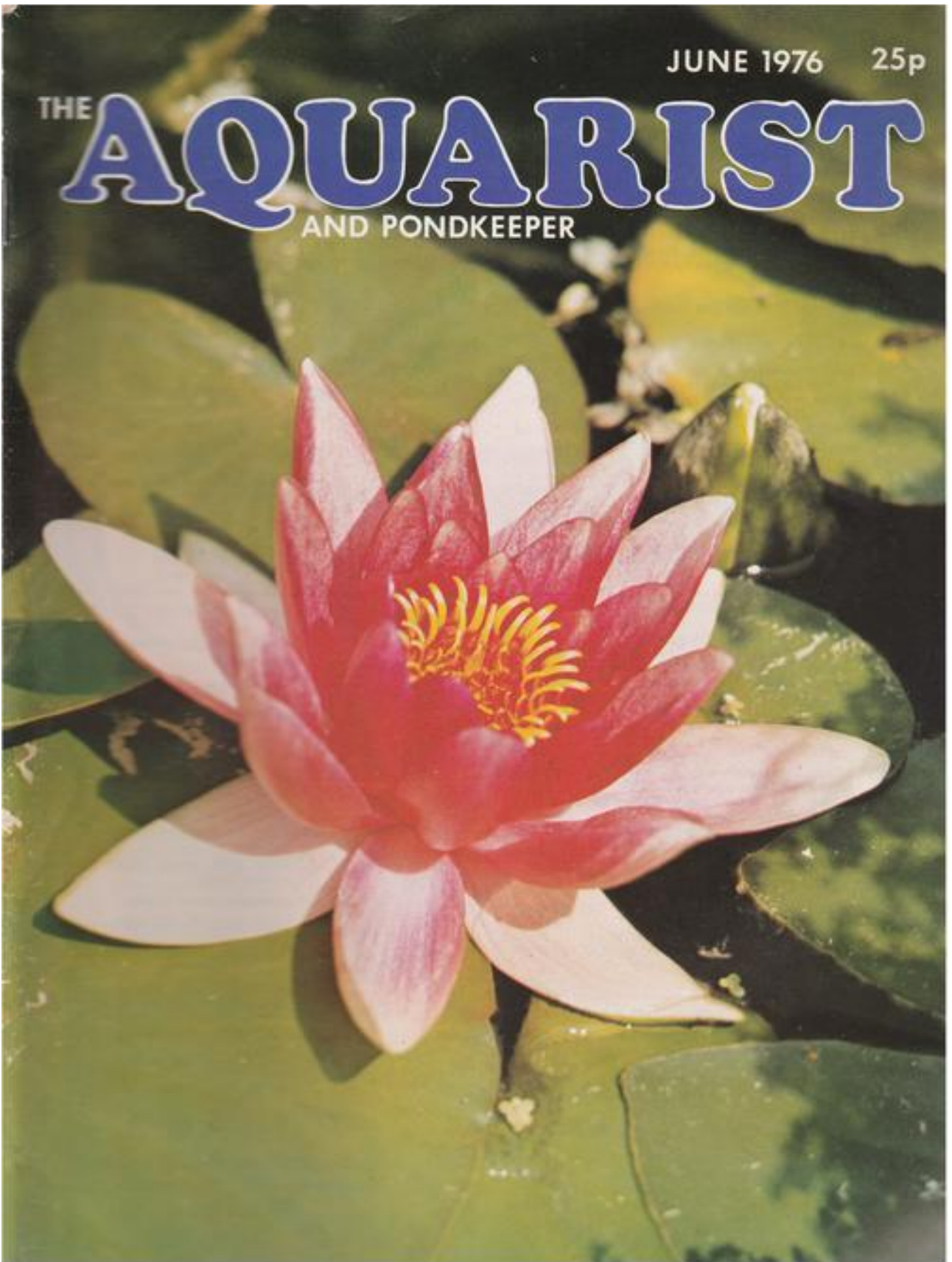


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THE **AQUARIST**  
AND PONDKEEPER





# THE AQUARIST AND PONDKEEPER

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## Contents

	PAGE
Identification and Control of Algae in Pool and Aquarium	88
The Fourth Scottish Aquarists' Festival	91
What is Your Opinion?	93
Our Readers Write	100
Buffers in Marine Aquaria	102
Fish Culture 2001	104
Book Review	105
Viewpoint	106
The Bull Frog	108
Product Review	110
Our Experts Answer: Tropical Queries	113
Coldwater Queries	115
From a Naturalist's Notebook	117
Junior Aquarist: Beginners' Corner: Planting the Aquarium	119
Aquatic Beetles	120
News From Societies	122

The Editor accepts no responsibility for views expressed by Contributors.

# IDENTIFICATION & CONTROL OF ALGAE IN POOL & AQUARIUM

by Barry James

(*Everglades Aquatic Nurseries*)

EVERY aquarist has at some time or other been troubled by infestations of algae and although he is concerned with eliminating the problem he often cannot identify the organism responsible and in many cases is even unaware that Algae are responsible. Such statements as "My water has gone green!" or "My plants are covered in hairs." are phrases very familiar to dealers in tropical fish stores. In fact, no aquarium is ever completely free of algae in one form or another but it is only when their growth is excessive that fish keepers really notice them.

Technically Algae belong to a division of the plant kingdom known as the Thallophyta which contains the most primitive forms of plant life. Algae constitute one big branch of the sub-order the other being the Fungi. Characterized by a simple plant body—Thallus—Algae are extremely diverse in their appearance varying from unicellular microscopic forms to gigantic multicellular organisms such as the larger seaweeds which may reach lengths of 70 metres with stems as thick as a man's arm. Although these larger types show differences in external and internal tissue differentiation, there are no distinct organs such as roots, stems, leaves etc. as found in the higher plants. Part of the success story of the Algae lies in their incredible speed of reproduction and also their viability as their spores are often so light as to be carried by air currents to every portion of the globe where, in spite of extremes of heat, cold and radiation, they will germinate often years later when conditions are suitable. This explains the sudden blooms of aquatic algae in pools and aquariums which were formerly quite free of them.

Although there are Algae which are found growing

on tree-trunks, rocks and damp soil, it is in water that the richest variety of species is found. Various types have adapted themselves to all waters whether they be flowing or stagnant, salt or fresh, warm or cold or even badly polluted. In aquaria they will be found floating on the surface, suspended in the water, just growing in tangled masses or attached to the gravel, rockwork and even the plants themselves.

At this point it will be useful to classify and identify the various types the aquarist will encounter in the aquarium and pool leaving out those with which he is unlikely to be concerned.

1. *Chlorophyceae*—The Green Algae.
2. *Bacillariophyceae*—The Diatoms.
3. *Euglenineae*—The Whip Algae.
4. *Myxophyceae*—The Blue-Green Algae.

## 1. The *Chlorophyceae*—The Green Algae

This class of Algae contain a large percentage of the troublesome types to be encountered. There are thousands of species but I shall select a few typical ones which are broadly indicative of the nature of the rest. In this group the Chlorophyll—green pigment—is not generally masked by other pigments as in other groups.

### Motile-Unicellular Types

These are characterized by the fact that each individual consists of but a single cell which possesses tiny "Whips" or Flagella with which they are able to move through the water. They are often responsible for the "green water" condition in aquaria but more commonly in ponds in late spring.

*Chlamydomonas* is a typical unicellular motile alga. The cells move towards bright diffused light and away from light of too great intensity by means of the flagella. The eyespot is the detecting apparatus. Reproduction under suitable conditions is rapid and may be asexual or sexual. Both processes terminate in the production of numerous identical individuals.

Other single-celled algae often encountered in aquaria include *Chlorella* which forms green films on the glass and *Sphaerella* which is a reddish colour and often introduced from rainwater butts.

*Volvox* may often be found as minute green balls just visible to the naked eye swimming in freshwater ponds and occasionally in aquaria. Here the organism is multicellular and along with other related genera such as *Scenedesmus*, *Pandorina*, *Pediastrum* and *Oocystis* and also with the unicellular species described above, give rise to "green water."

A free-floating alga which is often introduced into aquaria is *Hydrodictyon* which forms bright green meshes of cylindrical cells which often reach a length of 10 in.-12 in. In small quantities this colonial species is quite attractive but care must be taken that it does not get out of control.

The species of green algae which have been considered so far have either been single cells or a number of cells joined together to form a colony. A higher stage of development is found in what is known as the filamentous algae. In these the cells are arranged end to end to form threads or filaments each cell being separated from the next by a dividing wall known as a septum. *Ulothrix* species are common in streams and rivers where they form bright-green masses of tangled threads. Tropical species also find their way into aquaria.

*Ulothrix* has a complicated life cycle and may employ any of four methods of reproducing itself. Normal growth involves the division of the cells and therefore increase in length of the filament. These filaments are somewhat brittle and break off to form new filaments. Any cell may produce what are known as zygospores which are formed inside the cell and then escape when the cell wall breaks down to form new filaments. If drought threatens the filaments divide up into a number of small round green spores which lie in the drying mud to await the rise in water level. All these are asexual modes of reproduction by *Ulothrix* can reproduce sexually by producing tiny motile spores which join together in pairs to form a single zygospore which swim around for a while before entering a resting stage generally during hot weather. These zygospores later divide themselves again into numerous zoospores which give rise to more filaments. *Enteromorpha* forms two broad, flat layers of cells which separate to form tubes of ribbon-like strands which are commonly seen in

brackish water, and also in freshwater canals, drainage ditches etc. *Cladophora* is a branching genera and forms dense, dark-green masses at the bottom of lakes and the slower reaches of rivers. *Sphaeroplea* and *Pithophora* are more commonly seen in tropical aquaria than the aforementioned species.

*Oedogonium* is a common green algae and includes numerous species all living in fresh water. Each plant consists of an unbranched filament of elongated cells. These species are of interest to aquarists as they are capable of attaching themselves to stones and other objects by means of a lobed attaching organ.

*Vaucheria* is another species capable of attachment and is often responsible for the dark green hairs which develop on aquatic plants.

*Spyrogyra* is a well known filamentous algae which along with other species is often called "Blanket Weed." These form bright green tangled masses of threads in aquaria and ponds. Removal of *Spyrogyra* is often easily accomplished by rolling the threads onto a rough stick using a twirling motion with the finger and thumb.

This species may be easily distinguished by the characteristically slimy feeling when the filaments are handled. This is due to a layer of mucilage which covers the cells.

*Chaetophora* and *Bulbochaetae* are examples of filamentous algae with branched filaments which are commonly found in pools and often in aquaria.

The most highly developed Green Algae, the Characeae or Stoneworts are never troublesome in aquaria except in those which are exposed to natural daylight but can become serious pests in ornamental pools especially those which have a natural mud base. *Nitella* is a member of this family but is an ornamental and useful Genus rather than a pest.

The *Desmidiaceae* are a large and important group of unicellular algae which under the microscope are revealed to have the most beautifully sculptured shapes. However, although often present in aquaria as introductions are seldom the cause of any trouble.

#### The Bacillariophyceae the Diatoms

Few phyla of algae are as well described as the Diatoms. The cardinal feature of this group is the possession of a siliceous skeleton composed of precise segments which fit together to form the characteristic "pill box" or "date box" structure, which, however, can be modified by curvature to form an almost unending variety of forms. A large number of species are motile although there is no visible means of propulsion. It is assumed, however, that series of fissures and pores which are clearly visible pump out water on the "Jet Stream" principle to facilitate locomotion. Often living in colonies many species are part of the diet of many fish even in the aquarium. However, in conditions of plenty when the concen-

trations of phosphate and nitrate build up to high levels, Diatoms can become a pest and then form brown layers on the gravel, rocks, glass and even the water itself is discoloured. Some species, particularly those belonging to the genera *Cymbella* and *Gomphonema*, attach themselves to plants by means of gelatinous stalks and form a thick, felty layer which kills the plants by suffocation. Diatoms are capable of reproduction at extraordinary rates by spores.

#### The Eugleninae

This group remains something of a puzzle to scientists as they share certain characteristics of both plants and animals and are often thought to be the descendants of organisms which departed from the plant kingdom to form the first animals. *Euglena* is the type of species of the family and along with other members of the family is often found in great numbers in farm ponds and in other situations where high levels of nitrogenous matter are found. In quantity they impart a yellowish-green coloration to the water. Often introduced into aquaria they do not often cause any problems as by the time they have built up to epidemic proportions the fish population is almost certainly dead already.

#### The Myxophyceae (Cyanophyta) the Blue-Green Algae

Here is another group whose relationship to other organisms is in doubt as although I have included them amongst the algae they share many characteristics with both Bacteria and Algae and are nowadays classified in a separate group of their own.

The morphology of *Myxophytes* is basically that of unicells which aggregate to form colonies and filaments. Under the microscope they appear bluish-green in colour but unlike the algae the chlorophyll is not contained in chromatophores but seems to be evenly distributed throughout the cell. While some filamentous *Myxophytes* are relatively immobile, others are capable of gliding and rotating movements. Some species are buoyant and under calm conditions float to the surface of pools and aquaria forming the so-called water blooms. Vegetative growth is the only known method of reproduction in many species. The group is widely distributed in all soils and aquatic environments and even occurs in boiling sulphur springs. They are not, however, quite so common in the seas. Symbiotic relationships are quite common. A species called *Anabaena* with the water fern *Azolla*, Oiverwort *Anthoceros* and the well known waterside plant, *Gamnera*, and many species have symbiotic relationships with lichens and algae.

One of the worst and most easily recognisable of the problem algae in aquaria, the Blue-Greens, thrive in bright light, high nitrogen and phosphate levels and will succeed in acid as well as alkaline conditions.

They form dark-green to black sheets which creep slowly over rocks, plants, gravel and glass until in bad cases the whole tank may become engulfed. At the same time toxins may be produced which are lethal to fish. However, snails, and certain fish, including *Gyrenochelus* and *Labeo* species, will eat certain amounts but often the algae grows faster than they can consume it.

#### The Prevention and Control of Algae in the Aquarium

In setting up the aquarium it is important to avoid introducing ubiquitous species with the furnishings. Rocks and Gravel, if used in aquaria previously, should be scrubbed with boiling water. Plants should be carefully examined for hair algae which should be thoroughly removed as even a small piece of filament can become the source of an infestation. In this respect I have found that using specimens which have been grown in an emersed state are less frequently the cause of trouble than submerged grown specimens. All equipment including heaters, thermostats, filters, thermometers etc. if previously used should also be sterilized before use and the aquarium itself scrubbed with a proprietary disinfectant as sold for the purpose through the aquarium trade. I am wary of recommending hot water for this purpose as I have known aquarists who, by over zealousness, have cracked the glass by pouring boiling water into a cold tank.

Water should be drawn from the tap or some other non-contaminated source. Water from rivers, ponds, rainwater butts etc. must be boiled for some time if the introduction of viable spores is to be avoided. Ideally the water should have a pH which shows a slightly acid to neutral reaction and a low total hardness reading, as high pH and hardness levels will provide a happier medium for the algae-flora to flourish.

Planting is a key factor in the development of algae populations and adequate numbers of higher plants must be present to provide the necessary competition. Whilst it is not possible to state exact numbers of plants necessary per square foot one can obtain suitably balanced plant collections consisting of fast and slow growing types from specialist aquatic nurserymen. Floating plants should not be omitted from these collections as these are most important in the filtering of light.

The light itself is also a key factor. Too little will result in the death of the higher plants and the growth of algae which appreciate low light levels. Too much can have the same effect in reverse.

The composition of the fish population is also of great importance. Sucking Loach, Sucking Catfish, Mollies, Red-Tailed Sharks and even Goldfish are all

*Continued on page 119*

# THE 4th SCOTTISH AQUARISTS' FESTIVAL

## —1976—

"IT DOES NOT seem like one whole year, but here we are again!" John Young of *The Aquarist and Pondkeeper*, made this remark to me on the Friday evening at our pre-show dance. The fourth S.A.F. was well under way.

The show was well supported once again by Traders, Clubs and more general public than ever before. Moving the event away from Easter seems to have helped in this respect.

My job as Show Manager is made easier by an excellent panel of judges and a hard working secretary and stewards doing the paper work behind the scenes. Due to ill health, George Reid our honorary president was regrettably missing this year from the panel of judges. Mr. George Cooke, president of C.U.K.A. presented the trophies on the Sunday afternoon.

The TetraMin Trophy for the Best Tableau was won by the Scottish branch of the B.K.A. with a "Welsh Dresser," a small but every eye catching tableau.

Second came Lanarkshire A.S. with "Tammy Troot" (Fishmonger) complete with horse and cart. One of the new trophies known as the Earl of Motherwell Trophy for Guppies was won by a Lanarkshire member, with a very nice Top Sword. Disappointingly, this was the only tableau with aquarium plants on show. Third came Muirhouse A.S. with a "Cigarette Packet." The tar content did not stop them from having the best pair of livebearers on show, to win for them the Aquarama Trophy.

Some good ideas for tableaux came from a number of other clubs, a most gratifying sight because, this is after all what helps to make a show worthwhile. The Goldfish Society and the F.G.A. had displays, worthy of the species which they represent.

The Aquarist Trophy for the tableau with the highest points was won by Aireborough & District A.S. Amongst their other awards were The Edinburgh Pondkeepers Trophy for Best Goldfish which they won with a lovely Lionhead. The Muirhouse Trophy for a Dwarf Gourami and the Lanarkshire Trophy with Five Spot Livebearers. This collection obviously went a long way towards pushing them

to the top of the points table. East Kilbride A.S. picked up the Woodcock Trophy with a H. Pulcher, also the Alloa Trophy for Breeders Egglayers which they won with a nice team of Pseud. Red Zebra.

Another new trophy, the Bob Ferguson Trophy for Best Rasbora went to Livingston A.S. with a *R. borapetensis*. They also won the Friendship Trophy with a *B. frankel*. The first visit of Stanley A.S. to S.A.F. was well rewarded with the George Henderson Trophy for a *Heterandria formosa*, the Stan Taylor Trophy for a *Barbus filamentosus* and the Belle Vue Trophy for Fighters.

An all-glass tank was kindly donated by Sea Horse Aquarium of Manchester as a special award for the Best Shark and this was to be found on the Greenock A.S. stand.

The N.E.L. Trophy and the F.N.A.S. Trophy for Furnished Aquaria again went to Northumbria A.S. They certainly do set a high standard in these classes. In addition they also walked away with the Rift Valley Trophy for a *L. fulleborni*, the Fotheringham Trophy for a Texas Cichlid, and the Mark Aitken Trophy with a *Corydoras reticulatus*. The Bobby Wood Trophy and *The Aquarist* gold pin for the Best Fish in Show also went to Northumbria with John Robertson's, *Synodontis ocellifer*. This fish is an old friend of mine. I have judged it often. She was showing at her best with every fin displayed, whiskers faultless, spotting and colour showing well. A very deserving winner. Also in the tank was a "rubber band" which all the judges pointed higher than the Cat. I gave John this points sheet with its humorous remarks as a memento.

The Bell Thompson Trophy for Aquatic Art was won by Miss Margaret Thompson of Edinburgh Pondkeepers.

St. Gerrards School, Govan had a ten foot model shark along with literature, drawing, teeth and jaws. A most interesting display. Undoubtedly the best show we have had so far and which, we hope, will be the forerunner of many more even better shows in the future.

L. Naismith

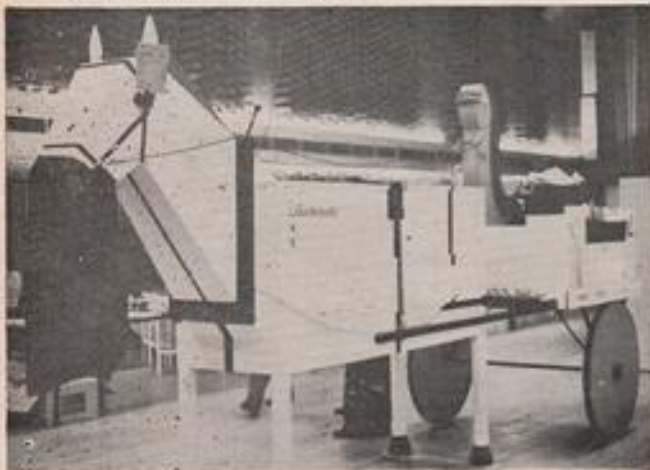


A member of Alreborough and D.A.S. receiving 'The Aquarist' trophy from George Cooke for the Tableau having the highest total number of points.



The award for Best Fish in Show went to John Robertson of Northumbria A.S. for this *Synodontis ocellifer*.

'Tammy Toot (Fishmonger)' won second prize in the Tableau contest for Lanarkshire A.S.



This model of a 'Welsh Dresser' won first prize in the Tableau contest for the Scottish branch of the B.K.A.

Third prize went to Muirhouse A.S. for this very neat model of a 'Cigarette Packet'.



# WHAT IS YOUR OPINION?

by B. Whiteside, B.A., A.C.P.

Photographs by the Author



OUR FIRST letter this month comes from Mr. L. Englefield, of 45 Colina Close, Coventry. He writes: "I have had great success with Java moss (*Vesicularia dubyana*) in my 58 in. x 18 in. x 18 in. tank, at 75°F, lit by one 4 ft. fluorescent tube. There is a long piece of cork bark, of about 6 in. in diameter, in the middle of this tank, and the moss was tied to stones and rested on the gravel, at the rear of the bark, about 3 months ago. I have since given away as much as I originally bought, and the remainder covers the whole of the top of the bark and rises above it an extra 5 in. The only trouble I have is when pieces separate from it and wrap themselves round the stems of the rest of the plants. I have to do a cleaning up job every week. My *Cryptocoryne nevillei* were gradually decomposing and being smothered by algae until I stuck some pieces of paper on the cover glasses, to give some local shade, about 2 months ago. The plants are now growing upright instead of horizontal and if new plants are produced at the same rate as they are now, in another 2 months they will completely cover the bottom of the tank! Any hints on growing hair grass will be appreciated as mine gradually turned brown and got uprooted. I don't think it helped being eaten by my rosy and tiger barbs either. My *Vallisneria* grows well and produces runners, but the leaves are very narrow: the giant *Vallis* looks like the ordinary species should. Is this due to too little light?" (More light plus a liquid plant fertilizer should help the *Vallisneria*—but the algae will also be helped. Photograph 1 shows one of my tanks in which Java moss is used as a ground cover against which plants with lighter coloured leaves show up well. *Hygrophila* shows up particularly well against it, as does Java fern. If the back glass of the tank is painted black on the outside, the combination, used in a small aquarium, shows up beautifully brightly coloured, little fishes such as cardinals and fancy guppies. Photograph 2 shows a close up of a section of the tank just as a cardinal and guppy pass each other. Small portions of Java moss can be tied, using nylon thread, on to filter tubes and heater/thermostat cables. The plant will cling on to the cables and tubes, as well as on to bark and rocks, and help to conceal them. I have also managed to

get it to grow on side glasses and up the vertical corners at the rear of the tank. Although the plant can grow well and spread fairly quickly, it can be controlled easily by pulling out patches with fingers and thumb. Some fishes will also use it as a spawning medium.)

From 192 Aycliffe Road, Borehamwood, Herts., comes a letter written by Mr. J. Comerford. He has the following to say: "I have only just read your article in *The Aquarist* and I was appalled at some of the methods which have been proposed for 'painlessly' killing fish. Some time ago, in an American book, I read of a method which I have since adopted when the need arose. It consists of immersing the fish in strong alcohol. I use methylated spirits and I have found that it kills the fish virtually instantaneously. I hope that this suggestion will prove useful to your readers." (I must admit I've never heard of methylated spirits being used for this purpose before. If it works as well as Mr. Comerford says, it should be a cheap and handy solution to an unpleasant problem that has caused a lot of controversy of late. Obviously the poison could be stored after use and re-used when required. A useful tip, Mr. Comerford.)

Mr. J. A. Dymott, who lives at 39 Harlech Drive, Leyland, Preston, writes about the same subject. "... I prefer the natural way of disposing of fish—and so, it seems, do the fish. I have in my possession a 9 in. pair of *Crenicichla saxatilis* and a 9 in. pair of *C. lepidota*. I have kept the former fish in community tanks with cichlids as small as 1½ in.—although the tanks did contain plenty of rock work for hiding places. They all got on well together; but if a fish had been unduly picked on by others of the same size, and was sufficiently weakened, it presented itself to the pikes for a death which was the quickest I have seen. A fish, too large to be swallowed at one go, is taken head first and killed with the first bite. Never has a tail flickered after this bite. The only problem is for those fish which are too far gone and are always on their sides, with the occasional flick for 2 or 3 inches. The pikes won't touch them. Perhaps a piranha is required here. I would warn though against fish that are dying from disease. These I isolate and leave.



Only once did I 'splat' one on the floor; and although quick, I still cringed and felt guilty afterwards. Now, on to guppies. It tickles me whenever I read about 'rules' for keeping these fish. To me they are a waste of man's talents. If a person wants pretty colours why can't he take up painting and stop producing genetic deformities such as those small fish dragged to the bottom by the weight of their tails—and costing 50p each! A male guppy has one use: to fertilize the female and then die. Is it not true that in the wild one female, already pregnant, has

built, a very decorative tank can be made with a few slabs of this. Recently we decided to plant out a tank and introduce dwarf cichlids. I bought nine Amazon Swords at 15p each and with these along the back of a 48 in. × 18 in. × 18 in. tank, plus a few rock work caves, it was all that was needed. I change some water every week in all my tanks. The water in my area seems slightly acidic and is very soft; consequently some tanks have a cockle shell base for hard water, and others a layer of peat under the gravel. If I change a quarter of the



an escort of about 6 males? Why? Is it not because when a predator comes along the males are purely 'bait' to attract the predator and so allow the female to go into hiding until the danger has gone? Maybe guppies have a use after all—as part of the food chain, finally ending at man.

"Now, for Mr. King. If he has made such a study of cichlids he should surely know that a cichlid's nature is such that it is unpredictable. My convicts didn't bite the eyes out of other fish; on the contrary, in a community tank they were extremely well behaved. Another method of keeping them peaceful was to have two females and one male. The females fought with each other only, and the male bred with each female in turn, but did not remain during egg/brood care. Consequently no pair bonds were formed and the females were too busy protecting small territories to cause damage. Single specimens also seem peaceful in any community. The trio were housed with a breeding pair of Jack Dempseys, one 9 in. pair of breeding *Crenicichla saxatilis*, one trio of *Geophagus pellegrinii*, an odd female pike, etc., in a 48 in. × 12 in. × 15 in. tank. On to your topics. The price of plants can only be excelled by the price of slate; but if one can get to a place where slate is in abundance, e.g., new roads being

water I fill with cold water fresh from the tap. If I change half, or have fry in the tank, I use warm water—warmer than that in the tank; consequently I seem to be able to breed most of those classed as difficult—even if I haven't raised them all . . ."

Master J. Barton lives at 163 Marine Parade, Leigh-on-Sea, Essex. He writes: "I am 13 years old and have been keeping fish for 5 years. This letter is to tell you about my experiences with the catfish *Pimilodella gracilis*. The fish pictured in the February W.Y.O. is possibly *P. gracilis*, but the head seems too sharp. My one has a blunt, rather sharp, head—as if it had swum into the side of the fish tank. About two months ago I purchased one of these catfish, in a local fish shop, for 25p, which seems very cheap. At the time it was 1½ in. long. It appeared to be stunted at first but it is now 5 in. long. The catfish has a black dorsal fin and a large mouth. The rest of the fish is a silver grey colour. The fish lives in a light, well planted, community aquarium and spends a lot of its time hiding. Almost any food is accepted. As a special treat it is given catfish tablets which are played around with and then greedily swallowed. Live food is also taken, especially *Tubifex*."

No. 43 Coombes Road, Dagenham, Essex, is the

address that heads a letter from Mr. G. Gudgeon. He tells us: "After reading in your last two editions about keeping piranhas, I felt I must write and tell you about mine. I have a *Serrasalmus rhombus*, in a 39½ in. tank. I have had two red-bellied piranhas in the past but I find that *S. rhombus* is a much more handsome and interesting fish. He does not have the traditional bull nose of the red-bellied piranha. When I first bought him over a year ago I could not get him to eat anything but live fish. I had to starve him before he would accept the ox heart offered; even now, when I feed him the odd guppy, he will eat nothing else for a few days. The only fish that has lasted more than a day in the same tank



is a 3 in. *Plecostomus* catfish. They have been together now for almost a year and the *Plecostomus* has suffered nothing but a badly bitten tail, which has now healed. At first I used U/G filters in my piranha tanks, but I soon changed them for the old corner type when I discovered the mess a piranha can make of his food when eating. I recently had to move the piranha to another tank and the 12 in. net I bought that day was ripped to pieces and the piranha was swimming around for days with a ½ in. piece of net hanging from his teeth. I did not have the nerve to clean his teeth. I have found piranhas to be very excitable fish. If any tank cleaning job is not done slowly and carefully the startled fish will clash itself against the glass of the tank and damage his lip. I have enclosed a photograph of the fish but I am afraid it is not a very good one as I have yet to master the art of aquarium photography. The picture was taken eight months ago." (Mr. Gudgeon's coloured photograph, like many of those readers have been kind enough to let me see, was spoilt by the fish being out of focus and the flash reflected in the aquarium glass. As I've said before, it's cheaper to polish up one's technique using monochrome film, having printed only those negatives

that look as if they would give reasonable prints.)

Mr. Roy Mathers writes from 29 Hawarden Road, Hope, Nr. Wrexham, Clwyd. His letter is headed, "Fish Photograph—Myth or Magic?" He writes: "How pleasing and refreshing it was to read the letter by Mr. L. King, for here was an aquarist who had worked on fish photography and broken the No. 1 myth of the subject—that flash *must* be used. In my attempts at using flash I, along with most other aquarists/photographers, found the following drawbacks: (a) bounce back—result, no picture except that of the flash; (b) partial bounce back—good photographs, only spoilt by the image of the flash gun at one side of the shot; (c) flash tends to

highlight every mark on the glass—even those not visible to the naked eye; (d) the uncertainty of success—I know people who take hundreds of shots of fish using flash and even now there is still quite a bit of hit and miss as to whether or not the picture will turn out. I, too, came to the conclusion that by using high speed film it should be possible to take photographs of fish without flash; but I have concentrated on colour transparencies." Mr. Mathers enclosed a number of samples of his colour transparencies, some of which were reasonable. In general, they showed some of the problems associated with using ordinary colour film under tungsten lighting conditions—particularly, in some shots, where the light levels in public aquaria were rather low to obtain the necessary depth of field for general fish photography. The films Mr. Mathers used included Gaf 200 ASA, and Gaf 500 ASA. Commenting on these films as he used them he says: "200 ASA film—too slow; 500 ASA—not bad. Does any other firm make a faster colour transparency film. As Gaf 500 ASA is the fastest I have found, and as I do not process them myself, I cannot try to up-rate them." Changing the subject, Mr. Mathers continues: "I have had success with tiger

barbs—up to 250 in one spawning, although the average number is about 150. Price received from shops for  $\frac{1}{2}$  in. to 1 in. fish is 10p each—from all shops approached. These were then sold for 45-65p per pair.

"I consider myself to be a general aquarist, not specialising in any one family of fishes; but I do prefer the breeding side of the hobby. I first read about the Cichlid Exchange Group in your column. On joining, to say I was impressed by the idea would be an understatement; and I felt it would be an asset to the hobby if there was such a group open for all species of fish and plants. A group of us are trying to form such a group—called Aquarists' Exchange Group. This is not in opposition to the C.E.G., which is now being run in conjunction with the B.C.A. The object of the Aquarists' Ex-

gets off the ground, Mr. Mathers, and I'll include a progress report in a future feature.)

Recent remarks in this feature about 'Jaws' and 'Gnasher' have kept letters about piranhas pouring in. Mr. B. Brown, whose home is at 55 Kennedy Square, Leamington-Spa, has the following tale to tell: "The first piranha I bought was about 2 $\frac{1}{2}$ -3 in. long when purchased. I brought it home in a sweet jar and put it into a 36 in. tank, heavily furnished with rocks to give the fish plenty of hiding places. The water temperature was about 76°F. I tried feeding it about two days after with raw meat, maggots and worms, but it just would not eat. After it hadn't eaten for a week I got a bit worried so I went fishing and caught some small carp. I dropped one in the tank and before it could swim into hiding it was attacked and eaten by the piranha; so this



change Group is to provide a service whereby members can list their wants, exchanges and sales of any cold-water and tropical fish and plants. The membership fee is £1.50; all monies received will be used to produce and distribute the lists to members. The lists, it is hoped, will be produced every four to eight weeks, depending on supply of material. It is difficult to calculate the cost of producing the lists, not knowing demand. The £1.50 is expected to cover 10 issues—approximately one year. If it is not successful then all outstanding monies will be returned. Aquarists interested should forward the fee, plus any wants, exchanges or sales, to be included in the next issue, to me. The success of this venture depends upon (a) publicity and (b) participation. I hope you will support the Aquarists' Exchange Group by giving it a mention in your column." (I'm pleased to be able to give Mr. Mathers and his group a bit of free publicity as the idea sound like a useful one. Let me know if it

became my main method of feeding. Shortly after I saw two more piranhas for sale and after checking whether or not I could safely keep them together I bought them. I put them in the same tank and they seemed to get on quite well for several months; but then I noticed that two of them had paired up and were bullying the other one; and I wondered at the time if I had a male and female. After reading about their breeding habits and requirements I decided that my tank wasn't big enough to do any good; so I left them alone. Very soon the single fish became so knocked about that I had to take him out and put him in a small tank to recover. This time the piranha's dorsal fin had been bitten so badly that it was hard to imagine that it should have had one. To my amazement, within two weeks it had completely re-grown and the fish was looking very healthy. By now the fish were about 4 in. in length and were eating small fish, maggots and worms; but the only time they would eat raw

or cooked meat was when I hadn't fed them for a few days. I also found that meat that wasn't eaten soon made a mess of the tank.

"After reading Dr. G. S. Myers's book about piranhas I am not convinced that these are dangerous fish under normal conditions; from what I saw of them in my tank they are very timid and easily frightened fish; but I do believe that if these fish are very hungry or frightened they will attack almost anything. I have good reason to believe this because one day I was cleaning my tank and catching the fish in my net when one of the fish bit a large hole in it and fell out; I automatically went to catch it in my hand so that it wouldn't fall on the floor; as I did so it bit a large piece of flesh out of my finger! I put on a bandage but it took nearly an hour to completely stop the bleeding. The fish I bought were *Serrasalmus nattereri*, the red piranha. I have heard many people say that they are ugly fish; but I would say that anyone who has seen them showing their colours properly will agree that they are very attractive and deserve a place in the aquarium." (After seeing a piranha in action, and after reading Mr. Brown's tale, I certainly wouldn't want to put any of my fingers anywhere near one of these interesting fish!)

"I purchased my spotted piranha, *Serrasalmus rhombus*, at about 1 in. in length for £1. This is quite expensive for my income as I am 15 years and unemployed," writes Mark Wood, of Tamworth Arms, 62 Tamworth Road, West Croydon, Surrey. He continues: "My first attraction was to have a fish with such an infamous reputation. I bought two at first but after twenty-four hours one died from unknown causes. After introducing the fish I left them for about an hour; then I couldn't resist seeing them feed. I wriggled a piece of meat just in front of the rock behind which they were hiding; then, in a flash, one of them came out, whipped the piece of meat from the thread, gulped it down, and returned behind the rock. After this no more was accepted. After the other one died, I fed Percy once every two days with ham, raw meat, swordtail babies and the occasional goldfish as I think this is good for him as it is his natural food. I have heard also that piranhas get lazy if they aren't fed with the occasional live fish. As you said in the February issue, the whole process is over very quickly. For the first month he was very shy, always staying behind his rock; but after this he became very bold, coming straight to the front corner where I feed him. Even now he is watching me. He is now 3 in. long and beautifully marked with black spots on a silver background, together with a scarlet underside. Now he is as precious because of his beauty as he is because he is a piranha. When I clean out his tank he retires behind his rock; then I put in

my hand to siphon off the sediment. I will certainly stop this habit as he gets larger." (If I were you, Mark, I'd stop the habit immediately!)

We go back to the subject of killing deformed fish in the following letter which was written by Mr. C. Pentelow, of 5 Hazel Close, Palmers Green, London, N.13: "As I am new to the hobby of fish keeping I was most interested in your comments about killing unwanted fish. I have had a deformed guppy for some weeks, but, like yourself, the methods you mentioned did not appeal to me either. Well, on the advice you had from the vet. I thought I'd have a try at the lemonade trick. We had no lemonade in the house but we did have some soft drink containing dissolved carbon dioxide which I thought would be just the same. I poured about 2 in. of the drink into a jar. I then caught the sentenced guppy and, with one eye on the second hand of the clock, I popped him in the jar. He swam round for a few seconds, swam unbalanced for another few seconds, then floated to the surface with gills still working; then suddenly they stopped. The whole operation took about sixty seconds in all. I can't say I was satisfied until we hear from other readers. I do think this is a very important part of our hobby as I have just heard of someone popping another one 'down the loo.'" (Mr. Pentelow's comments make interesting reading. At least we now know that the vet's suggestion, although made rather in jest, does work.)

Mr. B. Jones, whose home is at 12 Cae Mawr Grove, Caldicot, Newport, Gwent, has some strong views on fish euthanasia. He writes: "After reading the article in your feature I feel I must vent my feelings against the callous ways in which some people destroy their fish. I'm sorry to say that I find your method to be the most unfeeling way of all. Have you or any of the people who so dispose of their fish ever thought what happens once the fish is flushed away? You don't need me to tell you the contents of a sewer. Think of the poor fish fighting for its life in this filth, half in and out of water—if you can call it that! It could linger on for hours or even days in this environment before having a happy release. What a death by the scalding method; or just leaving the fish out of water! How many so-called animal lovers would tie a brick around a cat's or dog's neck and throw it into water? So it must be for a fish left out of water, as some people practise. There is only one way as far as I am concerned and that is the method which you find so repulsive: throwing the fish on to a hard surface. I find it to be the quickest and most effective way. The use of any chemical is found to have a momentary effect on the fish before death—either on the skin, gills or other organs. The method I advocate is quick, being all over in a split second.

If the fish is thrown with all one's force it is dead on impact. It might be messy and distasteful but if one's feelings are for the fish then it has to be done.

"The contributors to your column have been expressing their opinions about the most humane way of destroying a fish. The most humane for whom—the human or the fish? To me it seems the human. If one has a sick animal it is destroyed painlessly by a vet., the onus of killing going to the vet. If people are sufficiently interested in keeping fish, or indeed any pet, they should give it as good a life as possible; also as good a death as possible—regardless of one's feelings. If people treated a fish as pets and not as things that swim around in a tank, and developed some sort of feeling for them, perhaps then when the occasion arises they can at least give their fishes a quick and painless death." (I agree with some of the points Mr. Jones makes, but I have reservations about others. Just over a year ago I had to make the agonising decision as to whether or not I would agree to my vets.' advice that my old, ailing Scottish terrier should be put down because her future life would become a protracted agony for her. Having had the old lassie as my pal for over twelve years it was a harrowing decision to have to make. As I had my dog's feelings taking precedence over mine or anyone else's, there was only one decision I could take—and I stayed with her until she was pronounced dead. Needless to say my vet.—possibly the most humane person I know—didn't kill my old dog by smashing it against a wall or on a floor. My dog died—as she had lived—with dignity.

Do those of us who keep, say, half-a-dozen or more tanks of fish look upon our fish as pets? Are some of them pets, are all of them pets, or are none of them pets? Those who keep a small number of large fish probably look upon them as pets; but what of those who keep large numbers of smaller fish many of which are identical? Are such fish pets? Does the reason why we keep fish govern whether or not we consider them to be pets? The Penguin English Dictionary defines 'pet' as 'tame animal kept as companion'. Surely very few people keep fish as 'companions'. Although the majority of aquarium fish can be trained by conditioning—in the psychological sense of the word as used by Pavlov, and not in the sense that aquarists usually use it in connection with the keeping and breeding of fish—their brains are small and hardly capable of displaying intelligence—in the educational sense of the word. Obviously they can feel pain and discomfort—but to what extent? What is the morality involved in the killing of a guppy? How does it compare with that involved with the killing of a dog or a human being? In a natural environment many of the fish we keep in aquaria could be

killed by predators, or could die painfully during periods of drought, etc. In none of the incidences cited—involving a fish's death by the hand of man, by the action of predators, or as a result of natural phenomenon—does the fish elect to die. As a matter of interest, how do fishermen kill individual fish caught on a hook. My personal preference, were I to have to kill an ailing aquarium fish, would be to use a chemical—preferably an anaesthetic. Another point of interest: did many readers complete and post the questionnaire produced by Stirling University? A copy of it, under the title 'Why Do You Keep Fish?' appeared on page 30 of the April edition of *The Aquarist*. Having undergone the rigours of a tough summer school in Stirling's very beautiful university, some years ago, I attempted to complete the questionnaire. When I came to answer the question posed in the title, as given above, I found that during the years I have kept fish I have never really asked myself why I keep them. I'd be interested to hear your answers to the question—as I'm sure would Dr. G. Phillips to whom completed questionnaires should be sent. See the April edition of *The Aquarist* if you missed the original request.

No. 6 Dove Close, Debenham, Nr. Stowmarket, Suffolk, is the home of Mr. N. K. Daymond-John. He writes: "... I am glad that you have brought up the subject of photography as it interests me greatly. I am, however, finding it very difficult. I use a single lens reflex camera with various colour transparency films. I find that using an electronic flash looks the most promising, although I find that the exposure setting is very critical. The water must absorb more light than air because I get badly under-exposed photographs if the fish are not at the front of the tank. With normal tungsten lighting, using daylight film, the shots come out very yellow. Also, there is little depth of field due to the large aperture required. I usually use 1/30 sec. at f2." Changing the subject to that of conserving heat in tropical aquaria, Mr. Daymond-John has the following to say: "Surely it is easy to lag a tank, just like a hot water cylinder. I have used polystyrene ceiling tiles on the back and sides of a 2 ft. tank and their use certainly cut down the length of time for which the heater was on. ... May I congratulate you on a very interesting monthly feature. ..."

Mr. Ron Atherton resides at Glengarriff, Mickel Hill Road, High Hesleden, Hartlepool, Cleveland. He expresses the following opinions: "I have kept tropical fish for some seventeen years and I was rather surprised to read, in your recent feature, that Mr. Maxie Burns possessed a large *Scatophagus argus* that was shy. Some years ago I owned a fine scat that grew to some 10 in. in a 36 in. x 18 in. x 18 in. aquarium. Six gallons of water were

changed every day. The fish regularly ate a  $\frac{1}{2}$  lb. of earthworms per day and was anything but shy. I exhibited this scart in the very first Champion of Champions contest where it was awarded second prize. A photograph of this fish appears in *The Complete Aquarist's Guide to Freshwater Tropical Fishes*, page 228. I also photograph fish and have several hundred slides of exhibition fish and would be interested in exchanging slides with fellow aquarists. Please find enclosed a sample slide, for yourself, that was taken at B.A.F. '75." (Mr. Atherton's sample slide is amongst the best I have received since asking readers to let me see samples of their attempts at fish/aquarium photography. I'd be pleased to see examples of other aquarists' photographs. A few comments about how the photographs were taken would be useful as I could pass on details to the many readers who are having difficulties in the field of aquarium photography.) Mr. Atherton continues: "The rarest fish that I have kept is a *Distichodus sexfasciatus* that was only  $\frac{1}{2}$  in. long when purchased. The fish grew to become a splendid specimen that shared a 100 gallon tank with two lemon finned barbs. As this fish attained 9 in. in length, it became very quarrelsome with the barbs and eventually it caused them severe damage. I sold the barbs to a friend who devoted a great deal of time and attention to these fish; he was justly rewarded at the last B.A.F. when one of the lemon finned barbs won Champion of Champions. Unfortunately my *Distichodus sexfasciatus* died after being exhibited at the B.A.F. '75. I tried immediately to replace the fish and then I found how rare specimens are in the U.K. Prior to Christmas a dealer in Castleford answered my plea by acquiring a young *Distichodus sexfasciatus*. This specimen is being very carefully attended to in my new fish house. I am trying to obtain more specimens, especially a *D. lussoso*."

I'm pleased to be able to include a letter from a lady reader—Mrs. B. D. Mason, of 68 Cavendish Road, Kersal, Salford, Lancs. Mrs. Mason writes: "The February issue of *The Aquarist* is my first sight of this stimulating magazine. Herewith my opinions as requested. (b) My tank is in the window of a south facing room and gets full sun. This used to make the water like thick pea soup. The addition of a filter helped a little, and later a picture panel at the back of the tank protected the water from the sun. The tank still suffers from algae but nothing like as badly. The water gets quite warm in the heat of the day in summer, but everything, including plants, seems to revel in it. I once had a bottom filter and this went wrong somehow during some particularly tropical summer weather, and some fish died. I was heartbroken and furious, and threw the filter bed out and reverted to the corner

type. (c) Aeration is essential in my opinion, particularly if the tank is in the sun—see (b) above. (g) The tank is lit by one 15 watt (coloured) tube from dusk to about midnight—whenever dusk is, summer or winter. Re the humane killing of fish, I have always understood that swift decapitation is the *only* ethical way, unpleasant though this may be; it is the fish that has to be considered, not the feelings of the human. . . . May I ask your opinion? The controversy about an inch of fish per gallon of water . . . is there an ideal? I have two  $3\frac{1}{2}$  in. Cambridge blues, parents of one  $1\frac{1}{2}$  in. and one  $\frac{1}{2}$  in. fish, in  $4\frac{1}{2}$  gallons of water. I am enchanted by your magazine and have placed a regular order for it." (To be quite honest, Mrs. Mason, I have never paid any attention to such rules. Fish need food, clean water, oxygen, space, some light and a certain temperature level. Some fish will survive in dirty, cold water with little oxygen or food, and no light. Others would die immediately if placed in such conditions. If fish look healthy and content, and have space in which to grow, they should give little or no trouble. If your fish look healthy and content they could remain in their present container until they get bigger—although they would probably grow more quickly in a larger one. In our hobby there are many books containing 'rules' for keeping fish; after some experience many aquarists find that most of such 'rules' are invalid because of the large number of exceptions to them. If I have a 'rule' it is that if something works for me then it is valid for me—but not necessarily for all other aquarists. I suggest that you make up your own 'rules' as you go along. Each aquarist, each fish and each aquarium is unique—and fish tend not to know the 'rules' that writers have applied to them. The wide diversity of opinions featured in *W.Y.O.*? each month shows just what the 'average' aquarist thinks of 'rules'.)

Photograph 3 shows an albino tiger barb. Please send me details of your experiences with this species.

I've just returned from a rather expensive but very enjoyable few days' holiday in London. During my stay I visited the home of Mr. Douglas Rose to observe the progress of his aquaria. Douglas's marine tank continues to flourish; he has obviously perfected the art of keeping marines as some of his original fish are now three and-a-half years old and continue to grow and thrive. The latest addition to the tank is a horribly attractive lion fish that's tame enough to feed from his fingers. At a sign from Douglas the fish heads for the water surface and waits for him to supply it with a live shrimp. Needless to say, Douglas keeps his fingers well away from the fish as its stings are poisonous. I was surprised to see the lion fish reclining upside down before its meal! Douglas has bought himself

*Continued on page 103*



#### Thanks—A—Million

In the summer Mr. Hems gave me some advice about showing Guppies. Since that time I have obtained a third and a first place with my fish in the two shows I have entered. I am sure Mr. Hems' advice helped me very much and I should like to express my thanks to him for his assistance.

STEPHEN SCRIVEN (age 15),  
"The Tallet,"  
Steam Mills,  
Midsomer Norton,  
Bath BA3 2JY.

#### Aquarian Fish Foods

Thank you for your excellent review of the Aquarian range of Flake Foods. May I point out that although research and development is the responsibility of Pedigree Petfoods of Melton Mowbray, the manufacture and distribution is undertaken by Thomas's of Shelf, Halifax HX3 7JX, telephone: Halifax 21171.

DR. D. M. FORD, Aquarian,  
Animal Studies Centre,  
Freeby Lane,  
Melton Mowbray,  
Leicestershire LE14 4RT.

#### Aquarium Exhibition, Rotterdam

From the 3rd until the 12th September, 1976, there will be a world exhibition of aquariums, terrariums and palludariums in Alblasserdam, near Rotterdam. The entrance fee will be D.Fl.5,00. At the same time there will be an international symposium on the 5th September. The entrance fee for this event will be D.Fl.20,00.

As we expect many visitors from abroad to come to this symposium it is necessary to let us know as soon as possible if one has the intention to come. After receiving their letters they will be notified if there will be enough space to have them all at the symposium.

Yours faithfully,  
ROBERT ODIJK,  
Adm. Ned. Bond "Aqua Terra,"  
Winterstraat 1,  
Driemond 1230,  
Nederland.

#### Pen Friends Wanted

Junior aquarists of either sex seeking a pen friend are asked to contact Miss Sue Bradley, 221 Lightfoot Road, Hornsey, London, N.8.

#### Cramped Fecundity

I thought you might be interested in a "fact" I have proved wrong. I have two 14 in. x 7 in. x 7 in. plastic aquaria and in one I have two common goldfish and in the other one female goldfish with a male Veiltail Shubunkin. Both pairs of fish have been successfully breeding now for about two years.

All the aquarium books I have read state that it is impossible to breed goldfish in a tank less than 24 in. x 12 in. x 15 in.

I didn't separate the fish or do anything to them except feed them on worms, Tetra Min and porridge mixed with honey.

I am now happy to say I have got an all-glass, large aquarium and all the fish live together.

Yours for success,  
MISS ELAINE COATES (age 15)  
17 Stanshawes Drive,  
Yate, Nr. Bristol.

#### Re: *Plecostomus* Spawning

By remarkable coincidence I am able to add some observations of my own to Mr. C. V. Futcher's most interesting letter published in the March edition of *The Aquarist and Pondkeeper*.

I have a community tank, 30 in. x 12 in. x 12 in., the temperature of which is maintained within the range 76°-78°F. My initial observations are a striking confirmation of Mr. Futcher's, i.e., I purchased a single *Plecostomus* about 4 cm. long in early October, 1975. This grew steadily until, early February, 1976, it began to develop 14 or so "spikes" across its "snout". It is now about 7 cm. long, with "spikes" about 1 mm. long. While watching it feeding on the front face of the tank I noticed that it was rather fat and as I watched, it laid four eggs (white, about 2 mm. in diameter). These were, of course, infertile since there is no male. It continued laying eggs "at random" in groups of 3-4 for about 10 minutes, during which time at least 20 eggs were laid.

Of course, the absence of the male to either stimulate or fertilise the egg laying, renders the observations of behaviour and colour unreliable. However, it confirms that *Plecostomus* is an egg layer rather than a live bearer. I am rather intrigued that it should have spawned at all in the absence of a male—is this usual?

MARGARET D. SMITH,  
6 Barnards Hill,  
Marlow,  
Bucks. SL7 2NZ.

### Fluoridation should be discussed elsewhere?

It is twenty-six years since I last wrote to the *Aquarist*. (Junior letter of the month competition!) I have remained a reader during the whole of this time and have benefited enormously from the knowledge of your contributors. Once or twice I have disagreed with an opinion expressed by a writer and nearly put pen to paper to air my views. Happily a natural inertia has always prevailed and someone better informed than myself has taken up the point in a subsequent issue.

This time, however, I feel it is a duty to reply to the dangerously misleading letter from Mr. Hawksby published in your April edition.

I do not believe that this, or any other hobbyist magazine is the correct forum for a discussion on the fluoridation of public water supplies, but since you have seen fit to print such a letter then the facts must also be stated.

Many readers will be aware that fluoride exists naturally in the water in many parts of the United Kingdom. Indeed, in some places its concentration is well above the level of 1 part per million which is known to exert the optimum effect in the reduction of dental decay. Perhaps fewer readers may know that twenty-four health authorities in England are now wholly or partly fluoridated, from Hertfordshire in 1956 to Cheshire in 1975. Has any aquarist in these areas or in areas of natural fluoridation experienced any specific difficulties? Of course not.

For most of us the argument has been finally settled by the report of the Royal College of Physicians. This was recently published and contains the findings of a committee first set up in 1973.

Amounting to almost a hundred pages its conclusions may be summarised thus:

- (1) Fluoride when added or if naturally present in the water subsequently reduces decay.
- (2) Other measures of introducing it are ineffective on a community basis.
- (3) There is no evidence that the consumption of such water has any harmful effects.
- (4) **There is no evidence that fluoridation has any harmful environmental effect.**

May I beg anyone who is still doubtful, not to accept the advice of Mr. Hawksby to contact their local councils, but instead to ask the opinion of their medical or dental practitioners. From all over the U.K., in fact the whole world, they will find unequivocal support for this safe and effective measure.

R. D. OWEN (Dental Surgeon),  
"Shire's End,"  
Aston Clinton, Bucks.

### Non-Agressive Tigers

I was surprised to read in the March edition of

*The Aquarist* that Mr. Hems considers Tiger Barbs unsuitable for a community tank. While I realise that this is a common fallacy I have always found Mr. Hems' comments so knowledgeable and helpful that I did not expect to read this in *his* pages.

I keep a community aquarium 40 in. x 12 in. x 15 in. which contains 4 fully grown tigers. It also houses 1 pr. guppies, 3 swordtails, 5 cardinals, 4 zebras, 3 penguins, 4 *Nannostomatus eques*, 4 *Nannostomatus brifasciatus*, and 4 harlequins (all fully grown) and 1 *Gyrinocheilus* (4½ in. and still growing!) While I will admit that the tank is by no means overcrowded by many people's standards and that none of my fish have excessively flowing finnage, I have never had any trouble whatsoever from the tigers. They are, of course, boistrous fish, but only with each other and the plants. Indeed, so far from being bullied are the other inhabitants that they all regularly spawn or give birth except the *Nannostomatus eques* (and of course the lone *Gyrinocheilus*).

The tiger has been given a bad name because, no doubt, it can be a bully when just one or two are kept, but I see no reason why anyone with a reasonable mixed community tank should not keep four or more of these delightful fish in it with no trouble, as I have. Indeed, having kept them in this way I have found them such ideal inhabitants (provided one isn't too houseproud about one's plants) that I would not now dream of setting up a community tank without them.

Yours sincerely,  
SUSAN M. BLUNDELL.

I should like to believe that it is a common fallacy that tiger barbs are not to be trusted in every community tank. However, as my experience with *Barbus tetrazona* (if this is the species we are talking about) extends back to the time of its introduction into this country, I regret to say that I am unable to do so. Moreover, the fact that Mrs. Blundell informs us that none of her fishes has "excessively flowing finnage (*sic*)" and that the tiger barb "has been given a bad name because, no doubt, it can be a bully when just one or two are kept" prompts me to ask why she thought it necessary to write her letter? Perhaps she did not, or does not, realise that I consider it my duty to help the aquarist to avoid the risk of trouble even though in some cases, but not all cases, it may not exist.

JACK HEMS.

### Fables and Foibles

Science has bestowed upon the Loch Ness Monster the name. *Nessiteras rhombopteryx* which supplies the anagram: Monster hoax by Sir Peter S.



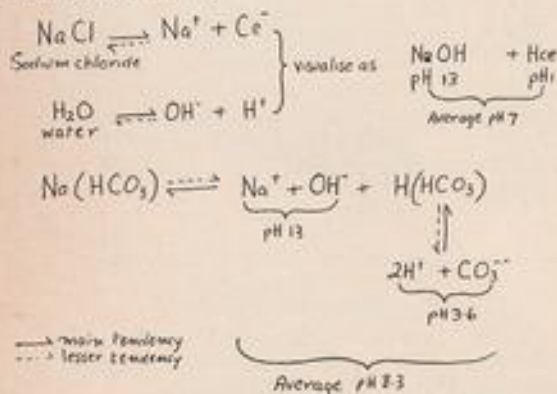
# BUFFERS

## IN MARINE AQUARIA

by F. W. Davies

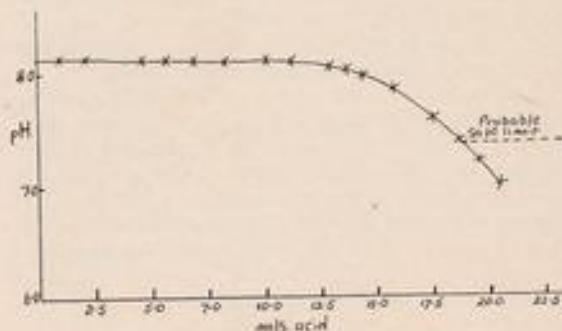
ALTHOUGH a newcomer to tropical marine fish keeping I have quite a few years background as an industrial chemist and I have been very surprised at the lack of significance U.K. journals attach to pH. It seems that, unlike their American cousins (1) the British enthusiast is solely concerned with testing regularly and adjusting to pH 8.3 or so.

Unfortunately, this is only part of the pH story. In the same way that bacteria are encouraged to prevent the build up of harmful nitrogen compounds, so the initial sea water formulation contained ingredients to ensure that the final pH would be 8.3, chief amongst these compounds is sodium bicarbonate. This useful chemical when dissolved in water over a wide range of concentrations produces a pH of 8.2 to 8.4. When sodium chloride is dissolved in water then the two atoms instantly split and interact with the water to produce two new units which are at opposite ends of the pH scale and, of course, cancel out at pH 7. In the case of sodium bicarbonate, only partial dissociation occurs, and if the sodium ions are encouraged into solution by the presence of a strong acid the balance will be shifted to maintain the pH at the 8.3 level. Though not precise chemistry, the following diagrammatic equations may help to clarify the position:—



In reality, sodium bicarbonate is only one of a number of salts of this type called buffers because they reduce the impact of extraneous materials. In view of some of the technical jargon in use today, I think it is a refreshingly descriptive term.

Almost everything that happens in a marine aquarium has an influence on pH. The waste products of digestion tend to be acid initially, then turn to the basic ammonia and end as acidic nitrates. (1) Even the essential aeration because of acidic components in air tends to reduce pH, so it does not take much imagination to imagine a tank apparently at 8.3 but poised on a shattering drop of pH. Over the weeks the buffering capability or alkali reserve has been gradually used up and the next milligramme of waste acid could cause a fall dangerous to fish. To illustrate this, I took a solution of a recommended sea water formula and using a pH meter followed the effect of adding a very weak solution of acid. It will be seen that a surprising amount of acid can be added without too much effect, but once the limit is reached the fall is rapid. Obviously, a well balanced sea water with a high alkalinity reserve can absorb nearly ten times as much acid as a marginal water, and that most of this acid has no significant effect on pH, very important for delicate specimens.



Why then do we not load our tanks up with bicarbonate? Fish are in delicate balance with the

concentration of dissolved salts in their surrounding water, if this equilibrium is disturbed Nature will put matters right by removing water from the fish to attempt to dilute the over concentrated solution. An alternative, very much canvassed in the literature, is to rely on limestone tank components to maintain alkalinity. Fortunately, due to slime, only slight solubility occurs because if a saturated solution did result then the owner would be the proud possessor of pH 9.4 and dubious fish. However, there is no doubt that some alkalinity derives from this source, but from the foregoing it is not a dependable method.

Thus, to avoid daily testing it is apparent that we must know more about the tank than simply its pH at a given time. Ideally we want to know how much acid it will safely take up and thus how much alkalinity reserve is remaining, also how to replenish the same. The method I use involves using an indicator producing a colour change at a pre calculated point, (a simple kit based on this principle is, I understand, becoming available to the hobbyist). Thus I can assess the probable alkali reserve and if required top up with a buffering mixture of carbonates, bicarbonates, borates and similar compounds. Although this solution is rather tiresome to produce, I feel it is much better than at least one commercial mixture as can be seen from the table. I obtained some old sea water

from a fellow aquarist. This water during the last 18 months had been kept over crushed cockleshell and topped up with local fresh water which has a pH in excess of 7, and at no time was any adjusting or buffering solution added. The water when tested had a pH of 6.8—so much for cockleshell—he keeps very hardy fish.

	Initial pH of Aged Sea Water	Drops to pH 8.3	mls. of Test Solution to pH 7.5
My buffer	6.8	8	9.6
Commercial buffer	6.8	14	5.0

The aged sea water was brought to a normal pH by use of pH adjusters and the reserve to the "danger" point determined by titration with my test solution. As can be seen by the results in Table 1 my buffer shows a much higher (double) alkalinity reserve. Being able to calculate the Alkali Reserve and by using this knowledge in advance I can make sure that my aquarium is kept in optimum condition and lessen the considerable danger of a dramatic pH fall.

#### References:

- (1) Marine Aquarist Vol. 6, No. 4.
- (2) Walker Marine Tropical Fish. Page 10.
- (3) V.C. Goldizen Helgo. Wiss Meers 20. 637-641.

## WHAT IS YOUR OPINION?

*continued from page 99*

a new, young piranha to replace the adult one he lost some months ago. The new specimen is much less timid than the previous specimen and doesn't spend its time hiding in the plants. This fish enjoys raw meat and garden worms and hasn't bothered with either of the small tropical fish sharing its aquarium.

While in London I had the pleasure of travelling to Longford to meet fellow contributor Mr. Graham Cox at his retail establishment. I was delighted to view the finest collection of varieties of marine and coldwater fishes I have ever seen—including ponds containing hundreds of young Koi. There

was an equally pleasing collection of freshwater tropicals—not to mention a good selection of aquarium plants, two species of which I hope to add to my collection in the near future.

For next time, please send me your opinions on any facets of the following topics: (a) Swordtails. (b) The use of lead weights, on plants, in aquaria. (c) Aquarium shows. (d) Why do you keep fishes and aquaria? (e) Do you know of any famous people who are keen aquarists? (f) Are plants necessary in the 'average' aquarium? (g) Garden ponds. (h) How were you introduced to the hobby?

### TETRA MEAN BUSINESS

To further consolidate their position in the U.K. as brand leader in fish foods and remedies (as they are virtually in every one of the eighty-two countries where Tetra is marketed), the Board of TetraMin (U.K.) Limited has been re-organised.

Gordon Corrigan who is Chairman and Managing Director of Peterama Limited now also becomes Chairman and Managing Director of TetraMin (U.K.) Limited and Mr. Hans Baensch of Tetra Werke, West Germany joins the Board and whilst he will be stationed at the German offices he will

be involved in assisting TetraMin (U.K.) Limited in every way.

In addition to the above Board changes the company has been further strengthened by the appointment of Mr. Frederick Pepworth as Marketing Manager.

Mr. Pepworth has been involved with Tetra Products in this country for a number of years and is already well known to many members of the Trade and Aquatic Societies.

The address of the Company is: The Bilton Estate, Waterhouse Lane, Chelmsford, Essex. Tel: Chelmsford 60258. Telex: 995291.

# FISH CULTURE 2001

by R. L. Brown

FOR SIX MONTHS, from 20 July, 1975 to 18 January, 1976, the International Ocean Exposition (Expo' 75) was staged in Okinawa, an island chain surrounded by stunningly beautiful coral reefs in the East China Sea. The first of its kind in the world, this marine exposition presented a vast variety of exhibits which reflected the relationship between man and the sea, past, present and future. The site of the fair on Motobu Peninsula of Okinawa Prefecture covered one-million-square-metres, of which 750,000 square metres of land area and 250,000 square metres of sea area were "blended into one whole." On this area were placed "pavilions" in which the various nations of the world exhibited their marine displays.

Expo' 75 was laid out as a vast subtropical park taking full advantage of Okinawa's natural beauty. The exhibits were grouped in "clusters" like the Ships Cluster, the Science and Technology Cluster, and Peoples and History Cluster. The Fish Cluster caused a great deal of interest in Japanese and American aquarian circles.

The cluster of pavilions devoted to fish and other living creatures of the seas had three major sections: the Japanese sponsored Marine Life Zoo and Aquarium, the Sumitomo Pavilion, and the buildings for foreign pavilions. Dominating the cluster area which was located in the north sector of the site near the entrances to Expo Beach and Expo Land, was the extensive Marine Life Zoo. It contains three separate exhibits of living fish and other specimens of marine life as found in the Black Current—*Kuroshio*—the Ocean Depths and the Coral Sea. This includes a living review of butterfly fish, moorish idols, triggerfish, angel-parrot fish and wrasse, together with coelenterata, molluscs and arthropods. Conditions in the aquarium tanks, one of which is the largest ever built, will be controlled automatically to ensure that their bizarre inhabitants will swim about in total comfort.

In the Sumitomo Pavilion, one of the largest at the exposition, visitors saw displays based on the theme "The Sea: Mother of All Life." A 23-minute film depicting the voyage of the Good Ship *Sumitomo* used a five-screen technique based on the writings of Rachel Carson and Anne Lindbergh.

Mr. Fumihiko Maki is the designer of the Fish Pavilions Cluster, and he said in a recent interview: "What we want is rare and interesting fish from all over the world." He stated that the theme of the

Fish Pavilions Cluster is "Familiarisation with the sea through contact with living sea creatures," and he hoped that each country would bring unique and curious fish from their part of the world to help make Expo' 75 a success. He continued: "As a result I hope the Fish Pavilions Cluster will be filled with enjoyable exhibits for visitors to see. I am planning to instal a series of aquariums of many different sizes to display fish from foreign countries. Our exhibits will be like a wonderland where visitors can observe fish, watch dolphins and dugong at play, and delight at the antics of crabs."

During the period from the end of the 1960s leading into the early 1970s, Japan has made significant strides in ocean technology: Seeing the sea as a major solution to her crippling land space and food problems. Pisciculture is being developed both as leisure and resource potential, the future plans of which took many forms at Expo' 75.

Fish are seen as the major oceanic cultural asset available to exploit by those who are to build cities on and under the sea. The Japanese government presented the Aquapolis, a prototype of the floating city of the future. The exhibit, placed about 400 m. off the Motobu Peninsula opposite the Sunset Plaza, used the latest marine technology in its building to ensure the Aquapolis would be firm and stable against any weather or sea conditions. The floating city occupied about 10,000 square metres, and comprised semi-submersible structure anchored with 16 huge chains.

The Aquapolis can be moved within an area of 200 m. by manipulating the chains and can be surfaced or submerged to a depth of 15 m. by pumping water out from or into the lower hull. Inside the two-storey structure are an exhibition hall, conference room, living capsule, sea water conversion mechanism, the Aquapolis cockpit, and many other facilities and devices like sewage disposal systems.

Planners see Aquapolis as the pilot city which could be mass produced to turn the Miyako and Yaeyama islands of the Sakishima group, south of Okinawa, into the aquarium centre of the world. The Miyako Group consists of eight islands, the largest of which is Miyako Island (147.9 sq. km.), and lies about 300 km. southwest of Okinawa. Miyako Island is mainly composed of limestone with a few hills or rivers but has an abundance of underground water.

There are many beautiful caves, fantastic crags and cliffs. The southern shores are rimmed with white sandy beaches, coral reefs and some of the purest waters in the world. Lit by the blazing sun, the southern sea is a clear, deep blue, changing to vivid green on the shoal of the coral reefs. The most picturesque spot is the Higashi-Henna Headland, with limestone cliffs, rocks and coral reefs, jutting out from the southwestern part of the island into the Pacific Ocean.

The Yaeyama Group is 150 km. southwest of the Miyako Islands and consists of 19 islands. The principal ones are Ishigaki (258.3 sq. km.) and Iriomote (321.9 sq. km.) and the farthest Yonakuni (30.9 sq. km.). These islands are called "the country of verse, the islands of song and the treasurehouse of folklore." The most famous place in Ishigaki Island is Kabira Bay, famous for its dazzling white beach and beautiful, serene waters. Black pearls are cultivated here. Iriomote is known for its mangroves and National Park in which is situated Taketomi Island (6.7 sq. km.), a small island connected these days with Ishigaki Island by hovercraft. It has beautiful beaches where unique star sand is found. The grains of sand are

shaped like stars and believed to bring happiness to the holder. The villages on the island are particularly charming, the narrow streets paved with coral sand, the houses roofed with red tiles and surrounded by stone walls—everywhere are relics of the sea from white coral to pools like giant aquariums of colourful fish.

Perhaps the most popular Japanese fish on show—and one with "decorative living space" potential—is the *koi* (or *goi*, the Japanese name for carp). Of the Cyprinidae family, the best-known of the coloured Japanese varieties is the gold, *Hi-goi* (known to the Japanese as red carp); next comes the *Nishiki-goi*, the carp of variegated coloration. Two other carp varieties—*iro-goi* (coloured) and *Hana-goi* (floral)—have been chosen as "ideal backcloths for the decor of the cities of the seas."

Making the sea a series of "fish-tanks" therefore was a prominent spectacle at Expo' 75 with projected uses in the sea-city of the future. Searchlights, lighting apparatus under the sea and continuous "submerged bands of illumination" helped make a sea of light to attract tropical fish set against a background of floodlit coral.

## BOOK REVIEW

**Aquatic Chemistry**, by Werner Stuman and James J. Morgan. Published by John Wiley and Sons Ltd., Baffins Lane, Chichester, Sussex. 583 pages. Price £20.45 in hardback.

Those aquarists who have a scientific background and some mathematical knowledge will be able to appreciate, and learn from, this very comprehensive volume. The title represents the authors' concern with the chemistry of all kinds of natural waters and the belief that the basic principles of physical chemistry apply to the variables and reactions involved in the make-up of such environments. Events in our aquaria tend to mirror those occurring in natural waters of similar properties in general, so the information given is relevant in many ways to our activities.

The serious aquarist who is prepared to read slowly and thoroughly, and to look up the occasional word from time to time, should benefit. I personally read many books and academic papers of this nature with a layman's eye and always find that something is gained from the exercise, even if it is only a small percentage of the total amount of material sifted through. Many subjects which create controversy amongst aquarists are dealt with very thoroughly; pH buffering, nitrification, carbon dioxide reactions, organic pollution, and so on.

The pages contain many graphs, diagrams, tables and equations. It is obviously a text-book for the serious student and not casual reading for the un-

trained hobbyist. For the initiated, however, it should prove to be a mine of information.

**Beachcombing for Beginners** by Norman Hickin.

Every keen aquarist will surely be tempted at some time or other to poke about in tide pools and to search along beaches for interesting specimens and examples of marine life. Much of my time on holiday every year is spent messing about like this, so it is nice to find that someone has written a book with us very amateur naturalists in mind.

Mr. Hickin deals with all aspects of collecting, identifying and cataloguing these souvenirs, and also discusses the way of life of the various organisms and the unique characteristics of life generally, as found in the tidal zones. The illustrations are reproductions of original scraperboard drawings by the author, all extremely well done and showing a wealth of detail. Advice is given on "seeing" specimens, i.e., on realising what one is looking at, and emphasis is placed on explaining where to search for the different kinds of life or its remains. Many finds are skeletal, in the form of bones or shells, and it is informative to know just which organism developed each, and to what purpose.

The author is an outstanding naturalist who has travelled the world to collect specimens, and his enthusiasm for his subject makes the book a most enjoyable read.

Published by David and Charles, Newton Abbot, Devon TQ12 2DW. 136 pages, 72 illustrations, £3.50.

A. JENNO

# VIEWPOINT

by A. Jenno

During May I was able to take up a long-standing invitation to visit the manufacturing premises of Uno Products at Nantwich in Cheshire. Mr. Walter Ellson was kind enough to show me around and I was able to meet his son Mr. Conrad Ellson, who actually runs the business.

As no doubt everyone knows, the mainstay of Uno's trading in the aquatic field is the production of aquarium heaters and thermostats, and in recent years the combined models. Other items are also produced but it would be true to say that this concern stands or falls on the quality and reputation of its temperature control equipment.

My most striking impression was that the factory is a happy one. Mr. Ellson's staff consists mainly of ladies, some of whom have been with him for many years, and there was a very noticeably pleasant atmosphere in the workshops and an extremely conscientious attitude towards the work which should ultimately give the customers a worthwhile product. Being an engineer of sorts myself, I was also able to appreciate the various production methods in use and to understand their contribution towards long life and reliability in the finished article.

Like our other British manufacturers, Uno are at the moment having to cope with the difficulties and changes created by the introduction of the new Electrical Safety Regulations last year. Mr. Ellson's interpretation of these, backed by discussions with persons who he terms "the powers that be", is that the long-established practice of encasing submersible heaters and thermostats in glass test-tubes has to stop this year. Therefore all of the manufacturers of these items have had to redesign and consequently re-equip their manufacturing areas. Other changes are involved also but the matter of the type of protective case employed is probably the most fundamental. Figures of many thousands of pounds are involved, as well as the jobs of many employees, there being a need to invest in new materials and technologies. At the moment the subject of the new regulations does not bring smiles to the faces of those directly concerned,

to say the least, especially as there is a conviction backed by years of experience that in some ways the changes being brought about are not, in practice, necessary.

However, things must progress, and so Uno for one example have buckled down to it, have made their investments for the future, and will be bringing out new designs which should prove very interesting and useful and may well set the pattern for years to come.

This is one of those periods when our manufacturers are having to plough back into their businesses profits made from us in the past so as to build again for the future, so it is to be hoped that we can support them and their efforts without which we would have no decent equipment and perhaps no hobby at all.

The successful breeding of the common Angelfish was a subject of great mystery and aquatic skill in days gone by, and in those times the production and proper development of a batch of these fishes was thought of as one of the ultimate signs of expertise on the part of the fish breeder. Over the years the process has become easier as the finer points have been widely published so that now anyone should be able to breed these fishes with a little dedication. I have been trying, on and off, for years and with only one recent exception have failed every time.

My problem has always been the same—the eggs fungus before the incubation period is up because my local tap water, and thus that in the breeding aquarium, is hard and slightly alkaline and so supports a high bacterial population, which induces fungal attack. Perhaps, then, some comments may help others who have similar difficulties.

*Pterophylum scalare*, the commonest Angelfish, originates in South American waters which are soft and acid and practically bacteria-free. It lives in circumstances similar to those of *Discus*, *Festivum*, *Ramirezi*, etc., but has now been bred through many generations in aquaria and other artificial environments so that it is unlikely that the aquarist will obtain true wild fishes, especially in the juvenile sizes. The

"artificial" Angels are not as demanding as their wild counterparts with reference to the water characteristics of their aquarium and so they are more easily kept throughout the country and will usually spawn frequently when conditions are otherwise suitable.

Where things get difficult, however, seems to be when we attempt to hatch out their eggs in waters which are different in character to that of the native habitat. The fishes have adapted over the years but the eggs have not and are thus susceptible to fungal infection which they would never meet in the wild. It may not therefore be reasonable to assume that water which the adults spawn in is necessarily suitable for the hatching of the eggs.

When Angels spawn the aquarist can either leave the eggs with the parents which, in nature, clean and guard them during the incubation period or, where the interest is in the definite acquisition of many fry, can remove the eggs to another container and hatch them out artificially. It has long been thought by experienced aquarists that the parents know whether there is much chance of their eggs hatching in the prevailing water conditions, and act accordingly. Sometimes the eggs are eaten straight away, and sometimes the parents just do not bother with them very much, but on occasion they do fight a losing battle in adverse conditions.

When the eggs are removed by the aquarist, on whatever substrate or plant leaf they are attached to, and installed in a separate hatching container then the ball is well and truly in his court and if the eggs were laid in unsuitable or dirty water there may not be much chance of success. If we assume 100 per cent fertilisation by the male, which is possible where an experienced pair have spawned together before, then there will at least be no infertile eggs to encourage the first fungal invasion.

There are various traditional treatments which can counteract the fungus problem in favourable circumstances. Methylene Blue was always the most popular, and Acriflavine a close second. One authority, Dr. Feroze Ghadially, recommended the use of distilled water when hatching the eggs away from the parents, and a modern method is the use of ozone as a fungus deterrent.

The main problem, however, in my experience and in tap waters similar to my own, is not how to stop the fungus, but whether the eggs can be obtained quickly enough to make any treatment viable. I have been fortunate enough to be present on just two occasions when the adults spawned on a removable substrate, and in both cases the eggs were moved immediately afterwards and hatched without difficulty. The first partial success was in distilled water in a brown-glass, wide-necked jar (to exclude light), and the second almost complete success followed the immersion of the eggs for 24 hours in a strong Methy-

lene Blue solution of 4 drops of 10 per cent aqueous stock mixture in two pints of the aquarium water. On every other occasion I have arrived home from work or elsewhere to find the eggs already perhaps some hours old, and then nothing has saved them. There are also times when the parents spawn on the wall of the aquarium so that the eggs are not removable anyway.

Dr. Ghadially, in his booklet "Angelfish—the King of the Aquarium" (*Aquarist and Pondkeeper*) came up against the same problem whilst using Sheffield tap water and in fact seems to have originated the distilled water idea. My eventual failure on the occasion I tried this method was that the brown-glass jar used made viewing difficult and in my eagerness to succeed (first time, remember) I moved the fry too soon to another container before they were properly free-swimming and then either that or the sudden change in water characteristics killed them.

On the second incidence, recently, I followed the advice of an experienced acquaintance who has the same tap water supply and most of the eggs hatched. This method involved immersing the fresh eggs (on the spawning stratum) in the protective solution as already described, but then removing them to a clean container of mature tap water with no additions before the approach of the end of the incubation period. The argument behind this is that the Methylene Blue, whilst being appropriate for fungus protection, is not very kind to the subsequent fry and that the initial soaking is enough to stop fungus anyway.

In my case at least, the above method worked so that at last after some years' puzzling I feel more confident of understanding what is going on. One Swallow does not make a summer, of course, so there will still be further experiments. The vital point, which should be emphasised, is that it does seem necessary to obtain the eggs quickly following spawning when they are to be hatched artificially. This, I think, explains a lot of my previous failures and contradictory conclusions. It may be that if we cannot remove the eggs within, say, 1 hour after the spawning then there may not be much point and it might be better to let the parents have a go on their own.

This advice, of course, relates only to my own experiences using South Staffordshire tap water. Friends in Birmingham, for instance, which has more suitable tap water, have hatched Angel eggs regularly with much less trouble and only minimal precautions. I have thought of transporting that water home for this use but have yet to do so. Dr. Ghadially's distilled water method is worth further investigation (as are all of his aquatic ideas), and I also intend to try ozone in this context as either this or ultra-violet sterilisation promises to be the most convenient simple method if successful.

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# THE BULL FROG

by Andrew Allen

*Rana catesbeiana* is undeniably the most impressive batrachian from North America, and among the most splendid in its colours. To most people it is *the* frog, that big green creature of the imagination that basks always on great lily pads.

It is the largest frog in North America, often six inches in length, with a record of eight inches—plus lots and lots of leg! It may be readily distinguished from other large New World frogs through the total absence of dorsolateral ridges along the trunk.

Most bull-frogs are coloured a vivid and unbroken grass-green, a lovely colour, proper to the smooth, enamelled surface of these amphibians. The belly is white or pale grey. But colour variations abound, and the green often becomes mottled with olive, or grey, or brown, a patterned mosaic that in the deep South tends towards black.

The species lives across most of the United States, but its stronghold is in the South and East. Once absent from the West coast, the natural limits to its distribution have been obscured by a series of introductions, and bull-frogs now inhabit California and other Pacific states. To the North, the bull-frog edges into Canada, to outposts in British Columbia,

the Great Lakes, New Brunswick, the Gaspée of Quebec, and Nova Scotia (including Cape Breton island)—but cannot be numbered among the truly hardy frogs of the continent. Thanks to further introductions, it is now established in Cuba, Mexico, and an assortment of offshore islands, large and small.

The bull-frog is impressive not only in dimensions, but in voice. Its call is a sonorous bass roar, a resonating boom most offensive to musical ears, optimistically rendered by Conant as *Jug o' Rum, Jug o' Rum, Jug O' RUM*. Vocally, it is first cousin to Concorde, rendering large areas uninhabitable to those with delicate eardrums. The call is generated and resonated within a single internal vocal sac.

In the North, cold weather mercifully curtails the breeding season and vocal activity to two months, usually May and June. But in the South, breeding occurs continuously between January and October, and the torture is prolonged. The female lays up to twenty thousand eggs, which hatch within a week. The tadpoles take between one and three years to develop, and themselves grow to six or seven inches in length. Bull-frogs can breed only in permanent water bodies that are in no danger of drying out.

Bull-frogs are truly aquatic, and encountered but



rarely in broken country or beside small ponds and streams. They pass their lives in lakes, canals and rivers, among the reed beds of the marshes, among the cotton-tufted sedges of the fens, beside the dark pools that open into the Sphagnum of the bogs—wherever there is a great open water, and a sun that shines. They are not to be found beneath the swamp alders, or in the forest, or in other dark places. Basking on tangled vegetation at the water's edge, or . . . yes . . . on a lily pad, they possess that love of the sun so rare among amphibians, but shared with those ecological cousins in Europe, the Edible and Marsh frogs (*R. esculenta* and *R. ridibunda*).

Sometimes an injudicious approach will precipitate a long leap into the water. Sometimes, bull-frogs show an amazing unconcern and, besotted with the sun, ignore a falling shadow or a stamping foot. One such, beside a remote Cape Breton lake, let me stoop down and stare it in the eye from two inches, a disconcerting experience for both concerned.

The appetite of the bull-frog matches that considerable volume. In short: it will eat almost anything, from a beetle to a mouse, anything that moves and is not too small to be noticed, so large as to be a predator. A bird in flight, a shrew, a vole, another bull-frog: all these have passed down the capacious, indiscriminate, bull-frog gullet. But aspiration oft exceeds ability. The frog has rather poor eyesight. A passing dragonfly will stimulate a gigantic leap, and a shattering belly-flop splash into the water. The frog surfaces, returns to its sun-pad. The dragonfly continues. Five minutes later—repeat performance—like result. It is good entertainment, for the observer. And sometimes those optimistic leaps must bring reward, for Natural Selection does not smile on the waste of valuable energy.

It will not have passed unnoticed that the bull-frog is likely to pose certain problems to the vivarium keeper. It requires strong sun and, if from the South of the range, a tolerably warm temperature. Those enormous leaps render it completely unsuitable as an inmate of any indoor vivarium. No living-room tank, except on a Blenheim scale, could encompass such acrobatics. In a small vivarium it is certain to damage its skin against walls and roof, causing skin lesions and the entry of a variety of pathogens. A large greenhouse or conservatory might prove the answer to these problems, with or without supplementary heating according to the local climate and geographical origin of the animals.

But the voice . . . is a different class or problem, a quite Royal Problem. With tact, and soft sell, and a box of chocolates, one can sometimes persuade a doubting family that the call of a tree frog is music most lyrical, a romantic trill from the Southern olive groves, associated with cicadas, aioli, cypresses and mellow walls. One would lie, but one might succeed. A North Sea foghorn at 2 a.m., from a dozen feet, requires doubtless a different technique, one that has so far escaped me, and a much richer and more persuasive set of lies. Then there are the neighbours: a foghorn audible at several hundred yards may be acceptable on Dartmoor, but does not win friends in Tooting, where it may also contravene local bye-laws.

These are minor blemishes. The bull-frog is a magnificent frog in its colour and scale of life, one that makes a powerful impact on the herpetologist. And unlike such other giants as the Goliath frog and Blomberg's toad, it may be viewed without the bother of organizing a tropical expedition, just by purchasing an air ticket to any major centre in the Eastern U.S. That is all that really need be said.

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at

BELLE VUE ZOOLOGICAL GARDENS, MANCHESTER

on

SATURDAY AND SUNDAY 23rd 24th OCTOBER 1976

*FURTHER DETAILS SHORTLY*



# PRODUCT REVIEW

**Es-Es Pre-Set-Matic Aquarium Thermostatic Heater**, modified to meet the new safety regulations; manufactured by Singleton Bros. Ltd., (Electronics), Truro Hill, Penryn, Cornwall TR10 8AX.

The Pre-Set-Matic is the first combined heater/thermostat to reach me that conforms to the government's new safety regulations. The modified model is similar to the previous ones, with two additions: (a) the glass tube is coated in silicone rubber and (b) the sealing sheath, over the bung at the top of the unit, is sealed closed with a small, plastic ring.

The silicone rubber sheath gives the unit a slightly "greasy" feeling, when touched, but the working parts are clearly visible inside. When submerged in the aquarium neither of the safety features is visible unless one looks specifically for them; however, in the majority of aquaria the usual aim is to conceal completely all heating equipment. When I examined the unit my main concern was that I could see no way of adjusting the setting of the unit without clipping off the sealing band round the top sheath; and I realized



that if it were cut then it would no longer serve any useful purpose. Hence I wrote to Mr. S. A. Singleton, one of the Directors of Singleton Brothers Ltd., to ask about the new safety features.

He kindly supplied the following information: "The sheathing on the P.S.M. is silicone rubber and it has a thickness of 0.75 mm. It is cemented to the glass tube and our tests prove that it is there permanently. Our tests were carried out with immersion heaters which were overloaded by 150 per cent. The reason we used immersion heaters rather than combined units is that the surface loading, i.e. watts per square inch of glass, is higher. To re-adjust the P.S.M. the clip has to be cut away and we do supply a spare; but this is only to meet the new regulations. The clip does nothing whatever and the instrument will work just as well without it. Again to meet the regulations we do supply a spare clip. No special equipment is required for fixing the clip."

Under test the modified unit performed as well as the original models. As is usual, the neon indicator lights up when the heater is switched on and goes off when the heater switches off. The unit is covered by a useful guarantee and is supplied with approximately

3 ft. 8 in. of two core cable—a very useful length as the cable fitted to some aquarium equipment is so short that one has to make unsafe joins to enable it to be plugged into a power supply. I like particularly the fact that the Es-Es Pre-Set-Matic is supplied with a suction holder with which to fix it in place in the aquarium; it saves one from having to take the trouble to obtain one separately.

Mr. S. Singleton informs me that he has an interesting new unit in production and he hopes to send me a review sample inside a month. It will have two neon indicators to overcome the problem of one not knowing when a heating element has failed.

In a future issue I hope to review the Es-Es Super Summit air pump for the benefit of readers who sometimes complain that there are no British pumps on the market.

B. WHITESIDE

**Late News from Singleton Bros Ltd.** gives following information.

Unfortunately the price of safety is high. The extra materials and labour involved mean that the retail prices (including V.A.T.) are likely to be in the following area:

'Presetmatic' thermostat heater	£3.95
'Superb' heater	£1.85
'Minor' with neon thermostat	£2.25

**Planting Pots**, for use in aquaria, price 3p each. Distributed by Hillside Aquatics, 29 Dixons Hill Road, Welham Green, Nr. Hatfield, Herts., AL9 7EF.

These plastic plating "pots" are made from light, clear plastic—identical to the type used in the "bubble packs" in which certain goods are sold. Three shapes and size are available. The round version is about 2 in. in diameter by  $\frac{3}{4}$  in. deep; the square one is about 2  $\frac{1}{2}$  in. square by  $\frac{3}{4}$  in. deep; and the oblong one is approximately 4 in. long by 1  $\frac{1}{2}$  in. broad by  $\frac{3}{4}$  in. deep.

The little units are ideal for use when one wants to grow a specific plant, in a particular growing medium, in a normally planted tank. The plant is planted in its special growing medium, e.g. peat, clay, in the little plant pot. The pot is then buried in the aquarium gravel in the required position.

If there's a particular plant that you have so far been unable to grow in a given tank, because it requires a special growing medium, an appropriate "pot" from the Hillside range could well lead to a solution to the problem. The pots mean that one can grow plants requiring acidic and alkaline rooting media in the same tank—without affecting the roots of other plants in the same tank. A useful idea well worth trying.

B. WHITESIDE

**The Es-Es Super Summit Air Pump.** In these days of almost total domination of some sections of the aquarium equipment market by foreign manufacturers it is refreshing to find a British product which is still going strong after 15 years of continuous production. The Super Summit air pump is still basically as originally designed, although there have of course been improvements in the materials employed, in line with modern technology. The inlet and outlet valves are made of silicone rubber, which does not perish, and unbreakable polypropylene is used for the outer casing and valve chamber mouldings. Four flexible-plastic mounting feet are fitted under the baseplate.

Aquarium air pumps generally utilise one of two modes of operation. In some models the energising coil activates a magnet which is attached to the diaphragm operating arm, while in others the arm itself is an iron plate which is mounted to lie across the coil face where it is influenced by the forces in the coil. The Super Summit is of the latter configuration. The great advantage of the moving-iron, as opposed to the moving-magnet system, is that the iron is magnetically non-polarised and is therefore attracted by both positive and negative half-cycles of the alternating power supply. This results in a pumping frequency of 100 impulses per second, as against 50 impulses per second for the moving-magnet type. All other criteria being equal then, for instance diaphragm area and travel, valve efficiencies, etc., a pump fitted with a moving-iron mechanism should pump twice as much air as a moving-magnet model.

The Super Summit certainly produces plenty of air for such a small, inexpensive pump. I made up a circle of twelve air stones and immersed them in fifteen inches of water. The pump easily managed to supply these. The manufacturers advertise an output capability of 1½ litres of air per minute at a pressure of 1 pound per square inch (1 p.s.i. is the pressure at a water depth of approximately 27 inches). The well-known disadvantage of moving-iron pumps, the tendency to generate metallic rattling as a result of the operating arm being mounted directly on the energising coil structure, is not apparent in the Super Summit. I tried it out sideways, upside down, even on end, and found it to be almost silent. Like any other diaphragm pump it must not be placed on anything which can amplify or resonate to its internal vibrations, but should be kept on a good solid shelf or hung up from a wall hook.

Spare diaphragms and valve chambers are available direct from the manufacturers or a reasonable repair service is established. A comprehensive instruction and adjustment leaflet is provided. Power consumption is 6 watts.

Price (at time of writing) £2.34 plus V.A.T. at 25 per cent.

Distributed by Singleton Bros. (Electronics) Ltd.

### The Algarde Water Treatment Capsule

This neat little unit is intended primarily for use as an auxiliary fitting for the Algarde under-gravel filter system. The main body of the assembly is a 3½-inch length of 2-inch diameter clear-plastic tube which is fitted with conical adaptors at each end to allow its use with the same size fittings as are employed by the standard ½-inch diameter lift tube. The idea is that the capsule can be installed in the alternative lift tube socket hole in the filter plate instead of this being just blanked off and left unused. The capsule can be filled with nylon wool, activated carbon or other water-treatment materials and will then perform beneficial operations on the output water flow while running in a parallel made to the main lift tube.

A complete set of fittings is included to make up this configuration, including a short length of ½-inch pipe and an end cap to bring the assembly up to the standard lift tube height. Two perforated internally-fitting end caps retain the filtering material against the push of the water flowing through. An alternative use for the capsule is as a separate small inside filter. Two suckers are provided to anchor it against the aquarium wall in this application, so that the base inlet opening can be held above the aquarium floor.

The makers emphasise that when in use with an under-gravel filter the capsule is *not* intended to be a substitute for the standard lift tube. This is because the wider bore and the presence of the filling will impede the water flow by comparison with that possible through the standard tube. An instruction leaflet shows an exploded assembly drawing and explains how the capsule can be joined to an existing filter system in a gravel bed without too much trouble.

Tests were carried out in one of my aquaria which already had Algarde under-gravel filters fitted, and results were very encouraging. The most effective use is, in my opinion, with a carbon filling to provide a chemical filtration function in addition to the biological action. The use of peat or other acidifying media in a biological environment would hardly seem sensible because nitrifying bacteria require alkaline conditions for best performance. Most aquarists use only one lift mechanism per filter plate and blank off the other socket-hole, after choosing the most convenient end for use, so this new capsule is clever in that it utilises an otherwise redundant facility. When used as a separate, it is very effective in small aquaria and the retaining suckers provide a really good anchor.

Price (at time of writing) 72p inc. V.A.T.

Distributed by Algarde Plastic Products, 46 Dury Falls Close, Hornchurch, Essex. Telephone: 01-594 1899 or 2439.

A. JENNO.

### The Vitakraft Laso-System Filter

A large capacity, free-standing power filter of the established well-proven type. At first glance this unit looks like a direct copy of the Eheim model 388, in that it has a similar green plastic tub-like media container, a round lid sealed by an O-ring and spring clips, and a lid-mounted water pump. There are however differences. The most noticeable, and I thought beneficial, is an improved attachment point for the inlet water pipe. On this filter it is pushed onto a hard-plastic tube projecting from the lid of the filter box and then the input water is fed down to the underside of the filter media by an internal ducting and piping arrangement, so that it will then rise up through the media in the accepted way. This arrangement of the water pipe attachment means that when the filter media is changed there is no need to disconnect the piping in order to remove the filter box from the vicinity of the aquarium. Aquarists who are familiar with power filters will know how inconvenient it is to have to continually remove bottom-fitting pipe connections, and how frequent manipulation often results in the breakage of the input fitting. Furthermore, water leaks are more likely to be avoided if the pipe joints do not have to be disturbed.

For similar reasons, the water pump motor is mounted onto the lid in such a way that it can be easily removed, for impeller cleaning, without disconnection of the output piping. Three large, hand-tightened screws attach the motor section to the impeller chamber, and two further small screws hold the motor onto the filter box lid. Removal of these allows the motor to be slipped off backwards, and this action leaves the output pipe still in place along with the impeller chamber casing. The impeller itself can then be easily removed from the motor for cleaning. The motor's electrical components are encapsulated in a sealed block, and being virtually indestructible in normal use, this permanent sealing provides very good insulation and hence electrical safety from water splashing and the conductive salt deposits found around marine aquaria.

The makers recommend the use of a specially made filter cartridge, shaped to form a tight fit in the filter box. Two patterns are available, both having a primary coarse filtering layer and then either a complete synthetic wool filling or an activated carbon plus synthetic wool arrangement. Fittings supplied include flexible water piping, elbows, jointing pieces, retaining suckers and hard-plastic piping in the forms of an input suction tube with strainer, and an output spray bar. Construction throughout is solid and efficient-looking. In use the filter performed exactly as expected and was silent and vibration free. The impeller is the only moving part

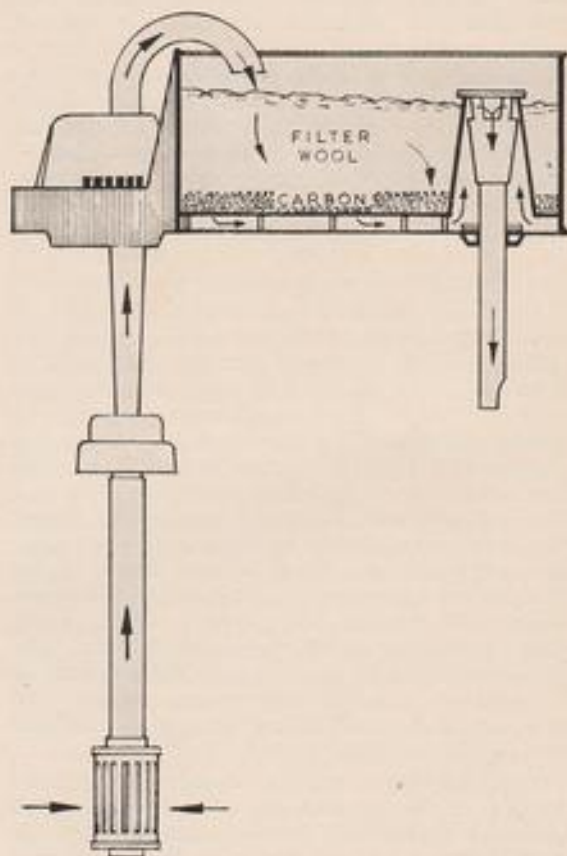
and is completely lubricated and cooled by the passage of the aquarium water. The makers state that the filter is suitable for use with salt water if required and recommend that the impeller be cleaned whenever the filter media is changed.

The circulation rate is given as 250 litres (approximately 50 gallons) per hour. Electrical consumption is 20 watts. A comprehensive instruction leaflet and a printed guarantee card are provided.

Price (at time of writing): £24.98 plus V.A.T. at 25 per cent.

Distributed by Newpet Ltd., Brough Park, The Fossway, Newcastle upon Tyne 6. Telephone: 0632-657428/9.

A. JENNO.



**The Beaver 400 Power Filter**

The above diagram was omitted from the review of this product which appeared in the May issue.



## OUR EXPERTS' ANSWERS TO YOUR QUERIES

### READERS' SERVICE

All queries **MUST** be accompanied by a stamped addressed envelope.

Letters should be addressed to Readers' Service, The Aquarist & Pondkeeper, The Butts, Brentford, Middlesex, TW8 8BN.

## TROPICAL QUERIES

by Jack Hems

**How can I prevent under-gravel filtration robbing the plants of nourishment?**

It is arguable whether all submerged plants are robbed of nourishment by undergravel-filtration. Be this as it may, try planting the vigorous root-spreaders in plastic trays filled with a mixture of clay, peat and grit, and then stand them on the grit covering the filter plates. More grit should be added to mask the plastic sides. Well-washed grit should also be spread over the top of the planting trays to prevent bottom-disturbing fish churning up the clay and peat mixture.

**My heater has become coated with a beige gritty-like deposit. I have been told that if this deposit is left intact it will result in a cracked heater. What should I do?**

The deposit may be prised away from the heater tube with the point of a penknife. Provided you do the job carefully, the tube will not suffer any damage. The fact that the deposit has formed indicates that the water in your aquarium is hard and alkaline. In future, make good the water lost by evaporation or cleaning with clean rain water or water which has been boiled first.

**Could I keep bitterling in a tropical tank?**

The short answer to this is yes provided the temperature is not strictly tropical and the bitterling are acclimatized to a temperature in the low seventies (°F) very gradually.

**I have purchased an angelfish with three ventral fins. Is this a new variety?**

A few years ago, a reader informed me that he was attempting to establish a breed of angelfish with a tripod-shaped arrangement of the ventral fins. Whether he succeeded or not, I do not know.

All the same, angelfish have turned up, now and again, with three ventral fins. I do not think, however, that an established variety with three ventral fins exists. At least, knowledge of such a variety has not come my way.

**I have just purchased some red-tailed black sharks. Please give me all the information you have on this species with regard to its food, temperature requirements, favoured quality of water, preferred plants, breeding procedure, literature on the species, etc.**

I imagine I could fill a small book on the requirements and whatever of the cyprinid known to science as *Labeo bicolor*. However, to rest your mind—for the time being, at any rate—the fish is not faddy about its water provided it is not unreasonably hard or alkaline or both. Nor excessively acid. As for temperature, a range of about 72°F (22°C) to 80°F (27°C) suits it well. Food: whiteworms, gnat larvae, shredded raw red meat or raw cod, and the like, is taken with relish. Also, dried foods and mossy algae. Plants: thickets of species of *Cryptocoryne*, *Vallisneria* and *Limnophila* afford the shelter the fish likes, and are suitable. Not much has been published about spawnings. Indeed, spawnings of *L. bicolor* have been few and far between. Roughly, though, it spawns like a typical egg-scattering barb. A lot of information about *L. bicolor* may be found in certain books of merit.

**I am a beginner with two ordinary black-and-silver angelfish living in a community tank. The other day I noticed both fish had what looked like a short pink worm protruding from the vent. Is this a sign that the fish have become infested with some parasitical worm? What should I do?**

The short pink 'worm' you have noticed is the tube down which sperm in the male and eggs in the female are passed during breeding. After the breeding instinct has been satisfied or has receded (as it so often does), the abortive pink tubes will vanish.

**I have a community tank housing a population of small clawed toads, various tetras, barbs and livebearers. Would it be safe to add a pair of rainbow cichlids to this tank?**

If the tank is a large one, *Herotilapia multispinosa* should not pose many, if any, problems. The clawed toads, at full size, could. They could down a neon tetra or platy at a gulp.

**I wish to manufacture bridges, castles and walls in cement for aquarium decoration. How do I cure them of free lime?**

Scrub your dried-out artifacts with a wire brush to remove loose sand and dust. Then soak them in several changes of water. Before the final change of water, test its chemistry with pH and water hardness testing kits. If it shows a pH on the alkaline side and a considerable degree of hardness, then continue to soak the cement objects in water to which sulphuric or hydrochloric acid (or distilled vinegar) has been added. Keep pickling them in such a solution until the water hardness remains negligible and the pH value remains at about 7.0 or less.

**I have several *Cichlasoma meeki* in my 4 ft. aquarium. How do I set about telling the sexes apart and when will I know when they are about ready to breed?**

If your *C. meeki* are quite well-grown, any males you may have will show more prolonged dorsal and anal fins than the females. Also, they will show more rosy colour. In breeding condition, the front half of the male fish becomes as brilliant as a splash of bright red paint.

**I have a 9 in. x 12 in. x 9 in. tank and wonder whether it would make a spacious enough home for some White Cloud Mountain minnows? Furthermore, what wattage heater and furnishings would I require?**

If your room is kept at a comfortable living temperature, then your White Cloud Mountain minnows would not require extra heat. On arrival home from the dealer's shop, however, float the unopened plastic bag in the aquarium for some twenty minutes before slitting it and allowing the waters to mingle and the fish to swim out. Your tank would support about six *Tanichthys albonubes*—to give this Chinese fish its scientific name—and plants such as *Sagittaria*

*subulata*, *Eleocharis acicularis* and *Vesicularia dubyana* should be included in the set up.

**I have a fish that I bought from a friend a few months ago. I understood it was a young male *Aequidens ityeni*. It has a brownish back shading to pinkish on the sides and pale underparts. It has a dark marking in the upper half of the caudal base and a slanting dark band extending from the snout to the rear base of the dorsal fin. It has reached a length of about 6 in. When I tried to obtain a companion for this fine-looking and well-behaved fish from a dealer, I was told that it couldn't possibly be *A. ityeni* because this cichlid is not nearly so well-coloured. Also it does not grow very large. I should be glad to learn what comments you can offer.**

I am afraid your dealer is wrong. Your description of your fish fits that of the colour scheme and colour pattern of *A. ityeni*. Furthermore, a full-grown *A. ityeni* does average about 5 to 6 ins.

**A pair of *Pelmatochromis thomasi* showed all the signs of sexual interest in each other, so I placed them in an aquarium with a flower pot turned on its side. They spawned. A few hours later, however, they ate the eggs. I tried them with a flat-surfaced stone and they spawned on this too. Yet again they ate the eggs. What should I do to stop the fish eating the eggs?**

The quick answer is to live in hope that one of the subsequent spawnings will prove successful. More sensibly, though, it would be best to separate the parent fish from the next batch of eggs (as soon as they have been laid) and supply the eggs with gentle aeration to keep the water moving around the spawning site. Perhaps your fish are disturbed too much by movements and shadows around their tank. You could try covering the front of their aquarium with a sheet of paper, with a tiny peep-hole cut in it, to give them a sense of security. Then you could watch their behaviour without frightening them.

**I have spawned zebra fish more than once in a rectangular plastic container. Unfortunately, the water in this container always turns green within the space of a few days. If I used a slightly raised screen of perforated zinc in place of washed granite chippings to protect the eggs from the cannibalistic parent fish would the development of the free-floating algae be inhibited by the metal screen?**

In all probability the unicellular algae would fail to develop. So, also, would the eggs of the zebra fish. In fact, a day or two in zinc-tainted water would kill the parent fish.

# GOLDWATER QUERIES

by Arthur Boarder

**I am very keen on attempting to breed fancy goldfish but I am discouraged by the fact that the young need so much live food on which to feed and I am not able to get any. Is it possible to rear fry without using any live foods?**

It is quite possible to rear goldfish fry on foods other than lives as I have done so on many occasions. When first they are hatched they have a yolk sac which supplies food for a time, depending on the temperature of the water. At one of about 70°F., the yolk sac will be used up in two days but it lasts a little longer when the water is cooler. Usually the fry start to swim freely once the yolk is used up. The next step is to give the fry Liquifry, as this is a fine type of floating food on which the fry can feed for a few days. Also it encourages the formation of infusoria. If you have a garden pond it is almost certain that the water will contain some Algae and also infusoria. Some of this water can be added to the fry tank each day whilst the fry are under two weeks old. From then on they can be fed on dust-fine dried food. It is possible to buy this dust-fine fry food from pet shops. If not it is possible to crush up flake food so that it can be strained through a nylon stocking. I have found one of the old fashioned coffee grinders ideal for reducing dried foods to a fine powder. The size of the food particles can be gradually increased as the youngsters grow. Provided that the fry have plenty of swimming space they will grow quite satisfactorily even although they never see any foods such as brine shrimps, grindal worm, *daphnia*, white worms or *tubifex*. I have also found that to feed fry on manufactured infusoria can be dangerous as the water added with the tiny creatures can soon pollute the tank water if given too liberally.

**Last year I kept some fish eggs in a tank for some weeks but they never hatched. How long should they take to do so?**

Goldfish eggs hatch according to temperature of the water, it is as simple as that. When it is at about 70°F., the eggs will hatch in three and a half to four days. When the water is colder they take longer, as much as a week if the water temperature is below 60°F. You may not have had fertile eggs or you may have mistaken snail eggs for those of fish, which has often been done. The eggs of goldfish are only about the size of a pin's head and are very difficult to see in water as they are practically transparent. If the plants holding eggs are lifted from the water the eggs show up with a pale amber colour.

**My goldfish do not appear to be very healthy and have gone off their food. I find a number of bubbles on the surface of the water in the tank every morning. Why is this please?**

When bubbles are seen at the top of the water it is a sure sign that the water is impure and needs changing. The fish have been mouthing at the surface for air during the night when the water plants cease to give off oxygen. You may have something decaying in the tank, such as uneaten food. This is the usual cause of pollution and is often brought about by the fact that food is given when the water is not warm enough for the fishes to feed at their maximum. Many fishkeepers fail to realise that the colder the water the less will the fishes need in the form of food. They eat very much more when the water is warm as long as it contains sufficient oxygen. Where an aerator is used in a tank, it is better to switch it on during the night in preference to day time, as water plants can supply most of the oxygen needed during the hours of daylight.

**Two years ago we raised some goldfish youngsters in a large tank after taking the eggs from the pond. This spring we moved about thirty of them to a tank, 19 x 11 x 11 in. and they seem to be dying off. There is an aerator and filter in the tank. The young fish are two inches long. Why are they dying?**

Your tank is too small for the number of fish you have in it. It should only hold about eight and a half inches of body length of fish. Even with an aerator and filter you cannot expect so many fish to thrive in the tank. As the fish are two years old, it is perfectly apparent that they have not grown as fast as they should have done or they would have been larger than they are in two years. Spread the fish out and you should be able to rear some of them. Space is as important as food when rearing fry.

**I have a tank, 30 x 12 x 15 in., and I cannot keep the gravel on the bottom from turning black and giving off bubbles. What can be the cause please?**

It is either that there is something decaying in the gravel or that there is something in the actual gravel, such as lime containing segments which give off the bubbles. I think it would be as well to get rid of the gravel and try a fresh kind. Wash it well at first and then do not over-feed the fishes and all should be well.

**I get bewildered by all the advertisements for fish foods and wonder which one to use. Which do you recommend?**

I am not sticking my neck out to recommend any particular fish food. Over many years I have experimented with so many kinds of fish foods that I have come to the conclusion that a goldfish will eat anything that a pig will eat and providing they are kept under proper conditions they will thrive no matter on what they are fed. Over many years I have carried out experiments, using one type of dried food or one type of live food for six months at a stretch, but have found no ill effects at all and certainly have never found the rate of growth to have been affected. The one thing I have found out for sure is that given plenty of swimming space the fish will grow well on any type of food. I have seen it stated that goldfish will swim to the top to take some special dried foods as soon as it is offered. Any hungry goldfish, in well oxygenated water will do the same no matter is the food given is the finest flake food advertised or just crumbled biscuit. Always remember that in a well-planted tank, which is not over-stocked with fishes, the water plants will usually have some soft Algae growing on them and if the fishes are not over-fed they will eat much of this Algae and so help to keep everything clean. If you leave a well-planted tank for a fortnight without feeding the fishes at all, you will find that the tank is much cleaner than when you started the withdrawing of food.

**I am thinking of making a garden pond with a liner. Is there any difference in the strength of the various makes and where can I get one. Also do Koi and Orfe require more space than goldfish?**

There are, as you state, various types of pond liner on the market and several are very good. One thing I must point out is that it is false economy to buy a cheap thin one, as it is not likely to last as long as a Butyl or Plastolene type. Remember that a good one will last for many years whilst a poor one could start giving trouble within two years. Golden orfe and Koi do need a fair amount of swimming space and the Orfe are especially fast swimming fish which appreciate a large pond, perhaps not when they are small, but in good conditions they grow very quickly and then would soon be in trouble in a small pond especially in hot weather when the water lacks oxygen. The Koi can also grow fast and when kept in good conditions and fed well need plenty of space.

**If the fins of goldfish are damaged, will the fins grow again?**

Providing the fin is not still diseased it will grow again. It takes some time to do so and where the fresh growth is made there can be a slight thickening. In an exhibition fish, this could lose the fish points.

**I have a tank, four foot by two foot by eighteen inches with fishes from two inches to five inches. I have also three Catfish, the largest 10 inches long. My problem is that some of my fish have lumps out of their sides and I wonder if it is the five inch carp that has done the damage. What do you think?**

I would not blame the carp but the catfish. These fish are carnivorous and will eat any fish small enough to get into their huge mouths or can bite fishes too large to swallow. I just cannot understand why aquarists put catfish in their tanks or ponds. If one wishes to keep them then do so away from other fishes. One might just as well put perch or pike in a tank or pond with goldfish and expect them to leave the other fishes alone. I have seen a catfish hardly four inches long with a two inch long stickleback stuck half-way down its throat. So what can one do to a nice smooth goldfish? Clear out the catfish and your other fishes will have a chance to live in peace. It is a pity that dealers sell catfish as scavengers to beginners as these fish do no better job of scavenging than any healthy, hungry goldfish.

**I am looking for some good fancy goldfish and especially veiltail moors. Does this variety still exist as I have not seen any for a few years?**

I am enclosing an address from where you can get some moors. The veiltail moor certainly does exist and there have been some good specimens at some of the shows. The fantail moor is also seen but I have found that when they have to compete against the veiltail moor the latter is usually preferred. I agree with you that it is very difficult to find a show which has a good range of classes for the various fancy goldfish and one usually finds that many varieties have to compete one against the other. It is difficult to assess the value of a lionhead against a veiltail and so on. It is a great pity that the several Goldfish Societies in this country cannot get together and arrange that certain shows throughout the country will supply at least one class for a particular variety of goldfish. In this way it would be possible for a special class for all the standardised varieties of goldfish to be staged at at least one show every year.

**I want to line my existing garden pond with a liner but do not know what to do with the fishes whilst this is being done. Would they be all right in the bath for a day or two?**

The fish should be all right in the bath for a day or two and be much better off than if you placed them in buckets or other containers with small tops. If you start to empty your pond first thing in the morning it is possible to complete the task and have the fishes back in the relined pond before nightfall.



# From a Naturalist's Notebook

by Eric Hardy

DIMORPHISM, or two colour phases, is a variation known in a few fishes and several plants, birds and other things. This is different from local colour variation as in char and trout, even the Loch Leven trout which lacks red spots from its local diet being free from molluscs and crustaceans. The blue-headed wrasse, a tropical reef-fish, has been shown to have two colour phases. One is small, of variable colour in male or female. The other is larger, in older fish, which may be blue and green with two vertical black stripes and usually male.

Some blue-headed wrasses are in the first phase as female but turn male when they reach the second in a rapid change of sex. The terminal males have an enormous reproduction potential, but the initial males have only a low mating success. A few initial phase males have a small percentage which succeed in fertilising females but only when in large populations. Sex-changing Red Sea *Anthias squamipinnis*, a sea-perch, is 90 per cent female, but sex-change is stimulated by removing males from a tank of these fish.

The German biologist Carl von Hess fostered the idea that fish are colour blind. His techniques are seriously criticised by modern researchers who find colour reception in all bony fishes investigated, like stickleback, Siamese fighters, trout and minnow. More primitive sharks and rays apparently lack colour vision. The bright colours of many tropical coral-fish may be a warning for predators to see, and remember, from experience of their bitter taste. Some, especially solitary reef-fishes in dark places, are for specific recognition, enabling the formation of pairs for breeding. Aggressive fighter fish use them as a warning to rivals of the same species. Others are camouflage, either cryptic like their surroundings, or deceptive to mislead a predator. The common roach has a rare blue form, the azurine, but the bronze-gold forms of rudd and carp and the silver ide or orfe are apparently the result of selective breeding. A deep sea fish emitting red luminescence has eyes sensitive to red and catches red deep sea prawns because, though they would remain invisible to it in the blue-green light of most phosphorescent fish, the prawns reflect this one's red light. Thus its eyes can see them.

Which brings me to the aquarium, and its origin. When was this first devised? Probably older than David Elliston Allen implies in his new 293-page social history *The Naturalist in Britain* (Allen Lane, £9). I first knew David Allen in 1950 as a young Southport naturalist revitalizing Rugby School Natural

History Society, then, at Cambridge, researching the history of the Wardian Case in which the Victorians grew their ferns indoors. His book suggests "that enormously popular invention, the marine aquarium" appeared early in the 1850s, after people had for years been trying to keep things alive in jars of water. However, nearly 5,000 years ago the ancient Egyptians practised fishpond culture with Tilapia. A base relief at the tomb of Thebaine shows this in 3,000 B.C. The slightly rounded caudal fin on the relief identifies *Tilapia nilotica*, the sacred "Inet" worshipped in ancient Egypt. The tank is shown with a deeper central channel used for draining it. On either side were shallower parts for growing aquatic vegetation where the fish sought shelter and nourishment. The Biblical Song of Solomon refers to the fish-pools or "ponds" (Hebrew Bible) of Heshbon. Here remains of a large tank survived to modern times.

Allen attributes the invention of the aquarium proper to Nathaniel Bagshaw Ward, a London surgeon, his idol who devised the Wardian glass case for fern culture a few years after Maconochie, a Scotsman had invented the same device. In the 18th and early 19th centuries, many naturalists experimented with methods of aeration from seaweed to pond-plants to keep fishes and aquatic animals alive in water jars. Another version of the Wardian Case for housing snakes and reptiles out of water became the vivarium. The slow discovery of oxygenating plants to keep fish alive in aquaria seems to have been the stumbling block, plus excessive duties on glass. But Shirley Hibbert was no pioneer of experiment or discovery, and his 1856 *Book of the Marine Aquarium* was only a compilation from the works of Gosse, etc. His "Rustic Adornments," published the following year reprints this and his "Book of the Aquarium" in added length, and it pays tribute to Dr. Johnston's 1842 *History of British Sponges* describing the first successful marine aquarium in a glass jar. In 1850, Robert Warington exhibited a goldfish in a 12 gal. glass aquarium planted with *Vallisneria spiralis* to the Chemical Society. Two years later Gosse and others were experimenting in the freshwater culture of plants and fishes. In 1853 London Zoo opened its first vivaria based on plans given by Bowerbank to Mitchell the secretary. Crystal Palace led the Victorian heyday of public aquaria. But it wasn't such a limited craze as D.E.A.'s book implies, for in 1928 the British Aquarists' Association was founded to meet a very active amateur interest in home-bred tropical fish,

previously imported at high cost from Germany.

Hibbert describes all sorts of improvised aquaria from foot-baths to inverted bell-jars and quotes so many sources that the practice was by then long established. Gradually Dr. Badham and others proved that the flat-sided tank, cementing glass, wood and metal, was superior to the old fish-globe. Thus began the "river-tank" of native cold water fish and shells, suitably furnished with native pond-plants in the comfortable "home of taste."

The use of the aquarium has progressed from the adornment of Victorian drawing rooms to fishery laboratories at Burnham on Crouch, Conway and elsewhere. Trout collected from 77 Norwegian rivers have been bred to test whether their ability to resist acid water can be transmitted genetically. Results varied considerably but the eight most resistant stocks are being used to raise a more resistant breeding stock to withstand the increasing acidity of Norway's lakes and rivers, caused by air-borne sulphur dioxide.

The vegetarian dugong, Siren of zoology, is the most interesting aquatic mammal ever exhibited in London Zoo aquarium. No relation of the Cetaceans, whose performing dolphins and killer whales have commercialised aquatic life beyond the dreams of the Victorian public aquaria, it is the subject of an excellent 30-page Wildlife Research Report by Sandra L. Husar, just received from the U.S. Fish & Wildlife Service. As well as describing structure and habits, this reviews the world literature of a much neglected species. It omits some records, like an account of the dugong on the Palestine coast of the Red Sea in Bulletin 12 of the now defunct Jerusalem Naturalists' Club, and Prof. Aharoni's disputed record of it from the Mediterranean coast in *Zeitschr. für Säugetierkunde*, 5, 1930. Steller's sea-cow (not to be confused with his sea-lion) is an extinct relative, otherwise this animal might have been farmed as the most efficient way of converting seaweed into edible meat. The small-brained dugong might be heading to extinction too, now living in 21-38 deg. C in the Indo-Pacific seas so far as Western Australia, South Africa, Fiji and

Formosa. The three related species of manatee, also kept in aquaria, haunt Atlantic estuaries. Their nearest land relatives seem to be elephants.

The longest captive dugong pair lived in the famous dugong enclosure in India's Mandapam Camp from 1959 to 1970. Apart from sharks and killer whales, man is the chief predator for their edible flesh, by net-fishing from Ceylon and Torres Islands, and by Australian aborigines. Marine parks are suggested for their conservation.

The Nature Conservancy Council's recently published first report (1973-75) proposes marine wildlife reserves around Lundy and Skomer islands, the Scillies and the Dorset coast, under pilot management by local skin-divers. Collecting sea-urchins from St. Bride's Bay, Dyfed, for lamp ornaments and other commercial uses might upset the ecosystem and increase seaweeds, claim local conservationists. The Scottish Marine Biological Association has similar ideas for the west of Scotland. A working party has been set up to advise on marine life and in November a world campaign to conserve marine life will be launched from the World Wildlife Fund conference in San Francisco. American conservationists have organised a beach patrol to protect loggerhead turtles when laying their eggs at Jekyll Island State Park, a popular resort in Georgia. A local biologist there set up a hatchery where 960 of last summer's 1,300 eggs were used to produce 820 young, which swam off to sea.

The recent establishment of a stock of anti snake-bite venom in Liverpool is needed for the dangers from escaped pets and imports. However, those who keep serpents know they are not without friendship. When Herr Thomsen of Svendborf (Denmark) zoological gardens was "hospitalized" in a pre-war illness, the large boa constrictor was claimed to have gone on hunger strike and would not eat until he returned, a few weeks later. Then it livened up and ate from his hand whatever he offered. The same happened when he went on holiday to recuperate. Or was it just coincidence with its frequent long gaps between meals, mistaken by a reporter?

## INDENTIFICATION AND CONTROL OF ALGAE continued from page 90

eager to consume various algae species, and a proportion of such algae-eating fishes should always be included. Snails, on the other hand, should generally be avoided as they do not discriminate between algae and the plants themselves.

Most companies supplying reagents and cures to the aquarium trade include an algicide in their range these days and although they can often be very effective against certain species are often total failures when other types are responsible. Basically I am not against their use and think that the development of a

really effective broad-spectrum algicide will be a boon to aquarium owners. I would welcome correspondence from aquarium keepers with their experiences of these products.

Summarising, the algae-free aquarium is one which contains a balanced selection of higher plants and fishes, which has adequate but not excessive lighting and which is regularly maintained with emphasis placed on the prevention of the accumulation of nitrogen and phosphate by regular small water changes.

## Junior Aquarist

# BEGINNERS' CORNER

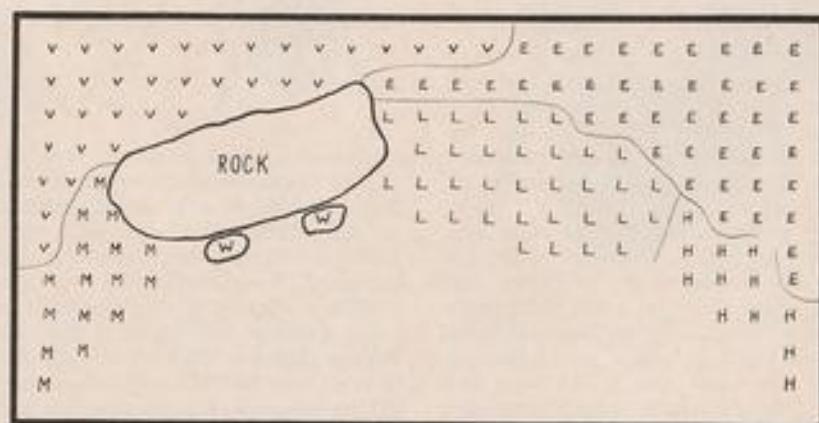
## (9) PLANTING THE AQUARIUM

THERE ARE as many opinions about the correct way to use and set plants in an aquarium as there are aquarists—no two people think alike. But there is one rule about plants that few can argue about: 'there must be enough plant life to absorb the wastes from the fish, or the water must be changed frequently.'

In the average aquarium it is often recommended that there should be 12 plants to each 1 in. of fish. For instance, three 2 in. goldfish would require 6 dozen plants. In practice it is better to aim at twice

method of approach will ensure that the fish he does keep will be in healthy surroundings, for the larger number of plants will find it easy to remove all the wastes from a small number of fish.

A layout for about 12 dozen plants in a 24 in. aquarium is shown here. They are set about 1 in. apart each way, and arranged so that there is an open space at the middle front. Such a planting would support three 2 in. goldfish in good health, or about twenty small tropicals equally well.



V. VALISNERIA E. EGERIA M. MYRIOPHYLLUM L. LUDWIGIA H. HORNWORT W. WILLOW-MOSS

recommended quantity of plants, for it is an established fact that a multitude of plants—well lit and growing properly—do more to make the water healthy for fish than anything else the aquarist can do.

The beginner, who has probably approached this hobby with the idea of keeping a few fish, and then decorating the tank with a few plants, should adjust his viewpoint to the idea of a water garden in which a few fish are kept to fertilise the plants. This difficult

"But I want to see my fish, not have them hidden by plants" says the beginner. This is understandable, but it would be better if he said: "I want to see my fish healthy, even if some of them are hidden by plants." It is all in the mental approach, and a little thought can soon adjust that. In any case most people would think that a heavily planted tank is a better spectacle than a bare one.

The actual planting is done with the water in place,

with two planting sticks. These can be obtained from all pet shops (or can be made), and have a V-shaped notch in one end with which to trap the plant and guide it to the bottom. With one stick the plant is persuaded down, and with the other the root or cutting end is pressed into the gravel. Then, still holding the plant in place, some more gravel is flicked over the roots. This should be practised a few times first, because invariably the first few rise to the top again. A little persistence will soon turn the amateur into an expert at this sort of planting.

Plants are purchased in two forms: those with roots, and those that are just cuttings without roots. Both

kinds are treated in the same way, except that those with roots should have only their roots covered. If too much stem of a rooted plant is covered it will rot. Simple cuttings can have one or two inches of lower stem covered, and will soon develop roots to anchor themselves securely.

Start planting along the back row, keeping each kind of plant to its own group. Never mix kinds in a group, for each kind of plant develops its own kinds of infusorians—which thrive best in their own colonies. It is the infusorians on and near the plants, as much as the plants themselves, that help to keep the water pure and healthy.

## AQUATIC BEETLES

by David C. Wareham

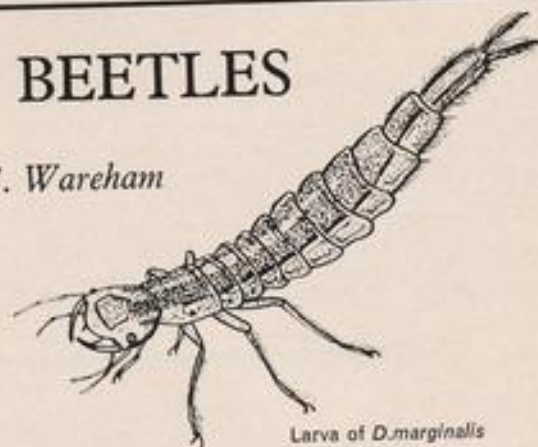
THERE ARE WELL OVER 3,600 different species of British beetles living in almost every type of habitat. Of this growing number there are some 330 species which are aquatic, spending their lives either on or below the surface of the water.

A common sight on most stretches of still or slow moving water in the summer months is the vast numbers of small, black beetles swimming rapidly round and round in figures of eight. These are members of the family *Gyrinidae*, the whirligigs. There are eleven British species, all of which are small and round in shape.

The whirligigs' antennae have eleven joints, the second joint being large and ear-shaped whilst the others are short and broad. They have two eyes which are each divided into two parts horizontally by the base of the antennae, providing the beetle with the ability to see both above and below the water's surface at the same time. The hind and middle legs are very short and broadly feathered, so that a stroke on either side spins the body round like a boat rowed with only one oar.

Females deposit their eggs in clusters on the leaves and stems of submerged plants. On hatching from the eggs the carnivorous larvae remain under water, either near or on the bottom and breathe dissolved oxygen through feather-like gills, on each segment behind those which bear the legs. They prey on aquatic nymphs and adults, predigesting them as do the *Dytiscid* larvae. When mature, the larvae develop air-breathing organs and leave the water to pupate.

When the adult whirligig beetles are seen on the



Larva of *D. marginalis*

surface of a pond or stream they are searching for food in the form of animalculae on or near the surface. They do this only in bright sunshine, submerging in dull weather or if alarmed. Their broad, dark bodies are smooth and shiny and the largest species measures 19 mm. in length.

"Water tiger" is the common and descriptive name given to the larva of the rapacious Diving beetle, *Dytiscid*. Varying in size from 1 mm. to 40 mm. the family *Dytiscidae* contains over 2,500 species of predacious, carnivorous water beetles, of which a hundred or more are to be found in the British Isles.

Structurally, they are the same as the ground beetles, *Carabidae*, with long thread-like antennae and six visible palpi. Their hind legs are flattened for swimming and their hard, oval bodies are smooth and streamlined. The wing cases fit tightly to the edges of the abdomen in such a way that an air trap is formed beneath them, enabling the beetles to breath beneath the water. This air reserve is renewed when the insect protrudes the tip of its abdomen above the surface. The forelegs of the male are equipped with broad, paddle-like feet and

suckers, which are used to grasp the female when pairing.

The larvae will attack almost anything including each other and although small aquatic animals and insects are the usual prey, they will not hesitate in killing small fish, frogs, newts and their tadpoles. They have tubular mandibles through which they suck their victims' juices, after having injected a pre-digestive fluid. Their bodies consist of eleven segments, with spiracles on the last segment only, these being continued as hollow tubes which are raised to the surface when the larva breathes. The rear few segments are often hairy and it is these hairs which help in swimming and in keeping the tail end above water when the larva is resting.

The adult diving beetle is almost as insatiable as the larva in its appetite and will frequently kill for the sake of killing. If one is introduced into an aquarium, either by design or by accident, it will quickly kill the fish occupants or any other living thing it can master.



Dytiscid beetles (not to same scale)  
Left: *D. marginalis* (male) and *Platambus maculatus*

When ready to pupate the larvae climb out of the water and work their way into moss or soft mud. Pupating takes two to three weeks plus a fourth week for the adult beetle to gain colour and hardness. The adult then returns to the water where it remains for the rest of its life except for brief intervals of flight, mainly in the evening, when it seeks other waters for more plentiful food or a mate.

The third and final family, *Hydrophilidae*, contains some 113 British species, of which two are "large". Generally they resemble the previous family in appearance. Their antennae are, however, quite different, being shorter than the palpi and heavily clubbed, and the last four segments are enlarged and hairy for gathering air at the surface. Their hind legs are not flattened for swimming and they tend to crawl rather than actually swim. They have only one visible pair of palpi which are long and have four joints. Although the majority are aquatic there are a few species which are terrestrial feeding

on and living in decomposing animal or vegetable matter.

Like the whirligigs, these beetles breathe oxygen whilst underwater, from a stored air bubble under the wing cases, or elytra. This is replenished periodically by surfacing and supplemented by the diffusion of dissolved oxygen in the water. When it renews its air supply, the beetle's antennae break the surface of the water and are tilted at such an angle that air travels down them and into the reserve beneath the elytra.

The female deposits her eggs, usually singly on water plants although she has been observed to carry them on the underside of her abdomen until they hatch. Some species lay their eggs, which may be as many as 40 to 50 in number, in a silken



*Hydrophilus piceus*

capsule with one end raised above the surface. After having eaten their way through the capsule, the newly hatched larvae resemble those of the diving beetles both in appearance and in habits, being carnivorous, and feeding on snails and other small water animals. The adults are entirely vegetarian and their diet consists of decaying water plants, fungi and other vegetable matter.

This interesting family, then, contains some of our largest beetles and our largest species, *Hydrophilus piceus*, is only second in the size ratings to the stag beetle, measuring 45 mm. Sadly it is not as common as it once was owing to its popularity among small boys and collectors, and it is now only extremely local.

# News

## from AQUARISTS' SOCIETIES

Monthly reports from Secretaries of aquarist societies for inclusion on this page should reach the Editor by 5th of the month preceding the month of publication.

THE results of the **Kettering A.S.** Open Show held in March were as follows:—A.V. Barbs: 1, E. Creighton (Corby); 2, A. M. Crew (Wellingboro'); 3, M. Marsden (Corby). A.V. Characins: 1, C. McAllister (Kettering); 2, S. Tine (Kettering); 3, R. Elliot (Corby). Cichlids: 1, A. McCall (Bedford); 2, K. Beaver; 3, P. Butt and S. Knight (Northampton). Apistogrammas/Pelmatocichlas: 1, M. Beamsbridge (Jones and Shipman); 2, P. Eady (Leicester). A.V. Labyrinth: 1 and 3, A. Hugland (Wellingboro'); 2, A. and M. Crew (Wellingboro'). Fighters: 1 and 2, R. Elliot (Corby); 3, L. Godwin. Egg-laying Toothcarps: 1, 2 and 3, A. and M. Crew (Wellingboro'). Tropical Catfish: 1, Mr. and Mrs. Campbell (Corby); 2, P. Eady (Leicester); 3, A. and M. Crew (Wellingboro'). Corydoras and Brochis: 1 and 3, Mr. and Mrs. Cobbett (Bletchley); 2, L. Godwin. Rasboras: 1, M. Brambridge (Jones and Shipman); 2, R. Langford (Bedford); 3, R. Elliot (Corby). Danios and W.C.M.M.: 1 and 2, R. Elliot (Corby); 3, L.R.E.S. Loach: 1, R. Elliot (Corby); 2, M. Brambridge (Jones and Shipman); 3, J. J. Sievwright (Corby). A.O.V. Egg-layer: 1, A. and M. Crew (Wellingboro'); 2, R. Elliot (Corby); 3, D. Cunningham (Northampton). Pairs Egg-layer: 1, A. and M. Crew (Wellingboro'); 2, M. Marsden (Corby); 3, Mrs. A. Giles (Corby). Pairs Livebearer: 1, A. McCall (Bedford); 2, R. Wilson (Corby); 3, S. Tine (Kettering). A.V. Guppy: 1, D. Swinford; 2, Mr. and Mrs. Campbell (Corby); 3, A. and M. Crew (Wellingboro'). A.V. Swordtail: 1, A. McCall (Bedford); 2, B. White (Bletchley); 3, D. Atkins. A.V. Platy: 1, L.E.E.S.; 2, J. Sievwright (Corby); 3, R. Wilson (Corby). A.V. Molly: 1, D. Peag (Dunstable). A.O.S. Livebearer: 1, A. McCall (Bedford); 2, R. Elliot (Corby); 3, R. Langford (Bedford). Single-tail Goldfish: 1, S. Andrews (Jones and Shipman); 2, A. and M. Crew (Wellingboro'); 3, K. Skyes (Jones and Shipman). A.O.S. Coldwater: 1, R. Langford (Bedford); 2, Mr. and Mrs. Scott (Jones and Shipman); 3, K. Skyes (Jones and Shipman). Tropical Egg-layer brood: 1 and 2, Mr. and Mrs. Marsden (Corby); 3, B. White (Bletchley). Tropical Livebearer brood: 1 and 3, B. White (Bletchley); 2, Mrs. M. Newton (Cambridge).

The society are always pleased to welcome new members. Meetings are held on the first Thursday in every month at the Avenue Hotel, Russell St., Kettering.

**OFFICERS** now serving **Basingstoke & District A.S.** are as follows:—President: A. Blake; vice-president: A. Marshall; Committee chairman: G. Clewer; vice-chairman: M. Strange; secretary: R. Rich, 93 Pinkerton Road, Basingstoke; treasurer: R. Peck; show manager:

R. Hight; show secretary: C. Wells, 271 Over-down Road, Tilehurst, Reading; programme secretary: P. George; projects officer: J. Ford; raffia secretary: Mrs. J. Lovegrove.

IN April the **Dorchester & District A.S.** welcomed the return visit of Mr. Jones of Southampton, who gave an interesting talk and slide show on the Catfish family. Mrs. L. Norman, treasurer gave a short talk on breeding kribensis in a community aquarium. The table show was for coldwater fish and the results were:—Junior: Common Goldfish, G. Maccroft; Comet Tail: R. & P. Christopher; Stone Loach: R. Cook; Comet Tail: R. and P. Christopher; Minnow: R. Cook. No entries were received from the senior section. Forthcoming events will include a visit to a neighbouring Tropical and Marine Aquarium in June.

**RESULTS** of the fixture between **Immingham A.S.** and **Scunthorpe A.D.A.S.** in the Quatro Inter-Society Show League were as follows:—Guppies: 1, Mrs. S. Stark (Imm.); 2, Mr. and Mrs. Morrissey (Imm.); 3, P. Smith (Scun.). Mollies: 1, P. Smith (Scun.); 2, N. and C. Crompton (Scun.); 3, D. Hargreaves (Imm.). Platies: 1 and 2, A. Clayton (Imm.); 3, Mrs. E. A. Newstead (Scun.). Swordtails: 1, A. Clayton (Imm.); 2, H. J. Plastow (Imm.); 3, B. Fidel (Scun.). A.O.V. Livebearers: 1, A. Clayton (Imm.); 2, Mr. and Mrs. L. Burr (Scun.); 3, G. Hoodless (Scun.). Small barbs: 1, R. Riley (Imm.); 2 and 3, Mr. and Mrs. Campbell (Scun.). Large Barbs: 1, Mr. and Mrs. Campbell (Scun.); 2, F. Newstead (Scun.); 3, P. Smith (Scun.). Small Characins: 1, Mr. and Mrs. Campbell (Scun.); 2 and 3, A. Clayton (Imm.). Large Characins: 1, F. Newstead (Scun.); 2, G. White (Scun.); 3, N. Goodale (Scun.). Corydoras and Brochis: 1, Mrs. S. Stark (Imm.); 2, G. White (Scun.); 3, A. Clayton (Imm.). Small Anabantids: 1, 2 and 3, A. Clayton (Imm.). Large Anabantids: 1 and 2, Mr. and Mrs. L. Burr (Scun.); 3, Mr. and Mrs. K. Berry (Scun.). Fighters: 1, Miss Y. Newstead (Scun.); 2, Mr. and Mrs. K. Berry (Scun.); 3, P. Blades (Scun.). Angels: 1, H. J. Plastow (Imm.); 2 and 3, R. Stark (Imm.). Small Cichlids: 1 and 2, Mr. and Mrs. Morrissey (Imm.); 3, Mr. and Mrs. Campbell (Scun.). Rift Valley Cichlids: 1 and 2, Mr. and Mrs. P. Berry (Scun.); 3, Mrs. E. Roberts (Imm.). A.O.V. Cichlids: 1, R. Burnham (Scun.); 2, R. Riley (Imm.); 3, Mr. and Mrs. L. Burr (Scun.). A.O.V. Catfish: 1, Mr. and Mrs. Morrissey (Imm.); 2, H. J. Plastow (Imm.); 3, G. White (Scun.). Ras. Dan. Mirm: 1 and 2, A. Clayton (Imm.); 3, Mr. and Mrs. Campbell (Scun.). Killies: 1, F. Newstead (Scun.); 2, D. Greenwood (Imm.); 3, Mr. and Mrs. Morrissey (Imm.). Loaches and Botias: 1, Mr. and Mrs. P. Berry (Scun.); 2, H. J. Plastow (Imm.); 3, N. and C. Crompton (Scun.). Sharks and Foxes: 1, R. Riley (Imm.); 2, A. Clayton (Imm.); 3, C. Herring (Imm.). A.O.V. Tropical: 1, Mr. and Mrs. L. Burr (Scun.); 2, G. White (Scun.); 3, Mr. and Mrs. K. Berry (Scun.). A.V. Coldwater: 1, 2 and 3, L. S. Jenkins (Imm.). Total points: Immingham A.S. 116 pts., Scunthorpe A.D.A.S. 100 pts. Best in Show: Mr. and Mrs. P. Berry, Scunthorpe A.D.A.S.

THE April meeting of the **Mid-Sussex A.S.** was opened by Mr. N. Short, the vice-chairman, with the monthly auction and then gave a very interesting talk to the members present on "making all glass tanks." During the evening the table show was judged by D. Soper, who awarded the cards as follows:—Labyrinth: 1, 2, and 3, M. Sparshott; Rasboras: 1, 2 and 3, C. West; Danios and W.C.M.M.: 1, E. and T. Tester; 2, S. Burtles; 3, P. Berry. Further details can be obtained from the secretary, Mr. B. Slade, Sundown, Bolney Road, Anstey, Phone: H. Heath 53747.

**OFFICERS** elected at the annual general meeting of the **Partington A.S.** were as follows:—Chairman: A. Wilcox; Secretary: (re-elected) Mrs. J. Freer; Treasurer: (re-elected) Mrs. J. Taylor; Show Secretary: M. Pownall; Committee E. Hanson and R. Barker. The meetings are held every first and fourth Wednesday in the month at Partington Community Centre, Central Road, Partington commencing at 8.00 p.m. and visitors are always very welcome.

All enquiries to Society Secretary Mrs. J. Freer, 2 Russell Road, Partington, Manchester. Tel: 775-9957.

AT the April meeting members of the **Stroud & District A.S.** once again heard Mrs. B. Ryan of Faversham Aquaria Redditch give a very interesting talk. This was called "What is a Fish?" and was very informative. No questions needed to be asked as the talk missed out nothing. The month's challenge was for A.O.V. Barbs. Result:—1, P. Davis; 2, C. Hodges; 3 and 4, C. Whitaker.

**OWING** to the Easter holiday the **New Forest A.S.** held their April meeting a week early. The committee brought along some fish, and all members tried their skill at judging them. At the close of the evening a P.B.A.S. qualified judge gave his comments on their efforts. In addition to being good fun, many members felt that they had learned a great deal on how to select a good fish. Result of the home furnished competition:—1, M. Aust; 2, B. Higginson; 3, R. Travers. Table show results: Characins: 1, 2 and 4, B. Higginson; 3, R. Travers.

**ORGANISED** by the **Sandgrounders A.S.** in conjunction with the **Dunlop Aquarium Keepers Society, Merseyside A.S.**, and the **Blackburn Aquarist Waterlife Society** the results of the Inter-Society Show were:—Platies and Swordtails: 1, R. Grant (Merseyside); 2, J. and G. Waterhouse (Sandgrounders); 3, F. Mullis (Merseyside). A.O.V. Livebearer: 1, J. Tinsley (Sandgrounders); 2, E. Seymour (Merseyside); 3, T. Hampton (Dunlop). Anabantids: 1, Mr. and Mrs. Newton (Blackburn); 2, P. Gomersy (Dunlop); 3, E. Stillwell (Sandgrounders). Barbs: 1 and 3, A. Vaisiere (Merseyside); 2, Mr. and Mrs. Taylor (Merseyside). Characins: 1 and 2, R. J. Stephens (Blackburn); 3, Mr. and Mrs. Newton (Blackburn). Cichlids: 1, Mr. and Mrs. Taylor (Merseyside); 2, B. Wilson (Merseyside); 3, T. Hampton (Dunlop). Catfish, Loaches and Botias: 1 and 2, Mr. and Mrs. Baldwin (Sandgrounders); 3, B. Mahony (Sandgrounders). Sharks and Foxes: 1, Mr. and Mrs. Baldwin (Sandgrounders); 3, T. Hampton (Dunlop). Rasboras, Danios and Minnows: 1, S. Seymour (Merseyside); 2, Mr. Thompson (Merseyside); 3, R. I. Payne (Merseyside). A.O.V. Tropical: 1, Mr. and Mrs. Davies (Dunlop); 2, K. Wright (Sandgrounders); 3, G. Brown (Sandgrounders). True Pairs: 1, B. Wilson (Merseyside); 2, Mr. McCombe (Blackburn); 3, A. Vaisiere (Merseyside). Breeders Teams: 1, R. I. Payne (Merseyside); 2, S. Hooton (Sandgrounders); 3, A. Vaisiere (Merseyside). Juniors: 1, I. Hopkins (Dunlop); 2, W. Booker (Sandgrounders); 3, P. and S. Taylor (Merseyside). Novices: 1 and 2, I. Halewood (Sandgrounders); 3, Mrs. R. Rimmer (Sandgrounders). Coldwater (Single Tails): 1, 2 and 3, G. Harvey (Sandgrounders); Coldwater (Twintails): 1 and 2, B. Harvey (Sandgrounders). Best Fish in Show: A.

IN AQUARIUM OR POND  
BE SAFE  
WITH  
  
Hillside Aquatics London N12

Vainiere (Merseyside). Society points: Sand-grounders, 41; Merseyside, 32; Blackburn, 11; Dunlop, 11.

THE committee elected at the Annual General Meeting of the **Horsforth & District A.S.** was as follows: Chairman: M. Barker; joint hon. secretaries: Mrs. Barbara and Miss Jane Helm; treasurer: M. Barker; show secretary: C. Coens; social secretary: Miss Joyce Dickinson; catering manager: Mrs. Joan Coens.

The Specified Trophy for the Year was won by Miss Jane Helm, the A.O.V. by C. Coens and the A.O.V. Junior by Miss Helen Coens. New members can be assured of a warm welcome and are invited to contact either of the joint secretaries at 29 Wellington Road, New Wortley, Leeds 12. Tel: 451025.

IN his report the secretary of the **Sand-grounders A.S.** at the annual general meeting said that since the last annual meeting, 99 members had been enrolled, the majority having attended the 25 fortnightly meetings, which included lectures, quizzes, auctions, table shows and socials. Other activities included a jumble sale, Xmas raffle, a stand at the British Aquarists Festival, another successful open show, and a home aquaria competition.

The show secretary, G. Waterhouse, thanked all members who had helped towards winning the very first show league organised by the Federation of Northern Aquarium Societies, and hoped that this could be continued in 1976. The meeting then duly elected G. Waterhouse as the new Chairman, and with the consent of the meeting, Mr. Cliff handed over to him to complete the election which resulted as follows: vice-chairman: A. Jervis; hon. gen. secretary: S. Hosson, 81 Radnor Drive, Southport, Tel: 24743. Hon. treasurer: R. Cliff; hon. show secretary: B. Baldwin; assistant show secretary: G. Harvey; public relations officer: J. Tate. Committee members: C. Ilvason, G. Bond, K. Howard, Auditor: K. Howard. President: B. Booker. Vice-Presidents: B. Crabtree, K. Howard, T. Tasker.

To conclude the evening, Mr. Waterhouse presented the trophies to the Senior and Junior Aquarists of the Year, Mr. and Mrs. B. Baldwin (senior) and Masters M. and N. Rimmer (junior).

OPEN Show results of the **Workshop A. and Z.S.** were as follows: Swordtails: 1, Mr. Tyson, 5, Humberstone; 2, D. Harris, Mexboro; 3, N. Blenkin, Bridlington. Guppies: 1, Mr. Mason, Scunthorpe; 2, Mr. and Mrs. Blades, Bassetlaw; 3, Mr. and Mrs. Binns, Scunthorpe. Mollies: 1, Mr. and Mrs. Ripley, Castleford; 2, Mr. and Mrs. Emerson, Castleford; 3, Mr. Tinsley, Rotherham. Platies: 1, A. Simpson, Barnsley; 2, A. Clayton, Immingham; 3, D. M. Lavcock, Sheaf Valley. Small Barbs: 1, Mr. and Mrs. Roberts, Doncaster; 2, B. Sleight, Mexboro; 3, H. Thorpe, Doncaster. Large Barbs: 1 and 2, W. E. Neville, Grantham; 3, Mr. and Mrs. Roberts, Doncaster. Small Characins: 1, Mr. and Mrs. Coughill, Retford; 2, Mr. and Mrs. Moore, Sheaf Valley; 3, Mr. and Mrs. J. Riley, Castleford. Large Characins: 1, Mr. Simpkins, Long Eaton; 2, Mr. and Mrs. Roberts, Doncaster; 3, Mrs. North, Hull. Egg-laying Toothcarps: 1, D. Greenwood, Immingham; 2, G. Hoyland, Don Valley; 3, A. Clayton, Immingham. Danios and Minnows: 1, Master S. White, Retford; 2, Mr. and Mrs. Tyson, 5, Humberstone; 3, Mr. Andrews, Hull. Rasboras: 1, Mr. and Mrs. Copley, Doncaster; 2, Mr. and Mrs. Binns, Scunthorpe Museum. Sharks and Foxes: 1, Mr. Chapman, Long Eaton; 2, Mr. and Mrs. Copley, Doncaster; 3, W. Hunt, Thorne. Dwarf Cichlids: 1, Mr. and Mrs. Binns, Scunthorpe Museum; 2, Mr. and Mrs. Copley, Doncaster; 3, W. Hunt, Thorne. Large Cichlids: 1 and 3, J. Coughill, Retford; 2, Mr. Hopkins, Darfield. Angels: 1, Mr. and Mrs. Kirk, 5, Humberstone; 2, G. Hoyland, Don Valley; 3, N. Blenkin, Bridlington. Catfish: 1, A. Thorpe, Doncaster; 2, J. Smith, Chesterfield; 3, Mr. and Mrs. Fletcher, Doncaster. Loach: 1, Mr. and Mrs.

Binns, Doncaster; 2, Mr. Daines, Doncaster; 3, J. Smith, Chesterfield. Fighters: 1, N. Blenkin, Bridlington; 2, Master H. Lake, 5, Humberstone; 3, Mr. and Mrs. Povey, Sheaf Valley. A.O.V. Anabantids: 1, J. Riley, Castleford; 2, Master J. Emerson, Castleford; 3, Mr. and Mrs. Tyson, 5, Humberstone. A.O.V. Tropical: 1, Mr. Simpson, Queen of the Midlands, Nottingham; 2, D. Harris, Mexboro; 3, Mr. and Mrs. Emerson, Castleford. Pairs (Livebearers): 1, Mr. and Mrs. Daines, Doncaster; 2, A. Thorpe, Doncaster; 3, A. Waddington, Barnsley. Pairs Egg-layers: 1, G. Collier, Goole; 2, A. Thorpe, Doncaster; 3, Mr. and Mrs. Fletcher, Doncaster. Breeders (Livebearers) 1-10: 1, B. Jackson, Doncaster; 2, N. Blenkin, Bridlington; 3, Mr. and Mrs. Goorwood, Retford. Breeders (Livebearers) 11-20: 1, Mr. Jackson, Doncaster; 2, Mr. and Mrs. Mangles, Retford; 3, Mr. and Mrs. Richardson, Scarborough. Breeders (Egg-layers) 1-10: 1, B. Jackson, Doncaster; 2, W. E. Neville, Grantham; 3, Mr. Hutton, Goole. Breeders (Egg-layers) 11-20: 1, Mr. Blades, Bassetlaw; 2, Master S. White, Retford; 3, G. Collier, Goole. Junior (Egg-layers) 11-20: 1, Mr. Blades, Castleford; 2, Master S. White, Retford; 3, J. Emerson, Castleford. Goldfish and Shubunkins: 1 and 3, Mr. and Mrs. Huse, Ind.; 2, Mrs. Steels, Retford. A.O.V. Coldwater: 1, Mr. Blades, Bassetlaw; 2, D. Harris, Mexboro; 3, J. Riley, Castleford. Furnished Mini-jar: 1, Mr. Ryley, Retford; 2, G. Craven, Mexboro; 3, A. Mason, Workson. Novelty Jar: 1, Master S. White, Retford. Best Fish in Show: Mr. Simpson, Queen of the Midlands Nottingham.

THE **Saracens Aquarium Club** meet at the Saracens Head Public House, High Street, Redburn, Herts. every first Monday in the month at 8.30 p.m. New members always welcome. At the annual general meeting held early in April a new committee was formed and is now as follows: chairman, B. Barford; vice chairman, B. Marden; secretary, Mrs. J. Barford, 33 Longfield Road, Harpenden, Herts. Treasurer, J. Eaton; show secretary, P. Garner; public relations officer, T. Woolley.

OFFICERS elected at the annual general meeting of the **Delson A.S.** were as follows: hon. president: M. Delingpole; chairman: R. E. Daves; secretary: P. J. Binsley, 25 Flyford Close, Lodge Park, Redditch, Worcestershire. Treasurer: E. Daves; show secretary: B. Faulkner; public relations officer: J. Newey. Meetings are held at Delson's Canteen, Studley Road, Woodrow, Redditch every first and third Tuesday of each month. Anyone is welcome to come as a visitor or as a prospective member.

IN March the **Merthyr A.S.** was the venue for the second round tie of the Cymry National Aquarist Association Knockout between Merthyr A.S. and Lanrwit Major A.S., each Club entering six livebearers and six egg-layers in the inter-club K.O., all other fish being entered in separate classes. A total of 99 fish was entered on the evening—64 egg-layers and 35 livebearers. During the judging, the members of both clubs were entertained by a quiz which was compiled by R. Purdy, M.A.S. This resulted in a win for Merthyr A.S. by 13 points.

For the first time in the history of the competition the result was a draw, twelve points each, and a re-match had to be arranged. Results were as follows: Inter-Club K.O. Livebearers: 1 and 2, G. Lewis, L.M.A.S.; 3, M. Davies, M.A.S.; 4 and 5, R. Purdy, M.A.S.; 6, J. Edwards, L.M.A.S. A.O.V. Livebearers: 1, C. Morgan, M.A.S.; 2, M. Morgan, M.A.S.; 3, A. Ibbotson, L.M.A.S.; 4, G. Best, L.M.A.S. Egg-layers: 1 and 5, M. Davies, M.A.S.; 2, M. Chick, L.M.A.S.; 3, E. Morgan, M.A.S.; 4, J. Edwards, L.M.A.S.; 6, A. Ibbotson, L.M.A.S. A.O.V. Egg-layers: 1, G. Lewis, L.M.A.S.; 2, E. Morgan, M.A.S.; 3, J. Thompson, L.M.A.S.; 4, M. Chick, L.M.A.S. Best Fish in Show: M. Davies, M.A.S.

BEFORE the business part of the annual general meeting of the **Goldfish Society of Great Britain**, J. Bundell gave a talk on

line breeding of goldfishes. About eighty members listened with interest to his lecture. He explained various methods of line breeding with charts and drawings shown on a screen, and also explained the method he used with suggested modifications to produce the ideal fish in the shortest time.

The election of officers followed, those elected being: R. Dodkins, secretary; H. Beger, show manager; G. King, committee member; A. Lawman, public relations officer and M. Cluse, president.

SPEAKER for the evening at a recent meeting of the **Portsmouth A.S.** was A. G. Harzworth of Basingstoke who gave an excellent lecture on marine fishes and invertebrates illustrated with slides. The following meeting was devoted to livebearers. The table show was judged by N. Davis of Havant and the results were as follows:—Swordtails: 1, E. Binstead; 2 and 3, Master G. Young. Platies: 1, E. Binstead; 2, Master G. Young. Guppies (male): 1, E. Binstead; 2, Master G. Young; 3, R. Smith. Guppy (female): 1, Master G. Young; 2, E. Binstead. The speaker for the evening was J. Stillwell who gave a detailed talk on livebearers using diagrams with which he described the finer points of breeding involving genetics.

RESULTS of the **Nelson A.S.** Open Show were as follows: Section F Barbs: up to and including Nigger—1, B. Tate (Nelson); 2, A. Chadwick (Oldham); 3, J. Teece (Wythen-shawe). Over Nigger—1, Mr. and Mrs. J. Taylor, section winner (Merseyside); 2, T. Hampton (Merseyside); 3, A. Chadwick (Oldham). Section G Cichlids: Angels—1 and 2, Mr. and Mrs. G. Muckle (Sand-grounders); 3, J. A. Whiteley (Aireborough). Dwarf: 1, R. Iddon, section winner (Sand-grounders); 2, B. Wilson (Merseyside); 3, Poulton Brothers (Southport). Rift Valley: 1 and 3, S. Hooton (Sandgrounders); 2, Mrs. K. McBride (Aireborough). A.O.V.: 1, Mr. and Mrs. J. Taylor (Merseyside); 2, R. Francis (Heywood); 3, J. Ridley (Heywood). Section H:—A.O.V. Tropical: 1, P. and H. Batchelor, section winner (Loyne); 2, C. Whitey (Accrington); 3, P. Walsh (Blackburn). Section I Coldwater:—Common Goldfish: 1, Mr. and Mrs. Wolstenholme (Blackburn); 2, R. Dingley (Heywood); 3, J. Wood (Aireborough). Single Tail Fancy Goldfish: 1, J. S. Hall (Aireborough); 2, C. and L. Snowden (Padiham); 3, S. Foot (Accrington). Twin Tail Fancy Goldfish: 1, G. Holroyd, section winner (Morecambe-Bay); 2, S. Foot (Accrington); 3, Mr. and Mrs. Wolstenholme (Blackburn). A.O.V. Coldwater: 1, A. Harvey (Sandgrounders); 2, Mr. and Mrs. D. Wolstenholme (Blackburn); 3, P. Walsh (Blackburn). Section J Pairs:—Livebearers: 1, P. Walsh (Blackburn); 2, Mr. and Mrs. K. B. Agar (Aireborough); 3, P. Wright (South Shields). Egg-layers: 1, J. B. McCombe, section winner (Blackburn); 2, A. Gregory (East-Lanes); 3, Mr. and Mrs. G. Muckle (Sandgrounders). Section A Livebearers:—Guppies: 1, T. Redfern, section winner (Heywood); 2, V. Clegg (Loyne); 3, N. Wallbank (Loyne). Swordtails: 1, Mr. and Mrs. R. Houghton (Southport); 2, Mr. and Mrs. T. Burton (Accrington); 3, D. Wilcox (Sretford); Mollies: 1, J. Teece (Wythen-shawe); 2, J. Tinsley (Sandgrounders); 3, J. Hampton (Merseyside). Platies: 1, R. Lamb (Southport); A. Saunders (Middleton); 3, Mr. and Mrs. G. Muckle (Sandgrounders). A.O.V.: 1 and 2, P. Walsh (Blackburn); 3, Mr. and Mrs. R. Baldwin (Sandgrounders). Section B Anabantids:—Fighters: 1, 2 and 3, T. E. Davies section winner (Heywood). Small:

**halomid** A FRACTION A DAY, KEEPS ALGAE AWAY  
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1, Mr. and Mrs. L. Newton (Blackburn); 2, B. Wilson (Merseyside); 3, M. A. Hay (Oldham). Large: 1, A. Gregory (E. Lancs.); 2, Mr. and Mrs. L. Newton (Blackburn); 3, Mrs. P. Wood (Aireborough). Section C Characins: up to and including Bleeding Heart: 1, R. J. Stephens (Blackburn); 2, Mr. and Mrs. B. Baldwin (Sandgrounders); 3, Mr. and Mrs. L. Newton (Blackburn). Over Bleeding Heart: 1, Mr. and Mrs. R. Houghton, section winner (Southport); 2, Poulton brothers (Southport); 3, J. A. Whiteley (Aireborough). Section D Scavengers—Corydoras and Brochis: 1, and 2 Mr. and Mrs. B. Baldwin (Sandgrounders); 3, N. Wallbank (Loyne). Catfish (A.O.V.): 1, A. Chadwick (Oldham); 2, P. and H. Batchelor (Loyne); 3, I. Iddon (Sandgrounders). Loaches: 1, Mr. and Mrs. P. Ham (Lyham); 2, P. Hinchley (Loyne); 3, M. Pownall (Stretford). Sharks and Peces: 1, Mr. and Mrs. B. Baldwin, section winner (Sandgrounders); 2, Mr. and Mrs. R. Houghton (Southport); 3, T. Hampton (Merseyside). Section E Rasboras: 1, E. Mullis, section winner (Merseyside); 2, Mr. and Mrs. G. Muckle (Sandgrounders); 3, E. Wilson (Merseyside). Danios and Minnows: 1 and 2, R. J. Stephens (Blackburn); 3, D. Richardson (Blackburn). Toothcarps: 1 and 3, K. Kryger (Wrexham); 2, B. Tate (Nelson). Section K Breeders—Livebearers easy: 1, T. Hampton, section winner (Merseyside); 2, Poulton brothers (Southport); 3, G. Bond (Sandgrounders). Egglayers easy: 1, T. Redfern (Heywood); 2, A. C. Hardcastle (Aireborough); 3, E. J. Brown (Blackborough). Egglayers hard: 1, I. Parkin (Keighley); 2, S. Hooton (Sandgrounders); 3, D. Robinson (Keighley). Section L juniors (under 15)—Livebearers: 1, I. Hopkins (Merseyside); 2, B. Davies (Stretford); 3, M. Brown (Middleton). Egglayers: 1, J. and J. Ashton, section winner (Heywood); 2, I. Hopkins (Merseyside); 3, Misses P. and S. Taylor (Merseyside). Section M Ladies: Ladies Any Variety: 1, Mrs. S. Newton, section winner (Blackburn); 2, Mrs. R. Muckle (Sandgrounders); 3, Mrs. E. Baldwin (Sandgrounders). Best Fish in Show was a Ruby Shark entered by Mr. and Mrs. B. Baldwin.

TROPHIES were during the year by members by the **Sittingbourne and District A.S.** were presented at the annual general meeting by the retiring Chairman T. McDonald. The awards were as follows: Senior Members: A. Sharp; Catfish, Cichlid and Characin trophies and the Point Trophy for the greatest number of points gained during the year. B. Newman; Barb Award and Fish of the Year Cup. L. Allen; Novice and Anabantid Trophies. J. Harris; Fighter Cup, Juniors; Diane McDonald, Swordtail Cup. M. Wicks; Junior Challenge Trophy. Christopher Floyd; Guppy Cup.

In the election of officers the following members were elected to serve on the Committee: Chairman: P. Floyd; Vice-Chairman: A. Scott; Treasurer: A. Sharp; Secretary: Mrs. A. J. McDonald, 44 Manor Grove, Sittingbourne, Kent. Phone: Sitt. 76572; Show Secretary: B. Newman; Assistant Show Secretary: J. Harris; Programme Secretary: Glenda Sharp.

AT the April meeting of the **Accrington A.S.** the lecture was given by Mr. P. J. Whelan who spoke on his personal fishkeeping problems and about his interesting tour of Europe collecting fish. There was also a small table show which was judged by the lecturer. The results were as follows: 1, A.O.V. Tropical: G. Brown; 2 and 3, S. Carter. Pairs: 1, D. Hargreaves; 2, N. Holden. Coldwater

(Best fish in show): 1, S. Foot; 2, N. Holden. Meetings are held every second Wednesday of each month at the Great Eastern Hotel, Arnold Street, Accrington.

THE **Brighton and Southern A.S.** enjoyed a very interesting talk by Mr. C. West on "Breeding for Beginners." At the April meeting. The first-leg of the "Over the Downs" Competition between B.S.A.S. and M.S.A.S. was also held which the B.S.A.S. won by 1,344 points to 1,277 points. The second-leg will be held on a later date at M.S.A.S.

Other results: E: 1 and 4, Mr. and Mrs. Ramshaw; 2, K. Hooper; 3, Mr. and Mrs. Sayers. C: 1, Mr. and Mrs. Ramshaw; 2 and 4, E. and T. Tester; 3, Mr. and Mrs. Sayers.

MEMBERS of the **Taunton and District A.S.** worked hard for a successful Open Show and were handsomely rewarded for their labours with a good entry and support from a large number of sources.

The results were: Class B: 1, R. Adams (Salisbury); 2, B. Rist (Chard); 3, M. Davies (M. Tydfil); 4, R. Bond (Yeovil). Class C: 1, B. Bow (M. Tydfil); 2, R. Adams (Salisbury); 3, B. Rist (Chard); 4, A. Bligh (Ilfracombe). Class D: 1, R. F. Adams (Salisbury); 2, C. E. Morrison (Ilfracombe); 3, R. Dore (Newport); 4, R. Welch (Chard). Class Ds: 1, C. Morgan (M. Tydfil); 2, A. Bligh (Ilfracombe); 3, R. Bond (Yeovil); 4, C. E. Morrison (Ilfracombe). Class E: 1, R. F. Adams (Salisbury); 2, E. Morgan (M. Tydfil); 3, C. F. Davies (Port Talbot); 4, Mr. B. Bow (M. Tydfil), Mr. E. Jones (Port Talbot). Class F: 1, D. Jackson (Salisbury); 2, C. E. Morrison (Ilfracombe); 3, M. Morgan (M. Tydfil); 4, W. West (Salisbury). Class G: 1, B. Rist (Chard); 2, B. E. Cox (Ilfracombe); 3, R. Dore (Newport); 4, K. Paul (Ilfracombe). Class H: 1, B. Grant (Chard); 2, D. Lee (Chard); 3, E. Morgan (M. Tydfil); 4, C. F. Davies (Port Talbot). Class I: 1, K. Paul (Ilfracombe); 2, 3 and 4, E. Barnshaw (Taunton). Class K: 1 and 2, M. J. Kerr (Pisces); 3, B. Rist (Chard); 4, R. T. Bond (Yeovil). Class L: 1, A. Bligh (Ilfracombe); 2, R. F. Adams (Salisbury); 3, R. T. Bond (Yeovil); 4, M. Davies (M. Tydfil). Class M: 1, N. Paul (Ilfracombe); 2, M. Davies (M. Tydfil); 3, J. Hodder (Weymouth); 4, R. T. Bond (Yeovil). Class Ma: 1, R. T. Bond (Yeovil); 2, D. Barnshaw (Taunton); 3, D. Curry (Taunton); 4, L. Pascombe (Taunton). Class N: 1, R. Dore (Newport); 2, D. Jackson (Salisbury); 3, J. Hodder (Weymouth); 4, M. Bray (Taunton). Class O: 1, M. Trait (Taunton); 2, D. Lee (Chard); 3, C. Vellacott (Taunton); 4, J. Hodder (Weymouth). Class P: 1, D. Barnshaw (Taunton); 2, J. Hodder (Weymouth); 3 and 4, B. Purdy (Ibbw Vale). Class Q: 1, B. Rist (Chard); 2 and 4, B. Bow (M. Tydfil); 3, C. Morgan (M. Tydfil). Class R: 1, W. West (Salisbury); 2, B. Grant (Chard); 3, C. Morgan (M. Tydfil); 4, P. J. Lampert (Yeovil). Class S: 1, B. Purdy (Ibbw Vale); 2, C. E. Morrison (Ilfracombe); 3, R. F. Adams (Salisbury); 4, B. Rist (Chard). Class T: 1 and 4, M. Davies (M. Tydfil); 2, W. West (Salisbury); 3, B. Bow (M. Tydfil). Class U: 1 and 2, C. Rupert (Port Talbot); 3, J. Hodder (Weymouth); 4, R. F. Adams (Salisbury). Class V: 1 and 2, G. J. Axe (Yeovil); 3 and 4, C. Rupert (Port Talbot). Class W: 1, G. J. Axe (Yeovil); 2, W. West (Salisbury); 3, C. Rupert (Port Talbot); 4, M. Bray (Taunton). Class Wb: 1 and 2, G. J. Axe (Yeovil). Class Xbm: 1, Mr. Holland (Naisca); 2, M. Bray (Taunton); 3, A. Bligh (Ilfracombe); 4, R. Hagley (Taunton). Class Xc: 1, C. E. Morrison (Ilfracombe); 2, B. Purdy (Ibbw Vale); 3, J. Hallet (Beaminster); 4, J. Hodder (Weymouth). Class Z: 1 and 2, C. Vellacott (Taunton).

AN illustrated talk on Catfish was given at the April meeting of the **Bristol A.S.** by Mr. Dennis Noble, of the Severnside panel of speakers, which provided the society with an informative review of this extensive group of fishes. That this talk was enjoyed by the large attendance

was shown by both the numerous questions and heavy vote of thanks accorded to the speaker. The meeting concluded with a sale of fish and accessories to raise funds for the forthcoming shows.

RESULTS of the table show at the April meeting of the **Llantwit Major A.S.** were as follows:—Class H: 1, 2 and 4, J. Thomson; 3, H. Chick. Class A.O.V.: 1, M. Eady; 2 and 4, J. F. Edwards; 3, G. Lewis. Whilst the judging was in progress members were entertained with a tape slide lecture by Mr. C. Harding which proved to be extremely interesting. The standard of tape and slides are to be recommended to any society who may require an interesting evening.

SINCE moving to their new meeting room at The Swan Inn, Penybryn, the **Wrexham T.F.S.** have increased their membership—but still have room for more. Recent activities of the society have comprised of slide shows, quizzes and talks on "Keeping Marines" by Keith Hobbley of Goodpoeth and another on "Fish in General" given by A. G. Bland of Hoyleke.

Results of the recent spring fish show judged by C. Pritchard were:—Danios: P. Smith, Mollies: A. Crump. Dwarf Cichlids: 1 and 2, Mrs. E. Garrison; 3, R. Mathers. Large Cichlids: 1, I. and R. Walker; 2, D. Price; 3, Mrs. B. Gorston. Killifish: 1, 2 and 3, K. Kryger. A.O.V.: 1, B. Roberts; 2, A. Crump; 3, K. Kryger. Winner of the Spring Shield: K. Kryger. Highest Pointed Junior: A. Crump.

THE **Bristol Tropical Fish Club** held their annual open show in April and results were as follows:—Best Exhibit in Show, Aquarist Gold Pin and Highest Individual Points all by F. Timmins (Glossocorpus A.S.); second highest points P. A. Moye (Sudbury). Highest Pointed Societies: Gloycenter A.S. and Bristol Tropical Fish Club 62 points each, Barb 54, Sudbury 25. Class results:—Fighters: 1, F. Timmins; 2, Mrs. B. A. Gale. Labyrinth: 1, L. Littleton; 2, F. Timmins; 3, Master K. Daniels; 4, R. Lawrence. Barbs: 1, P. A. Moye; 2 and 3, D. Phippen; 4, F. Timmins. Hemm and Hyph: 1 and 3, F. Timmins; 2, D. and R. Clark; 4, R. Jarvis. A.O.V. Characins: 1 and 3, R. Jarvis; 2, M. Jenkins; 4, G. Douglas. Angels and Discus: 1, F. Timmins; 2 and 4, C. Cowles; 3, Master M. Freshney. Dwarf Cichlids: 1, F. Timmins; 2, D. and R. Clark; 3, Master M. Freshney; 4, G. M. Morgan. Rift Valley Cichlids: 1, D. and R. Clark; 2, F. and R. Cripps; 3, F. Hemmings; 4, B. and R. Morgan. A.O.V. Cichlids: 1, R. A. Pooze; 2, R. K. Thomas; 3, W. Dalton; 4, C. Cowles. Corydoras and Brochis: 1, R. Lawrence; 2 and 3, P. A. Moye; 4, D. and R. Clark. A.O.V. Catfish: 1, F. A. Moye; 2, 3, and 4, R. Lawrence. Rasboras, Danios, Minnows: 1 and 2, F. Timmins; 3, E. Morgan; 4, Master M. Freshney. Sharks, Loaches, Bettas and Bels: 1, F. Timmins; 2, P. A. Moye; 3, R. Jarvis; 4, J. Ferguson. Mollies: 1, F. and R. Cripps; 2 and 4, R. Holder; 3, A. Purnford. Swordtails: 1, Master K. Daniels; 2, F. and R. Cripps; 3, G. M. Morgan; 4, M. Jenkins. Platies: 1, 2 and 3, L. Littleton; 4, P. A. Moye. Guppies (male): 1 and 3, W. Burton; 2, R. Jarvis. Guppies (female): 1, D. and R. Clark; 2, F. and R. Cripps; 3 and 4, W. Burton. Killifish: 1, 2, 3 and 4, R. A. Chapman. A.O.V. Tropical: 1, A. Purnford; 2, F. Timmins; 3, Master M. Gale; 4, D. Curtis. Breeders (egg-layers): 1, 2 and 4, P. A. Moye; 3, R. Tooze. Breeders (livebearers): 1, F. Timmins; 2 and 4, R. Jarvis; 3, R. A. Pooze. A.V. Sexed Pairs: 1, F. and R. Cripps; 2, E. Morgan; 3, C. Russell; 4, R. Tooze. A.V. Tropical (Juniors): 1, Master M. Owen; 2, Master M. Freshney; 3, Master D. Sullivan; 4, Master S. Owen. Twintail: 1 and 2, J. R. Phillips; 3 and 4, B. Webb. Goldfish and Shubunkins: 1 and 3, J. R. Phillips; 2, Master D. Sullivan; 4, T. Sullivan. A.V. Pond and River: 1, R. Lawrence; 2, N. Owen; 3, R. Holder; 4, J. R. Phillips.

OPEN show results of the **Coventry Pool and Aquarium Society** were as follows:

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**WHITE SPOT OUT**  
Hillside Aquatics London N12



Tropical Fish Classes:—A.V. Male Guppy: 1, Mr. Payne; A.V. Molly: 1, G. Brockhouse; A.O.V. Livebearer: 1, Mrs. D. Cruickshank; Danio, Brachdanio and W.C.M.M.: 1, Mrs. M. Netherell; Barbs: 1, Mrs. D. Cruickshank; A.O.V. Barb: 1, J. Mayle; A.V. Rasbora: 1, C. Burton; Cichlid: 1, Mr. Payne; A.O.V. Cichlid: 1, Mr. Nightingale; Male Siamese Fighting Fish: 1, Mr. Nightingale; A.O.V. Anabantid: 1, L.E.E.S.; Characin: 1, C. Mitchellson; A.O.V. Characin: 1, C. Sykes (Best in Show); A.V. Egg-laying Toothcarp: 1, A. M. Crew; Corydoras and Brochis Catfish: 1, Mrs. D. Cruickshank; A.O.V. Catfish: 1, Mr. Nightingale; A.V. Loach: M. Besimbridge; Pairs (Egg-layers): 1, Mrs. D. Cruickshank; Pairs (Livebearers): 1, C. Sykes; Breeders (Egg-layers): 1, P. Whitehouse; Breeders (Livebearers): 1, S.M.L.N.; Labrets, Sharks and Flying Foxes: 1, P. Patching; A.O.V. Tropical: 1, A. Rowell; Miniature Furnished Jars: 1, F. Whitehouse; Coldwater Fish Classes:—Best Coldwater Fish: 1, R. Hancock; Single Tail Goldfish: 1, A. M. Crew; Twintail Goldfish: 1, R. Hancock; Dorsal-less Goldfish: 1, F. Orme; Pond or River Fish: 1, L. Mayer; Best Koi: Aka-Mati/Gin Rin: Mr. Thomas.

APRIL was a quiet month for members of the Port Talbot and District A.S. At their first meeting the highlight of the night was a being and buy auction, in which a worthwhile sum of money was raised to boost club funds. The other fortnightly meeting dealt mainly with preparations for the club's annual open show which was held in May.

A TOTAL of 503 entries was benched at the Scunthorpe Museum Societies Open Show. The Best Fish in show trophy was won by Mr. and Mrs. Sellars of the Lincoln Society with a Rift Valley Cichlid. Section 1, Livebearers: Guppy: 1, Mr. and Mrs. Chester (Retford); 2, Mr. and Mrs. Mason (Scunthorpe Museum); 3, Mrs. Greenwood (Immingham); Swardtail: 1, Mrs. Plastow (Immingham); 2, G. Tyson (Sth. Humberside); 3, A. Clayton (Immingham); Mollies: 1 and 3, Mr. and Mrs. J. Riley (Castleford, Section winner); 2, P. Smith (Scunthorpe and District); Platy: 1 and 2, G. Andrews (Hull); 3, A. Clayton (Immingham); A.O.V. Livebearer: 1, H. Thorpe (Doncaster); 2, A. Onslow (Loughborough); 3, Master M. Lake (Sth. Humberside).

Section 2, Barbs: Small Barbs: 1, Mr. and Mrs. Emerson (Castleford, Section winner); 2, Mr. Watts (Sth. Humberside); 3, Mr. and Mrs. Roberts (Doncaster); Large Barbs: 1, W. E. Neville (Grantham); 2, Mr. and Mrs. Roberts (Doncaster); 3, Master J. Emerson (Castleford).

Section 3, Characins: Small Characins: 1, Mr. and Mrs. Chester (Retford); 2, Mr. and Mrs. Richardson (Scarborough); 3, G. Hayland (Don Valley); Large Characins: 1, H. Thorpe (Doncaster, Section winner); 2, Mr. and Mrs. Roberts (Doncaster); 3, G. Frisby (Hull).

Section 4, Cichlids: Dwarf Cichlids: 1, Master S. Green (Castleford); 2, Mr. and Mrs. Chester (Retford); 3, Mr. and Mrs. Hayes (Castleford); Large Cichlids: 1, Mr. and Mrs. D. Caldwell (Scunthorpe Museum); 2, R. Burman (Scunthorpe and District); 3, Mr. Bellard (Hull); Angels: 1, Mr. and Mrs. Sellars (Lincoln); 2, Mrs. Kirk (Sth. Humberside); 3, C. Hayland (Don Valley); Rift Valley Cichlids: 1, Mr. and Mrs. Sellars (Lincoln, Section winners); 2, C. Collier (Goole); 3, Mr. Greenwood (Immingham).

Section 5, Catfish: Corydoras Catfish: 1, Mr. and Mrs. Fletcher (Doncaster); 2 and 3, Mr. and Mrs. Emerson (Castleford); A.O.V. Catfish: 1, H. Thorpe (Doncaster, Section winner); 2, Mr. and Mrs. Morrissy (Immingham); 3, R. Wrenson (Scunthorpe and District).

Section 6, Loaches and Sharks: Loaches: 1, Mr. and Mrs. A. Binns (Scunthorpe Museum, Section winners); 2, Master J. Emerson (Castleford); 3, Mr. and Mrs. A. Binns (Scunthorpe Museum); Sharks: 1, Mr. and Mrs. Copley (Doncaster); 2, S. Neville (Grantham); 3, Mr. and Mrs. D. Caldwell (Scunthorpe

Museum); Foxes: 1 and 2, W. Hunt (Thorne); 3, W. Blundell (Doncaster).

Section 7, Coldwater: A.V. Coldwater: 1, W. Blundell (Doncaster); 2, Mr. and Mrs. Steeles (Retford); 3, Mr. Mapplebeck (York).

Section 8, Toothcarps: Single Killifish: 1, Mr. Greenwood (Immingham, Section winners); 2, Mr. and Mrs. Morrissy (Immingham); 3, A. Clayton (Immingham).

Section 9 Anabantids: Small Anabantids: 1, A. Clayton (Immingham); 2, Mr. and Mrs. J. Riley (Castleford); 3, Mr. and Mrs. Moore (Sheaf Valley); Siamese Fighter (Single Colour): 1 and 3, M. Morgan (Castleford); 2, Master M. Lake (Sth. Humberside); Siamese Fighters (Multi-Colour): 1, Mr. and Mrs. Moore (Sheaf Valley); 2, Mr. and Mrs. Chester (Retford); 3, Mr. and Mrs. Berry (Scunthorpe and District); A.O.V. Anabantids: 1, Mr. and Mrs. Berry (Scunthorpe, Section winner); 2, Master S. Green (Castleford); 3, Mr. and Mrs. Lowe (Halifax).

Section 10 Danios, Minnows and Rasboras: Danios and Minnows: 1, Master S. White (Retford); 2, G. Tyson (Sth. Humberside); 3, G. Andrews (Hull); Rasboras: 1, W. Blundell (Doncaster, Section winner); 2, Mr. Watts (Sth. Humberside); 3, Mr. and Mrs. Chester (Retford).

Section 11, A.O.V. Tropical: A.O.V. up to 8 ins.: 1, Mr. and Mrs. Emerson (Castleford); 2, M. Morgan (Castleford); 3, Mr. and Mrs. Copley (Doncaster); A.O.V. Tropical over 8 ins.: 1, Mr. and Mrs. Caldwell (Scunthorpe Museum, Section winner); 2, G. White (Scunthorpe and District); 3, Mr. Bellard (Hull); Section 12, True Pairs: Pair Livebearers: 1, Miss J. Cavill (Doncaster); 2 and 3, Mr. and Mrs. Daines (Doncaster); Pair Egg-layers: 1, Mr. and Mrs. Chester (Retford, Section winner); 2, A. Clayton (Immingham); 3, G. Tyson (Sth. Humberside).

Section 13, Breeders, Egg-layers, 1-10: 1, M. Hurton (Goole); 2, B. Jackson (Doncaster); 3, Mr. and Mrs. Sellars (Lincoln); Breeders, Egg-layers, 11-20: 1, H. Smith (Scunthorpe and District); 2, G. Collier (Goole); 3, Master S. White (Retford); Breeders, Livebearers: 1, B. Jackson (Doncaster); 2, Mr. and Mrs. Richardson (Scarborough); 3, Mr. and Mrs. Chester (Retford).

Section 14, Novice Section: Single Egg-layers: 1 and 3, Master C. Garner (Scunthorpe Museum, Section winner); 2, A. Jordan (Sth. Humberside); Single Livebearer: 1, Master D. Cavill (Doncaster); 2, G. Hoodless (Scunthorpe and District); 3, K. Hurton (Goole).

ENTRIES for the Rhondda A.S. Open Show totalled 309 and the results were as follows:—Bar: 1, J. and F. Edwards (L.M.); 2, M. Thomas (Rhondda); Br: 1 and 2, G. and J. Richards (Sudbury); 3, G. Best (Swansea); 4, J. F. Edwards; Ca: 1, M. Strange (Basingstoke); 2, H. Chick (L.M.); 3, P. Watts; 4, G. Best (Swansea); Cc: 1, G. Best (Swansea); 2 and 4, C. and J. Richards (Sudbury); 3, J. F. Edwards (L.M.); Dc: 1, 2 and 4, P. Thomas (Swansea); 3, A.E. and B. Fouracre (Port Talbot); Dd: 1, G. Best (Swansea); 2 and 4, J. Egan (Port Talbot); 3, M. Guy (Cardiff); Dc: 1, J. Egan (Port Talbot); 2, C. Morrison (Port Talbot); 3, M. Thomas (Rhondda); 4, A. and M. Smith (Rhondda); Ea: 1, 2, and 4; C. and J. Richards (Sudbury); 3, J. Egan (Port Talbot); Ee: 1 and 4, Mrs. E. Jones (Port Talbot); 2, P. Thomas (Swansea); 3, C. J. and T. A. Davies (Port Talbot); F: 1 and 2, M. Addicot (Newport); 3, H. Chick (Llanwit Major); 4, B. Purdy (N. Gwent); G: 1, J. F. Edwards (Llanwit Major); 2, M. Parsons (Rhondda); 3, C. and J. Richards (Sudbury); 4, V. Bruce (Aberdare); H: 1, J. Egan (Port Talbot); 2, B. Ashcroft (Rhondda); 3, G. Cavell (Aberdare); 4, R. Dore (Newport); I: 1, P. Thomas (Swansea); 2, M. Parsons (Rhondda); 3, Mr. and Mrs. Guthrie (Barry); 4, T. Click (Rhondda); K: 1 and 4, C. and J. Richards (Sudbury); 2, Mr. and Mrs. Guthrie (Barry); 3, T. Click (Rhondda); L: 1, B. Thomas (Swansea); \* 2, M. Parsons (Rhondda); 3, T. Click (Rhondda); 4, A. and M. Smith (Rhondda); M: 1, Mr. and Mrs. Guthrie (Barry); 2, M. Thomas (Rhondda);

3, B. Hannigan (N. Gwent); 4, D. Davies; N: 1, C. and J. Richards (Sudbury); 2, J. F. Edwards (L.M.); 3, B. Purdy (N. Gwent); 4, R. Dore (Newport); O: 1, C. and J. Richards (Sudbury); 2, B. Hannigan (N. Gwent); 3, P. Stonebrow (Merthyr); 4, B. Purdy (N. Gwent); P: 1, B. Davies (Rhondda); 2, and 3, C. and J. Richards (Sudbury); 4, B. Purdy (N. Gwent); Q: 1, G. Best (Swansea); 2, A., E. and B. Fouracre (Port Talbot); R: 1, J. F. Edwards (L.M.); 2 and 4, M. Guy (Cardiff); 3, R. Perkins (Port Talbot); S: 1 and 3, B. Ashcroft (Rhondda); 2, B. Davies (Rhondda); 4, B. Purdy (N. Gwent); T: 1 and 2, M. Strange (Basingstoke); 3, C. Morrison (Port Talbot); 4, B. Purdy (N. Gwent); U: 1, 3 and 4; C. Rupert (Port Talbot); 2, Mr. and Mrs. Guthrie (Barry); V: 1, 2, 3 and 4; C. Rupert (Port Talbot); W: 1, 2, 3 and 4; C. Rupert (Port Talbot); X: 1 and 2, C. Rupert (Port Talbot); 3, C. Morrison (Port Talbot); X-Bm: 1, M. Strange (Basingstoke); 2, G. Legge (Rhondda); 3, M. Thomas (Rhondda); 4, G. Best (Swansea); X-Or: M. Strange (Basingstoke); 2 and 4, C. Morrison (Port Talbot); 3, Mr. and Mrs. Guthrie (Barry); B-M: 1, 2 and 3; B. Bow (Merthyr); P-Ty: 1, 2 and 3; B. Bow (Merthyr); 4, N. Shepherd (N. Gwent); Best Fish in Show: C. Rupert (Port Talbot); Most number of points: C. and J. Richards (Sudbury).

MAIN topic at the meeting of the Kingsclere and District A.S. in April was a quiz set by one of the members, M. Sheer. This was an excellent quiz and the following were the winning places. Main Class: 1, E. Mouldy; 2, W. Cornick; Novice Class: 1, P. and D. Hutchins; 2, M. Cook; 3, W. Osborne. The results of the Table Show also held during the evening for Class Db were as follows:—Main Class: 1 and 2, E. Mouldy; Novice Class: 1, W. Osborne; equal 2nd: M. Cook and A. Lawson; 3 and 4, A. Lawson.

Fund raising was also a much discussed subject during the evening. It was finally agreed to arrange a mini-fete indoors, with a fish-keeping theme. Any prospective member would be made most welcome at the Crown, Kingsclere, at 8 p.m.

IN April the Witney and District A.S. held their annual general meeting. The new committee is as follows: chairman: P. Wixey; vice chairman: K. Horner; secretary: D. A. Tovey; treasurer: C. J. Adair and entertainment secretary: M. Lelliot. Meetings for the coming year will take place at "The Eagle Vault" Witney, every second and fourth Friday of each month at 8 p.m.

All hobbyists are very welcome to come along and join in one of the meetings, together with wives and juniors. Bar facilities are available and the club has a small library of aquatic books which are available to all members for borrowing. The next meeting will be held on the 11th June.

THE Billingham Half Moon A.S. Open Show results were as follows:—Furnished Aquaria: 1, R. Wrightson (Billingham); 2, Kane family (Billingham); 3, G. Jones (Half Moon); 4, L. Simpson (Half Moon); A.G. Furnished Jars: 1, E. Smith (Northumbria); 2, Kane family (Billingham); 3, A. Howgate (Stanley); 4, G. Poole (Half Moon); Large Barbs: 1, Mr. and Mrs. Duffell (Redcar); 2, J. Page (Half Moon); 3, T. Monkhouse (Independent); 4, J. Payne (Middlebeugh); Small Barbs: 1, M. Long (Cleveland); 2 and 3, J. Page (Half Moon); 4, M. Wilks (Stockton); Small Characins: 1 and 3, Michael and Andrew McCartney (Billingham); 2, D. Lawrence (Redcar); 4, M. Hall (Independent); Large Characins: 1, M. Aylesbury (Redcar); 2, J. King (Redcar); 3, T. Smith (Half Moon); 4, P. Davis (Half Moon); A.V. Angel: 1, S. Hay (Hartlepool); 2, J. Irwin (Stanley); 3, B. Smith (Half Moon); 4, E. Standley (Redcar); Small Cichlids: 1, J. Irwin (Stanley); 2, J. Ryan (Billingham); 3, B. Shackcloth (Half Moon); 4, Mr. and Mrs. Welch (York); Haplochromis Derivatives: 1, H. Garthwaite (Hartlepool); 2, R. Atherton (Hartlepool); 3, T. Hope (Hartlepool); 4, K. Noble (Redcar); Large

Cichlids: 1, M. Moreland (Half Moon); 2, S. Hay (Hartlepool); 3, K. Noble (Redcar); 4, Miss S. Cox (Redcar). Labyrinth: 1, P. Wright (South Shields); 2, B. Jackson (Redcar); 3, M. Westwick (Redcar); 4, N. Lynch (Stanley). Beta Splendens: 1 and 3, B. Jackson (Redcar); 2, A. Howgate (Stanley); 4, Mr. and Mrs. Lamb (Redcar). E.L.T.C.: 1, A. Howgate (Stanley); 2, B. Jackson (Redcar); 3, Master Lister (Stanley). Tropical Catfish: 1, H. Garthwaite (Hartlepool); 2, Mr. and Mrs. Low (Cleveland); 3, Mr. and Mrs. Saunders (Stockton); 4, P. Coleman (Billingham). Corydoras and Brochis: 1, P. Wright (South Shields); 2, Mr. and Mrs. Welsh (York); 3, N. Lynch (Stanley); 4, H. Ferguson (Stockton). Raboras: 1, Mr. and Mrs. Atwell (Billingham); 2, L. Collins (Stockton); 3, N. Lynch (Stanley); 4, M. Long (Cleveland). Danio-W.C.M.M.: 1, Mr. and Mrs. Duffill (Redcar); 2, D. Smith (Killingworth); 3, D. Lawrence (Redcar); 4, M. Long (Cleveland). Loach: 1, Mr. and Mrs. Welford (Cleveland); 2, T. Askew (Half Moon); 3, K. Greenley (Half Moon); 4, Mr. and Mrs. Welsh (York). Tropical Egg-layers: 1, Mr. and Mrs. Kidd (Killingworth); 2, M. Middleton (Half Moon); 3, Mr. and Mrs. Duffill (Redcar); 4, M. Moreland (Half Moon). Labos: 1, Mr. and Mrs. Shearer (Redcar); 2, M. Hall (Independent); 3, Mr. and Mrs. McClurg (Stockton); 4, J. Page (Half Moon). Pairs (Egg-layers): 1, Mr. and Mrs. Lamb (Redcar); 2 and 3, N. Lynch (Stanley); 4, R. Whirgosh (Billingham). Pairs (Livebearers): 1, P. Wright (South Shields); 2, Mr. and Mrs. Wood (Stockton); 3, C. Gledhill (Redcar); 4, J. Ryan (Billingham). Guppy (Male): 1, Mr. and Mrs. Knibbs (Stockton); 2, M. Noble (Redcar); 3, T. Hope (Hartlepool); 4, P. Wright (South Shields). Guppy (Female): 1, 2 and 3, K. Noble (Redcar); 4, K. Bowers (Cleveland). Sweettails: 1, M. Noble (Redcar); 2, D. Wright (Independent); 3, P. Coleman (Billingham); 4, M. Goldert (Stockton). Platy: 1 and 2, K. Noble (Redcar); 3, D. Smith (Killingworth); 4, Mr. and Mrs. Saunders (Stockton). Molly: 1, M. Willett (Half Moon); 2, Miss D. Knibbs (Stockton); 3, S. Hay (Hartlepool); 4, M. Stevens (Independent). Coldwater: 1, M. Long (Cleveland); 2, M. Middleton (Half Moon); 3, J. Fraser (Half Moon); 4, Kane family (Billingham). Breeders (Egg-layers): 1, Michael and Andrew McCartney (Billingham); 2, E. Prytherch (Ashington); 3, P. Kane (Billingham); 4, A. Howgate (Stanley). Breeders (Livebearers): 1, C. Bell (Stanley); 2 and 3, D. Smith (Killingworth); 4, Mr. and Mrs. Knibbs (Stockton). Junior: 1 and 4, Michael and Andrew McCartney (Billingham); 2, Master G. Hay (Hartlepool); 3, Master D. Lynch (Stanley). Best fish in the show was an Anabantus borelli entered by J. Irwin (Stanley).

**RESULTS of the Annual Open Show of the Hyde A.S. were as follows:**

Section A, Livebearers: Guppies: 1, I. Davies (Warrington); 2, D. and M. Laycock (Sheaf Valley); 3, K. Taylor (Loyne). Platies: 1, and Section winner, Poulton Brothers (Southport); 2, Mr. and Mrs. Muckle (Sandgrounders); 3, A. Sanders (Middleton); Sweettails: 1, C. and K. Davies (Northwich); 2, J. Buckley (Northwich); 3, R. Grant (Merseyside). Mollys: 1, T. Hampton (Merseyside); 2 and 3, J. Tinsley (Sandgrounders). A.O.V. Livebearers: 1, J. Abbott (Aireborough); 2, Mr. and Mrs. K. Crowley (Middleton); 3, T. and J. Selby (Wythenshawe). Section B Barbs: Small Barbs: 1, Mr. and Mrs. Emerson (Castleford); 2, Mr. and Mrs. Muckle (Sandgrounders); 3, Mr. and Mrs. Burgoyne (Bridgewater). Large Barbs: 1 and 3 and Section winner, A. Vaisiere (Merseyside); 2, A. Oldham (Wythenshawe). Section C Characins: Small Characins: 1, Section winner, 'Best Fish of the Show' and Best Tropical Fish: Miss S. Goddard (Macclesfield); 2, Mrs. Houghton (Southport); 3, T. and J. Selby (Wythenshawe). Large Characins: 1, Mr. and Mrs. Ham (Lytham); 2, Poulton Brothers (Southport); 3, Mrs. Newall (Glossop). Section D Anabantids: Fighters: 1, and 2,

T. E. Davies (Heywood); 3, L. Cuff (Aireborough). A.O.V. Anabantids: 1 and Section winner, Mr. and Mrs. Muckle (Sandgrounders); 2, Mr. and Mrs. Newton (Blackburn); 3, H. Buckley (Northwich).

Section E Cichlids: Angels: 1, Mr. and Mrs. Muckle (Sandgrounders); 2, Mr. and Mrs. Burton (Accrington); 3, C. K. Davies (Northwich). Rift Valley Cichlids (new class): 1, Mrs. Houghton (Southport); 2, S. Hooton (Sandgrounders); 3, D. Mason (Bridgewater). Dwarf Cichlids: 1, Mr. and Mrs. Agar (Aireborough); 2, R. Iden (Sandgrounders); 3, Poulton Brothers (Southport). A.O.V. Cichlids: 1 and Section winner, Mr. and Mrs. J. Taylor (Merseyside); 2, R. Francis (Heywood); 3, D. Wilson (Merseyside).

Section F Killie Fish: 1 and Section winner, J. Buckley (Northwich); 2, I. Barratt (Wythenshawe); 3, A. Vaisiere (Merseyside).

Section G Catfish: Corydoras: 1, Mr. and Mrs. P. Hayes (Castleford); 2, Mr. and Mrs. Baldwin (Sandgrounders); 3, G. Harvey (Sandgrounders). Loaches: 1, I. Davies (Warrington); 2, Mr. and Mrs. Ham (Lytham); 3, Mr. and Mrs. Burgoyne (Bridgewater). A.O.V. Catfish: 1 and Section winner, Mr. and Mrs. Baldwin (Sandgrounders); 2, Mrs. J. Freer (Partington); 3, R. Tomkinson (Glossop).

Section H Cyprinids: Sharks and Flying Foxes: 1 and Section winner, Mrs. Houghton (Southport); 2, Mr. and Mrs. Baldwin (Sandgrounders); 3, B. Dawson (Heywood). Raboras (new class): 1, R. I. Payne (Merseyside); 2, Mr. and Mrs. Muckle (Sandgrounders); 3, Mrs. Houghton (Southport). Danios and Minnows: 1 and 3, M. Hay (Oldham); 2, Mr. and Mrs. Newton (Blackburn).

Section I A.O.V. Tropical Fish: 1 and Section winner, Mr. and Mrs. Newton (Blackburn); 2, P. and H. Batchelor (Loyne); 3, Mr. and Mrs. Immerson (Castleford).

Section J Marine: A.V. Marine Fish: 1 and Section winner, Mr. and Mrs. Davies (Dunlop); 2 and 3, J. Midgley (Wythenshawe).

Section K Pairs: Livebearers: 1, Mr. and Mrs. Agar (Aireborough); 2, T. Hamerton (Merseyside); 3, R. Lamb (Southport). Egg-layers: 1 and Section winner, Mr. and Mrs. Baldwin (Sandgrounders); 2, B. Marshall (Blackburn); 3, K. Kryger (Wrexham).

Section L Breeders' Teams: Livebearers: 1, Poulton Brothers (Southport); 2, J. Abbott (Aireborough); 3, T. Hampton (Merseyside). Egg-layers: 1-10: 1, R. I. Payne (Merseyside); 2, A. Vaisiere (Merseyside); 3, K. Sherwin (Hyde). Egg-layers, 11-20: 1 and 2 and Section winner, A. Vaisiere (Merseyside); 3, S. Hooton (Sandgrounders).

Section M Juniors: A.V. Fish: 1 and Section winner, I. Hopkins (Merseyside); 2, B. Davies (Stretford); 3, R. Nichols (Lytham).

Section N Miscellaneous: Mini-lars: 1 and 3 and Section winner, E. Jones (Wrexham); 2, R. Lamb (Southport).

Coldwater Sections. These were completely revised and incorporated two new sections and seven new classes.

Section O Coldwater Common: Goldfish and Comets: 1 and Section winner, H. Penhall (Otram); 2, M. Werriman (Lytham); 3, Mrs. Houghton (Southport). Shubunkins: 1, Mr. Hall (Aireborough); 2, J. Wood (Aireborough); 3, S. Foote (Accrington). Koi Carp: 1, 2 and 3, Mr. Hall (Aireborough). A.O.V. Pond or River Fish: 1, H. Penhall (Otram); 2, Mr. Hall (Aireborough); 3, S. Walsh (Accrington).

Section P Coldwater Fancy: Fantails: 1 and 3, J. Wood (Aireborough); 2, H. Buckley (Northwich). Veiltails: 1 and 2, S. Foote (Accrington). Lionheads: 1 and 2 and Section winner, Mr. Hall (Aireborough); 3, H. Penhall (Otram). Moors: 1 and 2, S. Foote (Accrington); 3, J. Wood (Aireborough). A.O.V. Fancy: 1, H. Penhall (Otram); 2 and 3, S. Foote (Accrington).

Section Q Breeders' Teams: 1 and Section winner, S. Foote (Accrington); 2, Mr. Hall (Aireborough); 3, H. Penhall (Otram).

The Show was a great success in nearly all respects with a record attendance and number of entries. Eight societies who had not been before also helped to support the show. Each year the ranks of the Juniors

have increased, and this year another record was broken. There was, however, a severe reduction in support from the Trade.

**OPEN Show results from Chingford A.S. were—Class Aa/b:** 1, Bethnal Green; 2, Walthamstow; 3, Chingford. Ag: 1, Mrs. Hedges (Bethnal Green); 2, Mr. Dale (Bethnal Green); 3, Miss P. Hill (Walthamstow); 4, Mr. Smith (Chingford). B: 1, Mr. Bryden (Aylesbury); 2, Mr. Coyle (Walthamstow); 3, Mr. Brazier (Sudbury); 4, Mr. Chandler (Walthamstow). C: 1, Mr. Brazier (Sudbury); 2, Mr. Rollason (Aylesbury); 3, Mr. Thoday (Braintree); 4, Mr. Sale (Aylesbury). Ca: 1, 2 and 3; Mr. Ingle (Chingford); 4, Mr. Pipe (Aylesbury). Cb: 1, 2 and 3; Mr. Brazier (Sudbury). D: 1, Mr. Noronha (Orpington); 2, Mr. Rowland (Braintree); 3, Mr. Bryden (Aylesbury); 4, Mr. Ellis (Aylesbury). Db: 1, Mr. James (Tottenham); 2, Mr. Wiggold (Walthamstow); 3, Mr. Crosby (Ilford); 4, Mr. Noronha (Orpington). E: Mr. Smith (Walthamstow); 2, Mr. Clement (Chingford); 3, Mr. Chandler (Walthamstow); 4, Mr. Sale (Aylesbury). Ea: 1, Mr. Wooley (Catfish Ass.); 2, Mrs. Wiggold (Walthamstow); 3, Mr. Goddard (Sudbury); 4, Mr. and Mrs. Newton (Cambridge). F: 1, Mr. Wooley (Catfish Ass.); 2, Mr. Thoday (Braintree); 3, Mr. and Mrs. Shiner (British Kill Ass.); 4, Mr. and Mrs. Newton (Cambridge). G: 1, Mr. Wooley (Catfish Ass.); 2, Mr. Thoday (Braintree); 3, Mr. Ruggert; 4, Mr. Bryden (Aylesbury). H: 1, Mr. Bryden (Aylesbury); 2 and 4, Mr. Valley (Roehampton); 3, Mr. Dale (Bethnal Green). J: 1, Mr. Rollason (Aylesbury); 2, Mr. Thoday (Braintree); 3, Mr. and Mrs. Harvey (Chingford); 4, Mr. Smith (Walthamstow); K: 1 and 2, Mr. Chandler (Sudbury); 3, Mr. Wooley (Catfish Ass.); 4, Mr. Goddard (Sudbury). L: 1 and 2, Mr. Goddard (Sudbury); 3, Mr. Hills (Aylesbury); 4, Mr. Bryden (Aylesbury). M: 1, Mr. Thoday (Braintree); 2, Mr. Golightly (Harlow); 3, Mr. Coyle (Walthamstow); 4, Mr. Valley (Roehampton). N: 1, 2 and 3; Mr. Noronha (Orpington); 4, Mr. and Mrs. Shiner (British Kill Ass.). O: 1, 3 and 4; Mr. Noronha (Orpington); 2, Mr. Sale (Aylesbury). P: 1, Mrs. Adams; 2, Mr. Lambert (Kingston); 3, Mr. Wooley (Catfish Ass.); 4, Mr. Tuckey (Chingford). Q: 1, 2, 3 and 4; Mr. Noronha (Orpington). R: 1 and 2, Mr. Smith (Walthamstow); 3, Mr. Wooley (Catfish Ass.); 4, Mr. Waller (East London). S: 1, Mr. Jordan; 2 and 4, Mr. Valley (Roehampton); 3, Mr. Wooley (Catfish Ass.). T: 1, Mr. Brazier (Sudbury); 2, Mr. Cheswright (Southend and Leigh); 3, Mr. Noronha (Orpington); 4, Mr. Clark (Harlow). U: 1, 2, 3 and 4, Mrs. Hedges (Bethnal Green). Xb-M: 1, Mr. Noronha (Orpington); 2, Mr. and Mrs. Shiner (British Kill Ass.); 3, Mr. McMurdie; 4, Mr. Thoday (Braintree). Xo-T: 1, Mr. Cheswright (Southend & Leigh); 2, Mr. Goddard (Sudbury); 3 and 4, Mr. Noronha (Orpington). Z: 1, Mr. Shea (Chingford); 2, Mr. Smith (Walthamstow); 3, Mrs. Hedges (Bethnal Green); 4, Mr. Cheswright (Southend & Leigh). Winner of Best Fish in Show: Mr. Bryden (Aylesbury) Class H.

**RESULTS of the Inter-Society Quiz and Table Show between Northwich A.S., Chester A.S. and Wrexham A.S. were—**

Guppies: 1 and 2, G. M. Jones (Wrexham); 3, H. Buckley (Northwich). Sweettails: 1, C. and K. Davies (Northwich); 2, B. Connolly (Northwich); 3, L. and D. Thorne (Northwich). Barbs: 1, S. Howells (Wrexham); 2, J. Buckley (Northwich); 3, K. Kryger (Wrexham); 4, N. Thompson (Northwich); 3, P. Jones (Wrexham). Raboras, Danios and Minnows: 1 and 3, L. and D. Thorne (Northwich); 2, C. and K. Davies (Northwich). Catfish and Loaches: 1 and 3, C. Bowyer (Chester); 2, E. Jones (Wrexham). Characins: 1 and 3, C. Bowyer (Chester); 2, V. Oliver (Wrexham). Sharks: 1, R. Smith (Wrexham); 2, P. Jones (Wrexham); 3, A. Dodd (Chester). Fighters: 1 and 3, H. Buckley (Northwich); 2, L. Bradley (Northwich). Toothcarps: 1 and 2, K. Kryger (Wrexham); 3, J. Buckley (Northwich). Pairs (Livebearers): 1, L. Bradley

(Northwich). Pairs (Egglayers): 1, K. Kryger (Wrexham); 2, R. Mathers (Wrexham); 3, C. Bowyer (Chester). Best Fish in Show: C. Bowyer (Chester). Results of the Quiz: 1, Chester; 2, Northwich; 3, Wrexham.

After final adjustments of pointing for table show and quiz the Inter-Society trophy was won by Northwich & District A.S.

**THE Suffolk Aquarist and Pondkeepers Association** held their final meeting before the annual general meeting (held in May) at the Sporting Farmer Public House. After the business side of the meeting had been dealt with the members moved on to the main entertainment for the evening which was a taped lecture on the interesting subject of showing fish and was enjoyed by all.

#### NEW SOCIETIES

A new society has been formed in Scotland called the **Dumfries and District A.S.** The secretary, Mr. G. B. Jardine, 70 Church Street, Dumfries DG2 7AS would be pleased to hear from prospective members.

**The Village Bar A.S.** meets on the first Friday of each month at the Village Bar, Garden House Schooner Inn, Hagley Road, Birmingham. Start 8.15. Everyone welcome.

#### SECRETARY CHANGES

**Portsmouth A.S.:** P. Brady, 157 Elm Grove, Southsea, Portsmouth, Hants.  
**Scunthorpe Museum Society A.G.:** A. Binns, 67 Mill Lane, Brigg, South Humberside DN20 8ND. Phone: Brigg 52014.

#### SHOW SECRETARY CHANGES

**Chesterfield and District A.S.:** C. Lee, 21 Farnsworth Street, Hasland, Chesterfield, Derbyshire. Tel.: 36546.

**Sandgrounders A.S.:** B. Baldin, 10 Olive Grove, Southport.

**Scunthorpe Museum Society A.G.:** D. Caldwell, 5 St. Martins Road, Scunthorpe, Brigg, South Humberside. Phone: Brigg 53733.

#### SHOW VENUE CHANGES

Owing to a growth in membership the **Whitby and District A.S.** have had to change both venue and night of the meetings. These are now held on Wednesday and the first meeting was the 19th May and will be fortnightly after that date. The meetings are being held at Albion House, Silver Street, Whitby at 8 p.m. Any speakers willing to give a talk would they please contact Mrs. E. Lofthouse, 41 Derwent Road, Whitby, Yorks.

The **Hemel Hempstead A.S.** has changed their meeting place to Methodist Church Hall, nr. Dacorum College, Marlowes, Hemel Hempstead, Herts.

The **Hinkley and District A.S.** have recently changed the venue and date. They now meet on the first Wednesday of the month at the Barley Sheaf Inn, Lower Bond Street, Hinkley.

#### LIST OF SPECIALIST SOCIETIES

THE following list is not complete and we invite details of other specialist societies from the secretaries. These would apply only to the main addresses and not to any branches. This list will be published at various intervals.

**Catfish Association of Great Britain.**—Alan Haley, 255 Lewisham Way, London, S.E.4. Tel: 01-692 8296.

**Goldfish Society of Great Britain.**—R. A. Dodkins, 107 Cobham Road, Seven Kings, Ilford, Essex IG3 9JL.

**British Discus Association.**—F. W. Ashworth, 41 Pengwern, Llangollen, Clwyd LL20 8AT.

**British Koi-Keepers' Society.**—D. C. Davis, 137 Gayfield Avenue, Brerly Hill, West Midlands DY5 2BX.

**British Marine Aquarists' Association.**—J. H. Vickery, 26 Rosalind Avenue, Dudley, West Midlands DY1 4JW.

**Fancy Guppy Association.**—S. Croft, 85 Planks Lane, Wombourne, Staffs.

**British Cichlid Association.**—Ian C. Solick, 88 Kings Drive, Bishopston, Bristol BS7 8JH.

**Newcastle Guppy and Livebearer Society.**—P.R.O., R. Daly, 40 Palmerton Walk, Clasper Village, Gateshead NE8 2LV.

**British Koi-Keepers' Society (London Section).**—J. H. Packham, 5 Camden Terrace, London NW1 9BP.

**Yorkshire Koi Society.**—J. W. Mawson, 78 Gledhow Wood Avenue, Roundhay, Leeds 8.

**Midland Koi Association.**—R. Hunter, 46 Olive Avenue, Wyken, Coventry, Warwick.

#### AQUARIST CALENDAR

**5th June:** Weston-Super-Mare Tropical Fish Club Open Show will be held at St. John's House, Oxford Street, Weston-S-Mare. Schedules available from Show Secretary, Mrs. M. Tanner, 6 Byron Road, Locking, Weston-S-Mare.

**6th June:** Accrington and District A.S. Open Show, Antley Methodist Church Hall, Blackburn Road, Accrington. Details S. Walsh, 133 Lammack Rd., Blackburn, Lancs.

**6th June:** Loughborough & District A.S. Open Show at Bursleigh Community College, Thorpe Hill, Loughborough. Schedules from I. S. Purdy, 10, Cleveland Road, Loughborough, Leics. (available later).

**6th June:** Sudbury A.S. Open Show at the new venue, Wasps Rugby Club, Repton Ave., Sudbury. Schedules: L. J. Brazier, 66 Ormsby Way, Kenton Middx. 01-204 5374.

**12th June:** Llanrwst Major A.S. Annual Open Show to be held at The Town Hall, Llanrwst Major. Plaques awarded to first in every class, and medallions to all runners-up. Schedules available April onwards from J. J. Edwards, "Glansafon", Mill Park, Llanblethian, Cowbridge, South Glamorgan CF7 7BG.

**13th June:** Salisbury & D.A.S. 12th Annual Open Show at the Activity Centre, Wilson Road, Salisbury. The show will be run to F.B.A.S. rules. Schedules and further information from Secretary, R. P. Adams, 26 Empire Road, Salisbury, Wilt. SP2 9DP.

**13 June:** Northwich & District A.S. Eighth Open Show at the Hartford Secondary Boys School, Chester Road, Hartford, Northwich. Judging to F.N.A.S. standards. Details from Show Secretary N. R. Thompson, 54 Grassmere Road, Frodsham via Warrington, Lancs. WA6 7LQ. Tel: Frodsham 32745.

**13th June:** St. Helens A.S. Open Show to be held at George Street Assembly Rooms, St. Helens. Secretary, A. McBryde, 130 Robins Lane, Sutton, St. Helens, Merseyside.

**14th June:** Dunmow & District A.S. Open Show at the Fookes Memorial Hall, Gt. Dunmow. Schedules may be obtained from I. Farlow, 12 Castle Cross, Saffron Walden, Essex.

**19th June:** Whiteaway and District F.S. Fourth Open Show at Whiteaway Community Centre, Kelton View, Whiteaway, Bath. Schedules available from Show Secretary, Mrs. E. Daniels, 21 Haycombe Drive, Whiteaway, Bath BA2 1PG, Avon.

**20th June:** First Redditch Open Aquatic Show organized by Dalton A.S. At the Abbey Sports Stadium, Birmingham Road, Redditch, Worcs. Details: P. J. Binaley, 25 Pifford Close, Lodge Park, Redditch, Worcs. Phone Redditch 67342 (nights only).

**20th June:** Alfreton and District A.S. Annual Open Show at the Adult Education Centre, Alfreton Hall, Alfreton. Details from the show secretary, K. Dean, 22 Flenchers Row, Nottingham Road, Ripley, Derby DB5 3BA. Phone Ripley 3902.

**20th June:** North West Lancs., Section F.G.A. Annual Open Show at Preston. Details: Mr. D. Ormerod, 55, Barnes Ave., Rawtenstall, Rossendale, Lancs.

**20th June:** South Shields A.S. Annual Show will be held in the Bolingbroke Hall, Bolingbroke Street, South Shields. Schedules from B. H. Ribbrigder, 13, Chesterton Road, Biddick Hall Estate, South Shields.

**20th June:** Swillington A.S. Open Show, John Smeaton School, Barwick Road (off York Road), Leeds 15. Beginning 12.30 to 2.15 p.m. Further details from Show Sec. T. Seaman 24, Raincliffe Road, Leeds 9 LS9 9LR.

**20th June:** Malvern & District A.S. Third Open Show at Barnards Green Cricket Club, North-end Lane, Malvern. Schedules available later.

**20th June:** Nailsea & District A.S. Annual Open Show at Grove Sports Centre, Nailsea. Details and schedules may be obtained from D. Kenwood, Show Secretary, 90 Slade Road, Portishead, Bristol. Tel: Portishead 848947.

**27th June:** Dunlop Aquarium Keepers Society Open Show will be held at the Dunlop Factory, Speke, Liverpool. Schedules are available from show secretary, T. Hampton, 3 Madeline Street, Liverpool, 8, tel: 051-709 5509.

**27th June:** Boston A.S. Open Show. Schedules from K. Prendergast, 48 Robin Hood's Walk, Boston, Lincs. PE21 9JL.

**3rd July:** Cardiff A.S. Open Show, St. Margaret's Church Hall, Roath, Cardiff. Details from B. Mills, 3 Rutland Street, Grangetown, Cardiff. Tel: 388048.

**4th July:** Grantham & District A.S. Annual Open Show at Avelling-Balfords Social Hall, Gonerby Road, Gonerby Hill Foot, Grantham. Show schedules available mid-May onwards, S.A.E. from Show Secretary, W. E. Neville, 32 Sharpe Road, Grantham, Lincs. NG31 9BW.

**4th July:** Lytham A.S. Annual Open Show, will be held at Lytham Baths, Dicconson Terrace, Lytham, Lancashire. This is a larger new venue. Show Schedules from: Show Secretary, Mr. P. Ham, 1 Wyndene Grove, Freckleton, Preston, Lancs. Telephone Freckleton 633182.

**4th July:** Chard & District A.S. will be holding its Second Open Show at Purnham Scham School, Chard. Details from Mr. B. Riata, 128 Henson Park, Chard.

**4th July:** South East London A.S. Open Show at the Community Centre, 141 West Greenwich House, London, S.E. Details and entries—T. Asquith, 49 Central Avenue, Welling, Kent.

**10th July:** Basingstoke A.S. will stage an Open Show for Cichlids at the Carnival Hall, Basingstoke. Schedules from C. Wells, 271, Overdown Rd., Tilehurst, Reading or via Tel: Bas. 67039 (M. Strance).

**17th July:** Goldfish Society of Great Britain. General Meeting, 2 p.m., Conway Hall, Red Lion Square, London, W.C.1.

**18th July:** Provisional date for Sandgrounders Annual Show at Meols Cop School, Meols Cop Road, Southport. Further details when available from Hon. Show Secretary, B. Baldwin, 10 Olive Grove, Southport.

**18th July:** Scarborough & District A.S. Open Show, Eastfield Community Centre, Eastfield, Scarborough. Schedules: J. F. Richardson, 5 Keld Garth, Pickering, N. Yorks YO18 8DG.

**25th July:** Brighton & Southern A.S. Open Show and Exhibition at St. Barnabas Hall, Sackville Road, Hove, Sussex. Show Secretary, R. Sayers, 11, Seaview Estate, Southwick BW4 4AS. Phone Brighton 593851.

**25th July:** South Humberside A.S. First Open Show, Memorial Hall, Cleethorpes. Schedules available from G. Wilson, 100 Guildford Street, Grimsby.

**25th July:** Aireborough & District A.S. Annual Open Show, at Memston Civic Centre, Main St. Memston Nr. Leeds, West Yorks. For further details contact Stuart Hall (Show Secretary) 34 Salisbury Street, Calverley, Pudsey. Phone: Pudsey 74609.

**31st July:** Plymouth A.S. Open Show at Trinity United Reform Church Hall, Tor Lane, Hartley, Plymouth. Benching until 12 noon. Schedules, J. Webber, 2 Rathleigh Avenue, St. Stephens, Saltash, Cornwall.

**1st August:** Tonbridge & District A.S. Fifth Open Show. Schedules from Secretary, J. Feast, 19 Eardley Road, Sevenoaks, Kent TN13 1XX.

**7th August:** Newport A.S. Open Show at St. John's Hall, Victoria Avenue, Maindee, Newport, Gwent. Details from Show Secretary J. Tliffe, 1 Hawarden Road, Newport, Gwent. Tel: 74506.

**7-8th August:** Tottenham & District A.S. will be holding its annual open show at the Harringway open show. As is usual it will be for Goldwater fish with a special tropical exhibition.

**8th August:** Grimsby & Cleethorpes A.S. are holding their Fifth Open Show at the Memorial Hall, Cleethorpes. Show schedules are available from the Show Secretary, Mrs. S. E. Walker, 51, Cheshire Walk, Willows East, Grimsby, South Humberside.



**15th August:** Huddersfield T.F.S. annual Open Show, the venue being the same as last year at The Deighton Civic Youth Centre, Deighton Road, Deighton, Huddersfield. Benching from 12 noon. Judging commences 2.30 p.m. Further details and show schedules from B. Garrett, 23 Ryefields, Scholes, Holmfirth, Nr. Huddersfield.

**15th August:** Oldham & District A.S. Annual Open Show, Werneth Park, Oldham. Schedules obtainable from A. Chadwick, 341, Broadway, Chadderton, Oldham, 061-652 0809.

**15th August:** Stroud A.S. Open Show at the Subscription Rooms, Stroud. Show Secretary, J. Cole, 13 The Hill, Randwick, Stroud, Gloucestershire. Tel.: Stroud 4504.

**15th August:** B.K.A. Severnside Killifish Show: incorporated in the Stroud Open Show and open to everyone at the Subscription Rooms, Stroud. Show schedules from the Show Secretary J. Cole, 13 The Hill, Randwick, Stroud, Gloucestershire. Tel: Stroud 4504.

**21st August:** Hounslow & District A.S. Open Show will be held at the Hounslow Community Centre, Cecil Road, Hounslow, Middlesex.

**21-22nd August:** Yorkshire Aquarists Festival. **22nd August:** Long Eaton A.S. Open Show at Gregory's Rose Garden Centre. Further details and schedules (s.a.e. please) from Show Secretary D. Anthony, 50 Dean Street, Derby DE3 3PT.

**28th August:** The third Welsh National open show to be held at the Sophia Gardens Pavilion, Cardiff. Further details available from: C. Turner, 146 Arran Street, Roath, Cardiff. Tel.: Cardiff 499982. M. Guthrie, 4 Nantton Close, Rhosce, Glamorgan. Tel.: Rhosce 710649.

**29th August:** Castleford A.S. Open Show at The Civic Centre, Castleford. For further information and schedules please contact P. Hayes, Show Secretary, at Winton, 20 Park Ave., Castleford WF10 4ST. Telephone Castleford 2782.

**29th-30th August:** Gt. Yarmouth & District A.S. Tropical and Coldwater Fish "Exhibition 76" to be held at the Hopson Village Hall (on A12 between Gt. Yarmouth & Lowestoft).

**4th September:** Yate & District A.S. 10th Open Show at the Y.M.C.A. (Whitfield School Rooms) Park Road, Kingwood, Bristol, Avon (Nr. Clock Tower). Schedules after 1st August from C. Strickland, 20 Burgess Close, Chipping Sodbury, Nr. Bristol.

**5th September:** Wellington & District A.S. Open Show at the Weavers Sports Centre, Weavers Road, Wellingborough. Further details and show schedules will soon be available from the Show Secretary A. J. Crew, 67 Swinburne Road, Wellingborough.

**5th September:** Bethnal Green Aquatic Society Open Show, at the Bethnal Green Institute, 229, Bethnal Green Road, E.2. Schedules and further details available from the show secretary, R. Dale, 14, Rutland Road, Wanstead, London E11 2DY, tel: 01-989 9015.

**5th September:** The Killingsworth Aquarist Association is to hold their second annual open show at Commisicare, Killingsworth. Schedules from W. Kidd, 75 Hartlands, Bedlington, Northumberland.

**11th September:** Kingston & District A.S. Open Show. Benching times will be arranged when F.R.A.S. Conference times are known.

**12th September:** Cleveland A.S. Open Show to be held in the Church Hall, Whisby Road, Guisborough, Cleveland.

**12th September:** Harlow A.S. open show. **12th September:** Sunday—Midland Aquarist League, six class open show, Bulkington Parish Hall, Bulkington, Nr. Nuneaton. Details C. Chamberlain, 2 Stanley Court, Sydenham Drive, Leamington Spa. Tel: 28957.

**18th September:** Bristol A.S. Coldwater Open Show, Schedules from Show Secretary, E. N. Bowden, 12, Stoneleigh Walk, Bristol, 4. 775355. Postal entries close 31st August. Venue Bishopston Parish Hall.

**19th September:** Basildon Fishkeepers A.S. First Open Show. Schedules from K. Clarke, 4, Big Lane, Claborough, Retford, Notts.

**19th September:** Priory A.S. Lynnmouth Open-Show. Schedules later from W. J. Watson, 25, Rutherford St., High Howdon, Wallsend, Tyne & Wear NE28 6AW.

**19th September:** Wythenahave and District A.S. Open Show at The Forum Hall, Civic Centre, Wythenahave, Manchester. Tropical, Marine and Coldwater Sections. Show secretary, S. Berratt, 14 Piperhill Avenue, Northenden, Manchester M22 4DZ.

**19th September:** West Cumberland Aquarists' Club Open Show, The Civic Hall, Whitehaven, Cumbria.

**19th September:** Severnside Aquarist Association first Open Show at Stroud Subscription Rooms (not to be confused with Stroud and District A.S. Show to be held on 15th August). Details can be obtained from Denise Cole, Hon. Sec., Avignon, The Hill, Randwick, Stroud, Glos.

**25th September:** Goldfish Society of Great Britain. Annual Open Show, Sutton Adult School, Sutton, Surrey.

**26th September:** Northampton & District A.S. Open Show at the Sports Hall, Lings Forum, Weston Favell Centre, Wellingborough Road. Schedules being prepared.

**26th September:** Chesterfield and District A.S. Annual Open Show. Venue, Clay Cross

Social Centre, Chesterfield Road, Clay Cross, nr. Chesterfield, Derbyshire. Exit 29 off M1. Follow signs four miles to show. The venue is on the A61. Further details from Show Secretary, C. Lee, 21 Farnsworth St., Hasland, Chesterfield, Derbys.

**2nd October:** East London Aquarists and Pondkeepers Association annual show breeders, to be held at Ripple Road School, Barking. Entry forms can be obtained from Mr. J. London, 41 Maybank Avenue, Hornchurch, Essex.

**2nd October:** Goldfish Society of Great Britain, Open Show, to be held at Wimbledon Community, St. Georges Road, S.W.19. Schedules from G. E. Herring, 94 Penwith Road, S.W.18.

**3rd October:** Newbury & District A.S. Fourth Annual Open Show at the "Plaza," Market Place, Newbury. Schedules and full details from, Mrs. S. Canning, Show Secretary, 6 South End, Thatcham. Tel: Thatcham 64254.

**3rd October:** Ealing & District A.S. Open Show. Details to follow.

**3rd October:** Eboracum Aquarists Open Show at Nunthorpe Grammar School, Scaercroft Road, York.

**10th October:** Hartlepool A.S. Open Show at Lonscar Hall, Seaton Carew, Hartlepool. Further details from Mrs. A. Lion, 1, Loyalty Court, Hartlepool, Cleveland.

**10th October:** Immingham A.S. first annual show.

**17th October:** Sunday—Midlands Aquarist League, six class open show, Bulkington Parish Hall, Bulkington, Nr. Nuneaton. Details C. Chamberlain, 2 Stanley Court, Sydenham Drive, Leamington Spa. Tel: 28957.

**23-24th October:** British Aquarists' Festival Silver Jubilee, Belle Vue, Manchester. Further details shortly.

**31st October:** Doncaster & District A.S. Open Show. Benching 12 noon to 2 p.m. (Note change of venue) The Scaercroft Miners Welfare Hall, Scaercroft.

**7th November:** Blackburn Aquarist Waterlife Society Open Show. Venue at a later date. Secretary Mrs. J. Wolstenholme, 39 George Street, Great Harwood, nr. Blackburn BB6 7JF.

**7th November:** Halifax A.S. Open Show at The Forest Cottage Community Centre, Cousin Lane, Illingworth, Halifax. Details from D. Shields, Cobblestones, Gainsay, Kings Cross, Halifax. Phone Halifax 60116.

**14th November:** Bradford & District A.S. Open Show will be held at Textile Hall, Westgate, Bradford.

**20th November:** Goldfish Society of Great Britain. General Meeting, 2 p.m., Conway Hall, Red Lion Square, London, W.C.1.

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