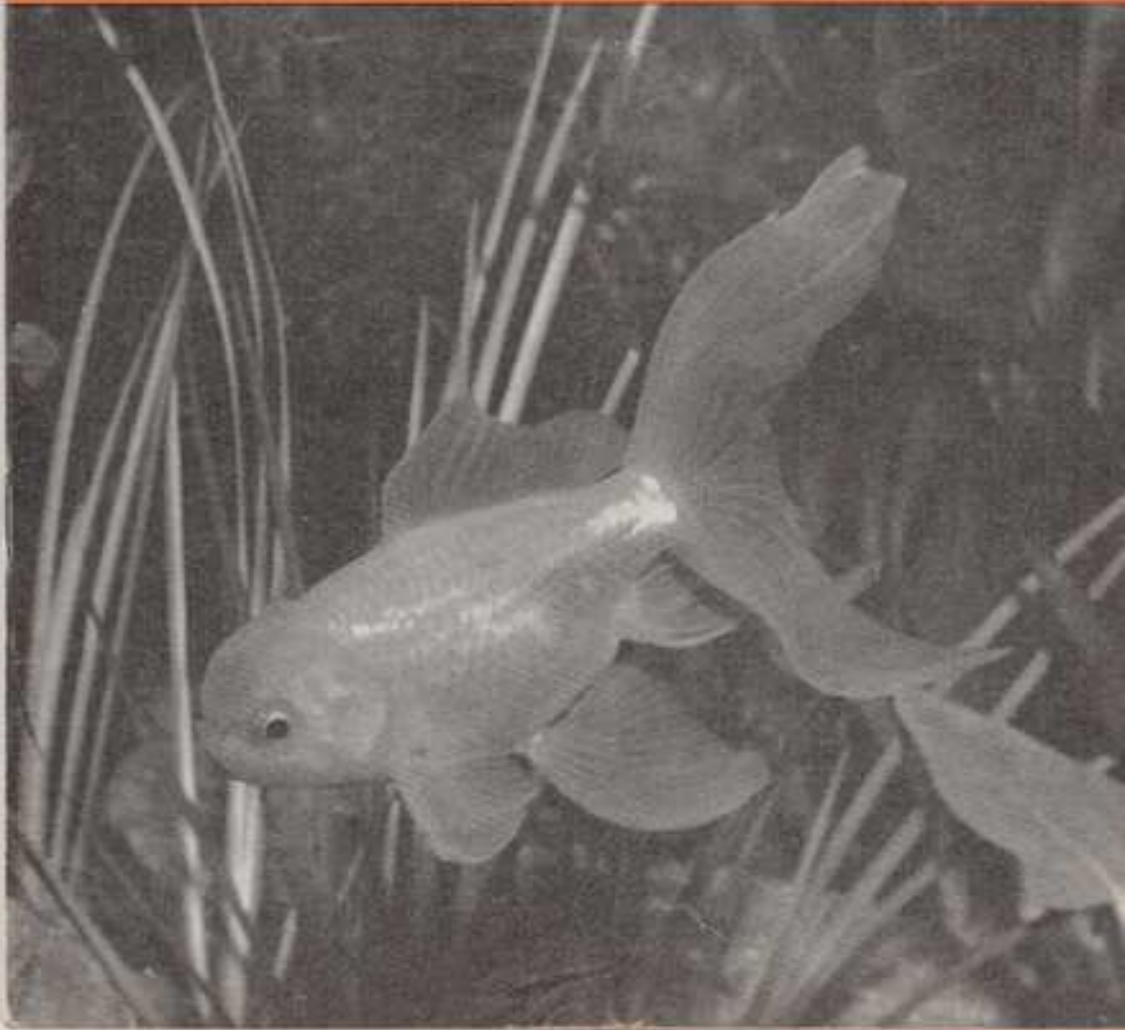


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Nigger Barbs, lgs.	74	Francaute	44	Leopard Danios	3-	Yellow Guppies, lgs. pairs	18-
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The AQUARIST AND PONDKEEPER

Founded in 1924 as "The Amateur Aquarist"



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The mosquito fish by B. Fry

ONE of the most fascinating tropicals for the enthusiastic hobbyist who likes tiny things and has a tiny tank to spare is the mosquito fish (*Heterandria formosa*). This perfectly formed and finely marked vivacious cyprinodont from North Carolina southwards to Florida is a giant at one and one eighth inches. And this is the female. The male seldom grows to more than about half that size.

The mosquito fish lives and breeds well at any temperature between the upper sixties and middle seventies (°F) with the advantage that although the quite portly little female gives birth to dark grey-brown babies every so often there is never any fear of a too rapid population explosion; for broods are small and the score or so of fry that comprise a brood are delivered a few at a time over a period of about a week to a fortnight. Usually, a female will have several batches of young in a year. If she does not, this is no fault of the male for he is an ardent and lively little suitor.

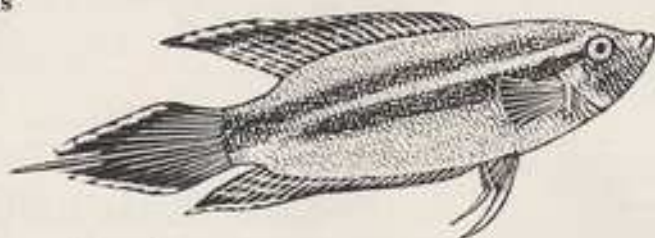
With plenty of thread- or minuscule-foliaged plants in the aquarium very few, if any, of the babies will be harmed by the parent fish, and their markings will begin to show after about five weeks. Full size is attained in about six months.

The predominant colours are greenish to greyish olive and blackish brown. A blackish brown band extends along the olivaceous sides from the gill-covers to the tail. This dark band is crossed by a number of equally dark bars. The lower sides and underparts are shining silvery white. The dorsal fin in both sexes is adorned in the base with black margined, or crowned, with a faint to glowing touch of red. The tube-like anal fin of the male is hyaline; that of the female is fan-shaped, blotched with black. As a rule, the colours in the male are more intense than they are in the female.

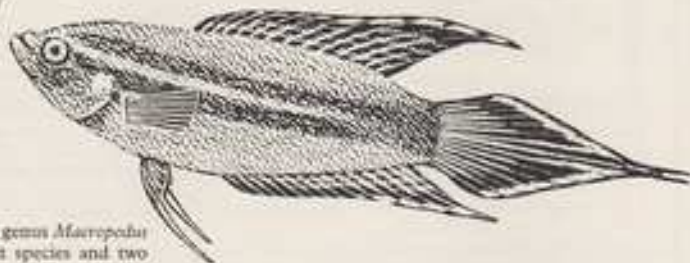
Although *H. formosa* bears the popular name of mosquito fish this has to do with its pygmy size and not with its feeding habits. In point of fact, it is no exaggeration to say that a mosquito fish can easily choke on a well-developed mosquito- or gnat-larva. It follows, therefore, that all dried and live food given to this species must be on the small side. Among live foods, micro-worms and Grindal worms are particularly recommended. For such a diminutive species *H. formosa* has quite a long life span—usually about two years.

The Paradise fishes

by Jack Hems



Macropodus cupanix dayi



PARADISE fishes, that is fishes of the genus *Macropodus*—a genus embracing three distinct species and two sub-species—range in the wild state from Korea southwards to Malaysia and westwards to southern India and Ceylon. They have been known to aquarium keepers for a very long time. As a matter of fact, one species, namely *M. opercularis*, is of some historical interest, for it was the first tropical fish to be introduced into the home aquarium. This notable event took place in 1867, when a few live specimens were brought to France from China by M. Simon, the then French Consul at Ningpo. A pair or two of these fish spawned in Paris in the following year, and by 1876 the species was firmly established as an aquarium pet in Europe and North America.

That *M. opercularis* still has its admirers (despite its fondness for savaging other fishes) is probably due to its splendid coloration and finnage, its quick and knowing response to its owner, and its ability to stand a temperature range of from about 60°F (16°C) to above 90°F (32°C). And, of course, *M. opercularis* and its congeners are famous for their interesting breeding habits and parental care. These they will demonstrate quite freely in the home aquarium, provided the conditions under which they are living are good.

Paradise fishes belong to the family Anabantidae. Members of this family—represented by genera in Africa as well as Asia—are characterised by the presence of an accessory breathing organ situated above each gill-arch which enables them to breathe atmospheric air as well as oxygen extracted from the water. It follows, therefore, that an aquarium measuring about 16 in. x 8 in. x 10 in. is large enough to support a pair.

Although they will take the larger grades of dried foods

freely, small crustaceans, molluscs, worms, flies, gnat larvae and tiny pieces of red meat are among the best foods for paradise fishes. Their breeding procedure, as has been hinted at already, is unusual. They mate under a flatish or somewhat domed island of foam, and the many hundreds of tiny bubbles that form this island or nest to contain the eggs are blown by the male, though an interested female is not above blowing a few.

A male *M. opercularis* in breeding attire is a lovely sight. He wears the richest colours: greens, golds, blues and reds, some of them sparkling with a beautiful metallic light. A sexually awakened female wears brighter colours too. But another and more positive sign of her fitness to spawn are her bloated sides.

The male manipulates his flowing fin and colours to attract her attention and lure her to the nest. He parades before her with all the splendid posturings of a peacock, or one of those highly trained top model girls. As a rule, she ignores the preliminary posturings and consciously or unconsciously heightens the male's ardour by playing a game of peek-a-boo among the plants. But in due course his persistence wins her over and with a wagging movement of her body she swims under the nest. Without any waste of time, the male wraps his body around her and together they float up towards the nest. As they rise the male applies some pressure on her sides and eggs are expelled. The fertilising fluid is poured out by the male during the embrace.

In the main the eggs are buoyant, but those that drift towards the bottom are gathered up in the mouths of

both parents and spat out again into the nest. This performance may be repeated a dozen or more times before the female is spawned out. The male turns spiteful after spawning is over and divides his time between keeping the female a prisoner in the plants and blowing mesc bubbles to prevent the eggs falling out of their foamy bed. Unless the spawning tank—a size about 24 in. by 12 in. by 12 in. is recommended—is thick with greenery it is advisable to remove the bruised and torn female from the reach of her mate. At a temperature of about 78 F (26°C) the eggs hatch in about two days.

The male watches over the fry in the nest day and night—all through the night—and any fry that spiral away from the rest of the pulsating brood are caught up in his mouth and returned to the nest. As soon as the fry are seen to be moving about all over the aquarium microscopic live food (or flour-fine dried food at second best) should be given. As a rule, the male will not harm his offspring even after they have reached an appreciable size. Aids to success in rearing the fry of paradise fishes are an even temperature, rather shallow water, and a close, draught-proof atmosphere below the cover glass. Incidentally, anabantid fry do not develop their accessory breathing organ until a few weeks have passed. But now something about the different kinds of paradise fishes.

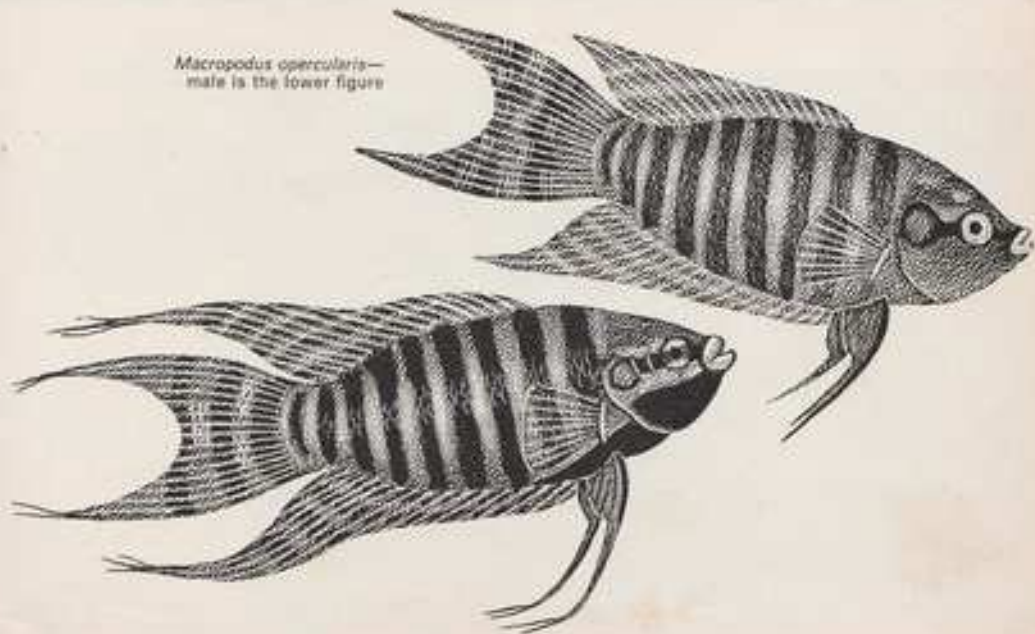
The albino paradise fish is a man-made colour variety of *M. opercularis* which was produced in Germany in the late 1920s or early 1930s. It is less overtly pugmacious (except among its own kind) than the type. Indeed, some

albino paradise fish do no harm at all in a well-planted community tank stocked with fast-moving, medium-sized fishes. Slightly larger than the ordinary paradise fish is the so-called black paradise fish (*M. opercularis concolor*), a sub-species (or a fish believed to be a sub-species because the fin-ray and scale counts are identical with the type) from Malaysia. It was named by the late Dr. Ernst Ahl, a great German ichthyologist, in February 1937. Although this fish is commonly called the black paradise fish, it is not really black but a deep greyish blue. Nevertheless, when it is in spawning condition it does become almost black. The long dorsal, anal and caudal fins are blue-black with green or red margins. The pelvic fins are bright reddish orange. Young fish are a drab greenish grey with dark edges to the scales. A mature female is paler in coloration than a mature male; also, her fins are less elongated. The black paradise fish, like the ordinary paradise fish, is far too quarrelsome to share a tank with other species. Furthermore, it is less hardy than the type.

M. chinensis is slightly smaller than the 3 to 3½ in. paradise fishes mentioned above. It has a rounded caudal fin and on account of this is usually referred to as the round-tailed paradise fish. It is a clayey to greyish brown in colour, darker above than below, with some darkish bars on the sides and brownish to blackish fins marked with green and some red spots. It looks peaceful and is peaceful

Continued on page 145

Macropodus opercularis—
male is the lower figure



Snakes for the snake pit—Part 2

by M. Peaker, B.Sc.

IN the first article of this series I described the design of a snake-pit. In this article I shall describe some suitable inhabitants for this type of reptiliary.

The majority of types suitable for outdoor life in Britain are either European or North American. Apart from climatic considerations, length is an important criterion

as the walls around the enclosure may perhaps only be three feet high. I do not advocate the keeping of venomous



Grass snake
(*Natrix natrix*)



Smooth snake
(*Coronella austriaca*)

snakes, even those of the back-fanged type as not only can their bite be unpleasant to say the least but their presence can impose an unfair risk on the neighbourhood. No venomous forms will therefore be considered. Unfortunately, a number of the less poisonous back-fanged species are sometimes sold by pet-shops without any indication that their bite can be dangerous or extremely unpleasant. The pet-shop manager is usually ignorant of the fact that they are not harmless. Several years ago I saw the Southern European Cat Snake (*Tiliocopus fallax*) in several pet-shops, all of which had bought them from one wholesaler believing them to be harmless. I understand that the venom of this species can on occasions be dangerous if sufficient quantity enters the wound, especially in a child. Fortunately, most pet-shops sell the harmless Grass or Dice Snakes.

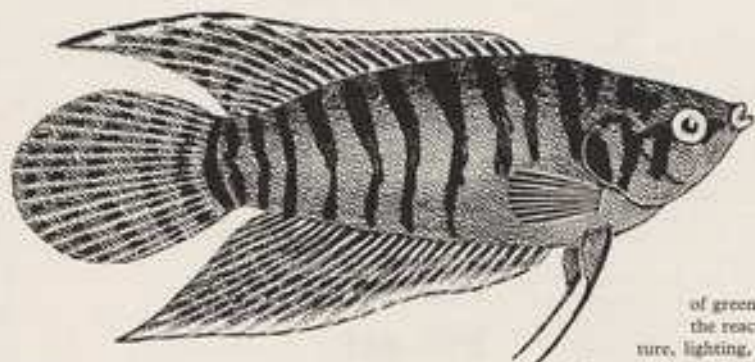
Perhaps the most suitable species are those two types together with another species making up the European membership of the genus *Natrix*. I once had a reptiliary which solely housed these three species—the Grass Snake (*N. natrix*), the Dice Snake (*N. tessellata*) and the Viperine Snake (*N. maura*)—so called because of its supposed resemblance to the Adder (*Vipera berus*). As there are a number of sub-species of the Grass Snake, these also were represented by three forms—*N. natrix*, *helvetica* and *persa* which occur in different parts of Europe. Frogs of various sizes, smooth newts (*Triturus vulgaris*), tadpoles and small fishes (mainly goldfish runts). All of these were eagerly devoured. The Dice Snakes spent a good deal

of time in the water and ate most of the fish; the Viperines preferred newts or small frogs and the Grass Snakes larger frogs. Tadpoles were readily eaten especially by smaller individuals. In a large established reptiliary, these three species made an interesting and entertaining exhibit.

Some American species of *Natrix* can also be obtained which can live outside, for example, *N. sipedon* which occurs in the northern part of the North American continent. From the same region, garter snakes (*Thamnophis* sp.) are attractive and desirable inhabitants. Some will accept earthworms as food and now that frogs are becoming increasingly more difficult to obtain, any species which will sometimes eat worms is desirable.

The Leopard Snake (*Elaphe stria*) has a reputation as a bad feeder. I have never kept one but I did advise an acquaintance to try baby (pink) mice as food for a newly arrived individual. Fortunately, these were readily accepted. Another European member of the same genus *E. longissima*—the Aesculapian Snake I have found to be a very desirable species to keep. I have never had trouble with feeding small mice for smaller individuals which can live outside.

The snakes which prefer lizards are not recommended as food is difficult to supply. Occasionally, they will accept rodents. Included in this category are the species of *Crotalia* which includes the rare native Smooth Snake (*C. asotriaca*) and the European members of the genus *Coleler*, the Whip-snakes. Sometimes an individual or two will thrive in a large outdoor enclosure.



Macropodus chinensis
(male)

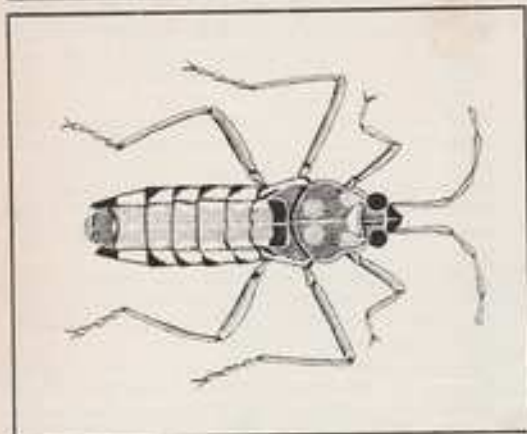
The Paradise fishes

continued from page 143

out of breeding time. It is native to Korea and the Chinese mainland down to about Shanghai.

M. opercularis opercularis and *M. opercularis dayi* (a sub-species) are peaceful too. They attain a length of 2½ to 3 in. In general they are reddish to greenish brown, with a green sheen on and about the head and two horizontal stripes

of green that come and go according to the reactions of the fish to the temperature, lighting, and one another. The pelvic fins are orange red; the other fins are grey to grey-blue with red markings. The middle rays of the caudal fin are elongated, which explains why the fish are popularly known as spike-tailed paradise fish. *M. opercularis dayi* has more red in the body and fins and is, in fact, a finer-looking fish than *M. opercularis opercularis*. Although the latter species appears to be confined only to the coastal areas of southern India, *M. opercularis dayi* is said to range as far as Burma and South Vietnam. Both these spike-tails call for a temperature above 68°F (20°C). Neither produce eggs so readily or so abundantly as *M. opercularis*.



The Junior Aquarist

Water cricket (*Velia caprai*)

The water cricket

by Bill Simms

CONSIDERING how common is the Water Cricket (*Velia caprai*, or *V. carroni*) it is surprising how little we really know about this creature. It is one of the many kinds of water-bugs a vague term used to define a number of families of insects that have adapted to water life.

Very little thorough research has been done on many of these water-bugs. For instance: we do not know for certain where the eggs of this present species, the most common of our two water crickets, are laid. It is thought probable that the eggs are laid on plants near the water but not on those actually in the water.

The adult *V. caprai* is only 7 mm long, so it will be realized that the eggs are very tiny and not easily found. A few have been hatched and grown on and the resultant youngsters have been found to go through five larval stages before turning into the adult water cricket.

These five larval stages take quite a time so that the development from the egg, through three stages to the adult and on to the second generation of eggs, takes a full year, with the mating always taking place in the spring.

Water crickets, like the pond skaters with which they are easily confused, run about on the water surface, using the skin tension of water for a support. They can also dive, however, which denotes the ability to break through this skin tension.

Their food consists of any kinds of small creatures carried along by the water, both alive and dead. Like all

other "bugs" the water cricket has a pointed mouth part with which it pierces the skin of its victim, and then sucks out the juices.

In order to catch those of its victims that are alive the water cricket has become very skilful on the water surface, being able to run against the current as easily as in any other direction.

There are two species of water cricket with the size of 6-7 mm., and three more species rather smaller, which come under the name of *Microvelia*. All these species have approximately the same habits with the exception that the three *microvelia* tend to keep to the water's edge, whereas the larger two venture over the water at any distance from the shores.

ESSAY COMPETITION

Another of our prize-winning essays

Caught in the fish net

by Malcolm Wilmore (14 years)

THE ping pong ball bounced from the blue bowl into the red and turned into a goldfish.

I had been trying to win a box of sweets by throwing a ping pong ball into a blue goldfish bowl, but now I found myself accepting reluctantly from the fair man, a clearly inedible creature who, seemingly aware that he was unwanted, gaped open-mouthed from his plastic bag.

In our garden was an old sink in which I put the brute but one small goldfish in a white porcelain tank is a lonely

sight and soon a companion was secured for him by an interested sympathiser.

Winter came bringing cold problems. An ornamental goldfish bowl was retrieved from the attic and the fish were installed. Miserably they circled their spotless prison, differing markedly from the friendly mud and dropping foliage of their former environment. I transferred them to a small tank and there they stayed until the following March when they were moved to a larger tank which I had acquired together with some artificial aeration equipment. Urged by my ever increasing enthusiasm for the hobby, I stocked my tank with tench, veil-tailed goldfish and sunfish.

In the garden I had paid no attention to live food as lots of insects fell into the sink; however, once indoors, I had to give them a balanced diet including daphnia and chopped earth worms.

After my large cold water tank, I decided to set up a tropical one. I had a mishap when my neon tetras were sucked into the filter and I had to replace them.

The tank did well until some daphnia apparently brought

with it some hook worms causing my fish to dash themselves to pieces on the rocks. This happened whilst I was on holiday and by the time I returned they were all dead. I was very upset about this but I restocked immediately after cleaning out the tank.

My tropical aquarium has now been going for two years without a hitch and I have not lost a fish. The tank is kept at 70° F and is heavily planted with *Vallisneria* and *Myriophyllum*. It is lit by a 60 watt lamp. The fish are fed on daphnia, tubifex and fine dried food.

As I have not bred egg layers yet I do not trouble with the pH and hardness level of the water. I believe in only disturbing the fish twice a day, at feeding times so as not to frighten them too much.

I am starting an Aquarist Society at school and I am making arrangements for the installation of tropical tanks there. The Society will also help any one who wants to take up this fascinating hobby.

By mid-summer I will have fitted out a tropical marine aquarium and by it's end I shall have built a new garden pond to give my first goldfish a happy retirement.

Getting under their skin

by Peter Dendy

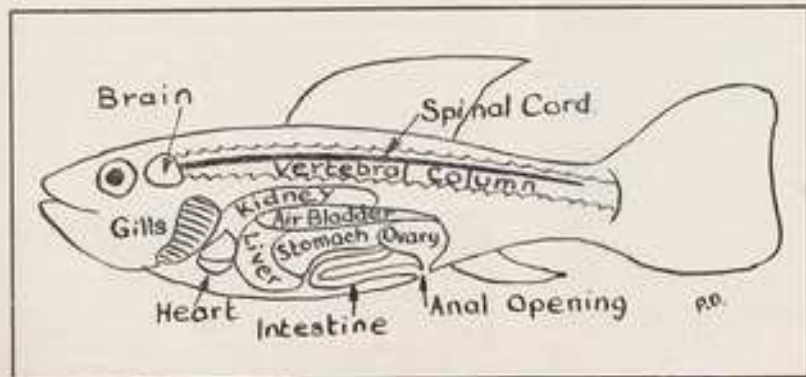
WE are apt to take our fishes for granted. We feed them, breed them, raise them, maybe show them, give them away or just ditch them when we feel like it. Some of our fishes may be able to consider themselves fortunate in their surroundings and general standard of living conditions, while it is quite certain that others, if pressed for an opinion, would hold quite the opposite view. I am thinking particularly of those that are ill-housed, overcrowded, under or over fed or merely raised to provide live food for the more favoured big cichlids.

Whatever may be the lot of aquarium kept fishes, nothing will alter their absorbing interest which repays detailed study over and over again if you are prepared to give them enough of your time. Fish play a pretty important roll

in the scheme of things forming a part of the staple diet of millions and representing one step in the ladder of evolution which produced aquarists, both the good and the bad.

The common shape of fishes is lingsh with two pointed ends kept apart by the back-bone, but of course the backbone is not only there to keep the ends apart, but also to get in the way when you are eating a kipper. The backbone or the axial vertebral column affords protection for the main longitudinal nerves and blood vessels and forms a foundation for the bony cage-like structure which gives the fish its shape as well as providing an anchorage for muscle tissue and caudal fin etc. The body cavity con-

Continued on page 150



Our experts' answers to tropical fish-keeping queries

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

I have just bought six young moonlight gouramis. How does one tell a male from a female?

A male is distinguished from a female by his brighter coloured pelvic fins, but the characteristic orange-red colour does not become very apparent until a male has reached a fair size.

Recently I acquired two angel fish, but every time I approach their aquarium they dash themselves against the sides of the glass. What can I do to cure them of this nervousness?

What you need is a thick hedge of plants to separate the open water from the glass ends. Also, plenty of vegetation at or near the surface to provide shade. With thickets of plants to slip into, and protection overhead, the angel fish will feel more secure. In due course, they will settle down in their surroundings and lose a lot of their natural timidity.

What is a variable platy?

The variable platy is just another common name for *Xiphophorus variatus* or, as it was once called, *Piaropyocilus variatus* from southern Mexico.

Over the last few months I have been rasping the green algae from the sides of my aquarium with a small wad of steel wool. When I mentioned this to my dealer he warned me that if I continued in this practice I would soon start losing lots of my fish. I should appreciate your views on this subject.

The fragments of steel wool that break off the small wad would have little or no effect on the chemical content of the water. The danger lies in bottom-grubbing fishes sucking the metal splinters into their internals. We agree with your dealer. Steel wool should be kept out of a filled aquarium.

I have two *Helostoma temminckii*, but they seem loath to accept any live-food I have offered them. What foods does this species prefer?

The kissing gouramis are largely herbivorous and flourish best when they can browse on mossy or soft woolly algae, nitella, and the like, supplemented with a fine-milled dried food or a flake food that soaks for a while before sinking to the bottom.

An *Anostomus anostomus* I have keeps chasing after some of the other fishes in my aquarium in order to nibble at their sides and underparts. What is the reason for this?

We can only guess that the slime that covers the bodies of some fishes has an attraction for *A. anostomus*. Our advice is to remove these sought-after fishes, or the anostomus, from the aquarium before harm is done.

What is an anchor worm? What does it look like?

The anchor worm—a parasite that attaches itself to fish—is not really a worm at all but a copepod, that is a member of a sub-class of the Crustacea. It is the female which does the harm. She attaches herself to a fish

and feeds on its blood. The wound made quickly becomes a banqueting table for lesser nasty little organisms. One way of removing an anchor worm from a fish is to spot the parasite with a drop of medium-strength solution of permanganate of potash. But take care that the permanganate does not run into the gills or mouth of a fish. The anchor worm looks like a small leech (about 1 in. in length) with anchor-like appendages at the head. The female produces twin egg-sacs at the tail-end of her body. The larvae that develop from the eggs swim around until they in turn find a fish to feed on.

Is the bulk fibre offered for sale in florists' shops suitable as a rooting medium for cryptocorynes?

We do not recommend bulk fibre as a rooting medium for aquarium plants. For one thing, a lot of the fibrous strands continue to decay under water and give rise to noxious gases. For another thing, various fertilizers are usually added to fibre mixtures to help along the bulbs for which the medium is intended. Too much of a good thing can quickly destroy the clarity of aquarium water and cause trouble among the fish.

Is it true that water plants will not grow in a tank devoid of fish?

Water plants will grow in any tank, provided the light is right for them and the nutrients are there to keep them going. Ordinarily, the rich droppings of well-fed fishes supply the plants with food, just as plenty of manure supply good vegetables or garden plants. If you remove the fish from an aquarium and introduce a small quantity of loam or clay in their place the plants will go on as before.

Does the frequent feeding of brine shrimps over a protracted period lead to an unsuitable environment for the fishes? A fishkeeper I met in a dealer's shop told me he stopped feeding brine shrimps on this account.

If you mean does feeding brine shrimps in any quantity alter the chemical composition of the aquarium water, the answer is yes. The smaller the aquarium is and the more lavish you are with the shrimps the faster the change will come about. A slow and reasonable increase in the salinity of the water will not harm salt-tolerant fishes, but those species that do not like salt, and certainly most aquarium plants, will suffer if the salt content keeps mounting up.

Is the firemouth cichlid peaceful enough to live in a community tank?

Individual firemouth cichlids differ greatly in temperament. Some of them seem to go through life quite willing to let other fishes swim around unmolested. Others become spiteful as they increase in size and snap at their companions. Young firemouths, however, are usually quite harmless in a community tank stocked with robust fishes of about their own size.

Some sticklebacks in a local brook are as spectacular in appearance as many tropical fish. Would it be possible to acclimatise some of these well-coloured sticklebacks to a heated aquarium?

The stickleback can stand a reasonably high temperature during the summer months, but you must bear in mind that it is a coldwater species and soon weakens and dies if it is denied access to cooler water. A tropical tank is no place for it. Incidentally, the male stickleback is the one with the lovely colours. The female is quite drab.

THE AQUARIST

Coldwater fish-keeping queries answered by A. Boarder

I have read recently in *The Aquarist* that soil can be put in the bottom of a tank. Will this not discolour the water?

If a little soil is placed near the back of the tank back and it is well covered with coarse sand it should not discolour the water at all. Pour the water into the tank onto a piece of flat board so that the bottom is not disturbed. After a couple of days the water should be quite clear and remain so.

I have a pond about 7½ ft. long by 4 ft. wide and about 3½ ft. deep. I have 72 fishes in it varying from half-an-inch to eight inches long. Could I add two *Coveras* and is there any special treatment required by Hudd and Orfe?

I think that you have quite enough fishes in your pond without adding any more. There is no point in stocking a pond to capacity. A few fishes will live happier and healthier than a large number in over-crowded conditions. Remember, that if the fishes are to keep healthy and grow they must have plenty of swimming space. The rudd will eat most foods as taken by goldfish and the orfe will also eat the same. However, orfe are very fond of all types of live foods and will thrive and grow much better if they get plenty of worms, etc. They also like a well-oxygenated water and are soon in trouble if the water gets foul or too warm.

We have a mill pond 50 by 40 yards and about 2-3 feet deep. There are some Roach, Stone Loach, Sticklebacks, and a few Tench and Perch. These fishes are badly infested with fish lice (*Argulus*). There have been some before but never on this scale. Can you suggest any means of clearing away these pests?

You have a major problem in so much water. To clear fishes of lice when in a tank or a small pond is an easy task but in your case it is very difficult to cope adequately. If you could catch some of the fishes to keep as stock, then empty the pond and let it dry tight out, you could probably clear away all the pests. The *Argulus* could not survive a drought nor could their eggs. The lice only leave a fish to lay their eggs and this is when they might be eaten by such fish as Minnows. I think that small Perch would also eat them. A fairly strong solution of permanganate of potash could kill the lice but it would be very difficult to make a solution which could take effect in so much water. If any fishes had lice on them when they were caught these could be picked off with tweezers or if the fish was immersed in a solution of Dettol, a half teaspoonful to a gallon of water, the lice would leave them immediately. The fish must be watched whilst in the solution and returned to fresh water within a minute or two, and at once if the fish turns over. I do not like Sticklebacks with other fishes as they often carry parasites and diseases, but if not fed by any other means could be eaten by Perch. I have often found them in the stomachs of Perch, although their spines might have been thought too sharp. If Minnows were put in the pond to eat the lice, they in their turn could be eaten by the Perch.

I intend setting up a few coldwater tanks and would like to know how large Peacock-eye and Diamond Bass can grow, also Tench and Moors?

The Peacock-eye can grow to six inches but four is about the usual in a tank. The Diamond Bass or Sunfish grows to about four inches. Tench could grow to a foot long or more and weigh several pounds. They should be placed in a pond as soon as they reach four inches long overall. Moors are fairly old when they reach four-inch body length.

I set up a tank 18 x 12 x 12 in., with 7 fancy goldfish. I have had a bad attack on the fishes of fin-rot and have lost several fish. What can have gone wrong?

In the first place I think that any tank under 24 x 12 x 12 in. is much more difficult to keep in good order than

one of that size or above. The size of the fish was not given and as the tank should not hold more than 9 in. of fish it is possible that you were over-crowding. Once this happens it is surprising how soon something starts to go wrong. There is one very important point about fish keeping and that is unless fish have sufficient swimming space they will not thrive, this in spite of aeration or filters. Fish in a crowded state are soon prey to any disease which may crop up. They have a natural mucus protective covering which acts as a repellent to many diseases. Once a fish gets slightly out of condition this mucus either becomes weakened or deranged. It is then that germs etc., can get a hold and the fish becomes ill. Obviously if one fish in such a tank becomes infected or infested the trouble can soon spread to any other fish in the tank. Set your tank up afresh and only have two or three small fish. Do not over-feed and all should be well.

One of my goldfish is swollen on one side. What is the cause? It is probably that the fish is a female which is full of eggs. These fish often show a pronounced swelling on one side more than the other.

I have a bath in my garden I use as a fish pond. Some of the fish have white mould on them and are very sluggish. What is the matter with them?

The fish have a disease called Velvet disease, Oodinium. This is often caused by bad conditions and it may well be that your bath is too small for the number of fish you have in it. You should not have more than half a dozen three-inch goldfish in the bath and you must not give too much dried food or the uneaten food will soon turn the water sour and the fish will die.

I have a pond which has a weeping willow tree hanging over it. The leaves fall into the water and I am afraid they will pollute it. I do not want to remove the tree. Is there anything I can do?

Apart from netting the pond when the leaves are falling you will have to use a net and catch them up each day before they sink to the bottom. They are not likely to do any harm until they sink and start to decay.

Could the Peacock-eyed Bass be included in a class for Carps and Minnows?

Sunfish are usually included in the class for any other species or variety of coldwater fish.



Sunfish (*Lepomis gibbosus*)

Marine queries answered by T. Ravensdale

How does organ pipe coral grow and where does it come from?
Organ pipe coral (*Tubipora hepatica*) belongs to the sub-class Octocorallia. It comes from practically all the warm oceans and can be found on practically any reef. It does however take 'root' on almost any object and can even be found growing on dead crab shells or rocks. When alive organ pipe coral is green, the live polyps protruding from the tubes of their dead parents.

I understand that Sea fans are the skeletons of live animals rather like coral, is this true?

Sea Fan (*Gorgonia flabellum*) is not only similar to coral—it is coral! It does not however grow on the coral reefs but anchors onto the floor of the ocean, mainly in the East Indies, on the Continental shelf. When alive this coral is covered both sides by a colony of polyps which can retract into the safety of the skeleton structure formed by the skeletons of its parents.

How large can the Opelet anemone grow and is it a tropical anemone?

The Opelet (*Anemonia sulcata*) can reach a diameter of eighteen inches and comes mainly from the Mediterranean Sea. It can therefore be regarded as tropical. Opelets can however be found in English waters and these are smaller and, needless to say coldwater specimens.

What is the correct name for the so called 'spider shells' and Murex shells?

The spider shells are scientifically named *Pterocera* species and hail usually from Tahiti. There are many shells known as 'Murexes' but the most common import to Great Britain is *Murex approximatus*. Others are *Murex saxifera*, *Murex micropylus*, etc.

Is it possible to keep an octopus in the aquarium?

When you say an Octopus you are covering an immense field for there are over five hundred species alive today (and ten thousand extinct species!) but I imagine you mean the common octopus (*Octopus vulgaris*). Whatever you mean I feel the possibilities doubtful for the octopus is an extremely intelligent and nervous creature. The London Zoo loses most of its specimens through visitors photographing them with a flash or tapping on the glass. That's how delicate they are. The common octopus grows to about three feet and requires a vast supply of shellfish. With its enormous strength and extraordinary ability to squeeze through the tiniest cracks a very substantial top should be placed on the aquarium or the creature will get out of the tank and crawl away to die in the cold.

Getting under their skin

continued from page 147

raising the vital organs is housed within the bony cage in the lower anterior part of the body.

To survive at all a fish requires to extract oxygen from the water which it does by taking water in through the mouth and passing it backward over the gills and ejecting it again. The gills are broad and flat and a dense red, formed like a fringe, containing numerous finely divided blood vessels. The heart pumps blood to the gills where it passes along the fine blood vessels through which oxygen is absorbed from the water. The blood stream is then distributed to the different parts of the body and the oxygen is used up for the production of various forms of energy, after which the blood returns to the gills for re-oxygenation.

The gills are provided with protection externally by the operculum or gill cover and internally with gill rakers to prevent the passage of food through the gills themselves. The gill rakers are in the form of a row of short, stiff rods on the inner face of the gill arches and when food and water are taken into the mouth the gill rakers retain the food until it is brought against the opening of the gullet and is swallowed. Under normal conditions the front of the gullet is kept closed to avoid taking unnecessary water into the stomach.

Food passes down the gullet into the stomach which may be a U-shaped organ or merely a sac of quite small size. The stomach walls contain gastric glands for digestion and vary greatly in character depending on the normal type of food eaten by the particular variety of fish. From the stomach food passes to the intestine in liquid

form where the goodness in the food is assimilated and passed for absorption by the blood, which in turn circulates it through the body for the production of tissue and energy. The length of the intestine varies greatly, being dependent on the staple diet of the fish. Species which feed almost exclusively on other fishes are provided with very short intestines, whilst vegetable eaters have a lengthy intricately coiled intestine to provide a far greater area of absorptive surface. The intestine terminates directly at the vent for the expulsion of waste matter.

The heart is situated behind and below the gills and is provided with three or four chambers to take care of the circulatory system of the blood. Fish are provided with an air bladder to control their buoyancy, which is arranged to be neutral in most species. The action of the air bladder is quite delicate and surprisingly quick in effect, which is easily demonstrated.

If a fish is placed in a closed container with a piped connection and the pressure is increased by blowing, the fish will tend to sink for a short while until the compensation mechanism comes into operation and the air bladder restores the equilibrium. When the pressure is released, the reverse will be seen to happen. In some fishes the air bladder is used as a secondary means of respiration and the walls are well endowed with a network of fine blood vessels to absorb the oxygen. Fish may gulp air into the gullet for this purpose particularly if the oxygen content of the water is low. The anabantids also have a dual breathing mechanism as in addition to the gills they are equipped with a labyrinthine organ for storing atmospheric air.

Aquaria and zoo guide

CHESHIRE

North of England Zoological Society, Zoological Gardens, Upton-by-Chester, Cheshire. Admission charge—to Gardens: Adults, 4s.; children under 14, 2s.; to Aquarium, 6d. Open daily throughout the year from 9 a.m. to dusk. Party terms (parties of 25 and over): Adults, 2s. 6d.; children under 14, 1s. 3d. Aquarium admission 6d. No reductions for parents. Description: Mainly tropical freshwater fish. 179 species of fish. Collection of fish, 2,400. Improvements have been made to the marine section and it is hoped that new stocks will be arriving soon. Some interesting species have been added to the freshwater collection including *Colomesus*, *Betta*, *Latesila*, *B. Molina*, *Betta*, *Cnemidophorus*, *B. Fasciatus* and *B. Stoliczka*.

DERBYSHIRE

Pan's Garden—Zoological and Botanical Gardens (including an Aquarium), Ashover, Chesterfield, Derbyshire. Admission charge—Adults, 2s. 6d.; children, 1s. 3d. Open 11 a.m. to dusk every day of the year. Description: The aquarium section of the Zoo comprises 12 tanks and a floor pool, and includes coldwater, tropical and marine sections. We endeavour to exhibit terraria, such as anoles, clawed frogs, piranhas, paradise fish, dragon fish, sea horses etc., rather than the more common species.

DEVON

Ramoth Aquarium, Sea Front, Bournemouth, Devon. Admission charge—Adults, 1s. 6d.; children, 6d. Open 10 a.m. to dusk every day, May to September; week-end during winter. Party terms on application. Description: 30 tanks ranging from 24 by 12 in. to 17 by 7 by 10 in., housing our giant turtle measuring 9 ft. long by 3 ft. Sea horses, local fish, also tropical and coldwater exhibits. Seawater is pumped up from the sea through a 700-ft. long pipe. Aquarist's shop adjoining.

Paignton Zoological and Botanical Gardens, Paignton, Devon. Admission to Zoo, 5s.; Aquarium, 6d. Open daily at 10 a.m. Party terms: Reduced rates for parties over 30 into Zoo. Description: Tropical plant house, reptile house and aquarium. 37 fish tanks showing 150 fish of 43 species, 7 terrarium tanks and 25 reptile cages 174 reptiles of 62 species. Expected soon: Estuarine crocodiles, soft-shelled turtles, and mangrove snake. Most important exhibits: Matamoras terrapin, 20 ft. reticulated python, electric eel.

Paignton Seashore Aquarium, Paignton Harbour, Paignton, Devon. Admission charge—Adults, 1s. 6d.; children, 9d. Open every day including Sundays, 10 a.m. to 10 p.m. Party terms: Organised parties 6d. per head. Description: Each aquarium tank illustrated by models and information to explain facts of the living organisms. Large number of educational exhibits explaining local seashore life. All specimens are from immediate local waters. Filming studio on premises where television (B.B.C. "Look" series) films are made about marine life.

Taignton Aquarium, The Den, Taignton, Devon. Admission charge—Adults, 1s.; children, 6d. Open every day including Sundays, 10 a.m. to 10 p.m. Party terms: Organised parties 6d. per head. Description: Each aquarium tank contains local seashore life. A large number of educational exhibits explain local marine life with excellent display among others.

Marine Biological Association of the United Kingdom, Citadel Hill, Plymouth, Devon. Admission charge—Adults 1s.; children 6d. Open weekdays 10 a.m. to 6 p.m. (May to September to 8 p.m.). Party terms: Reduced rates by prior arrangements by letter to the Director. Description: Local marine fishes and invertebrates displayed exceptionally well in an aquarium of modern design. Sevenson tanks, largest approx. 30 ft. x 9 ft. x 5 ft.—42 ft. deep; smallest approx. 1 ft. 6 in. x 1ft. x 1ft.

EDINBURGH

The Carnegie Aquarium, The Royal Zoological Society of Scotland, Scottish National Zoological Park, Murrayhall, Edinburgh, 12. Admission charge—Adults, 6d.; children, 3d. Open every day of the year. Summer 11 a.m. to 6.45 p.m. Winter 11 a.m. to dusk. Party terms: none, except for Edinburgh Corporation Schools. Description: Consists of three large halls. Tank devoted to marine exhibits including green and black-billed turtles, conger eels, lobsters and crabs etc., and many sea fish. Freshwater specimens include electric eels, lung fish, giant salamander, giant catfish. Large variety of brilliantly coloured fish, both coldwater and tropical.

ISLE OF MAN

Marine Biological Station (University of Liverpool), Port Erin, Isle of Man. Admission charge—Adults, 1s.; children under 14, 6d. Open Monday to Saturday, 10 a.m. to 5 p.m. all year. Party terms: Organised educational parties admitted free if prior notice given. Description: Marine, 6 large and 10 smaller tanks. Good display of local fish and invertebrates. Plaster terraria.

LANCASHIRE

The Tower Aquarium, Tower Main Buildings, Blackpool. Admission charge—Adults, 5s.; children, 1s. 6d. This includes general admission which includes Tower Ballroom, Zoo, Avistron and Ocean Room Cabaret. Open 9 a.m. to 10.30 p.m. Sunday to Saturday. Description: Aquarium founded in 1924. Consists of a central block of twelve large tanks with 58 smaller tanks on the outer walls. The total collection is 348 species of fish and 24 species of invertebrates. Latest addition, Chinner grass carp (*Carpomyxodon salmoides*), *Clarias* (*Clarias asotensis*). Aquarium speciality: British marine fish.

Marine Land, Seaside Jetty, Morecambe, Lancashire. Admission charge—Adults, 4s.; children, 2s. Open daily from 10 a.m. Party terms: Parties of 25 or more, 3s. and 1s. 6d. Description: Europe's first Oceanarium; also wide collections of marine and freshwater tropics. Local fish and coldwater fish, seals, sea lions, penguins, alligators, turtles and dolphins. Sea circus daily at 11.15 a.m., 2.15 p.m. and 4.15 p.m. with performing clowns, sea lions and dolphins. Newly arrived: "Clapper," star dolphin performer from New York's World Fair.

Belle Vue Zoo Park Aquarium and Reptilium, Manchester, 12. Admission charge—Adults, 1s.; children, 6d. Open daily 10 a.m. to 6.30 p.m. General admission to Park 3s.; children, 1s. 6d. Party rates (25 or more): Adults, 2s.; children, 1s. 3d. Admission to Aquarium and Reptilium: Adults, 1s.; children, 6d. Description: Three halls of tanks ranging from 25 to 1,500 gallons exhibit familiar favourites of the tropical freshwater world, fishes of the coral seas and specimens from our own coastal waters, rivers and lakes. Continuing through the Reptilium, a wide range of snakes, lizards, terrapins, monitors and the new world-famous breeding alligators may be viewed.

LONDON

The Aquarium of the Zoological Society of London, The London Zoo, Regent's Park, London, N.W.1. Admission charge—Adults, 3s.; children, 1s. Open throughout the year (except Christmas Day) from 10 a.m. to dusk (closing time of main Zoo at dusk or 7 p.m., whichever is earlier). From Good Friday to September, just admission to Aquarium is 7.15 p.m., closing time 7.45 p.m. Description: Marine and freshwater: 130 tanks ranging in length from 12 inches to 30 feet. Marine Hall with fish and invertebrates from tropical and temperate waters. Tropical Hall with many primitive freshwater fish and an aquarium over 4 feet long. Temperate Freshwater Hall with representative collection of European and other fish; also aquatic amphibians.

SURREY

Chessington Zoo Ltd., Leatherhead Road, Chessington, Surrey. Admission charge—6d., adults and children. Open week-ends in March. Closes to 31st October, 10.30 a.m. to 3.30 p.m. early season, 4.30 p.m. full season. Party terms: 3d. each adult and children for parties of 20 or more. Description: Chessington's Aquarium, although small, has a varied collection of coldwater and tropical fish (500 in 70 species) kept in 26 tanks varying in size 24 by 12 by 18 in. to 66 by 12 by 24 in. Amphibians and reptiles are also on display as at the moment there is no separate Reptile House.

SUSSEX

Brighton Aquarium, Marine Parade and Madeira Drive, Brighton, Sussex. Admission charge—Adults, 2s.; children, 1s. Open every day of the year 9 a.m. to dusk; Christmas Day 9 a.m. to 1 p.m. Party terms: Adults, 1s.; children, 6d. Description: 12 freshwater tanks, two large enclosures, containing carp, eels and bream; 10 marine tanks, specimens added as available; 12 tropical tanks. Lung fish and plaques are recent arrivals. Other large tanks contain harbour seal and turtle. A sea-ben pool (great attraction to visitors).

WORCESTERSHIRE

The Dudley Zoological Society Ltd. (The Aquarium), 2, The Broadway, Dudley, Worcestershire. No admission charge to Aquarium. Open Monday to Sunday, 10 a.m. to 6 p.m. (during summer months) 10 a.m. to 4 p.m. (winter months). Party terms: 2s. 10s. Adults or children or mixed: Adults, 5s.; children, 1s. 4d. 10s. 25s. Adults, 2s. 6d.; children, 1s. 3d. 25s. 50s. Adults, 2s. 3d.; children, 1s. 3d. and over; Adults, 2s.; children, 9d. Description: Built in the Castle Creeps, the Aquarium contains 59 tropical tanks (one marine) and 18 coldwater. Several amphibians, as well as invertebrates, are also displayed. Heating is achieved by both gas boiler and electric tubular heaters. Interesting specimens include an electric eel, an African lungfish, and a 24 lb. black "dunk."

Discovery of fossil fishes

by Michael Lorant

DR. BOBB SCHAEFFER, chairman and curator of the Department of Vertebrate Paleontology of The American Museum of Natural History, New York, has recently discovered six new kinds of fossil fishes in ancient pond and stream deposits in Colorado, Utah, and Texas; also collected several hundred other specimens of fishes that lived about two hundred million years ago during the last part of the Triassic Period.

The specimens from Colorado and Utah represent the largest single fish collection ever found in a series of sedimentary rocks called the Chinle formation. The Texas specimens are among the finest examples from a rock unit of the same age, the Dockum formation.

In addition to the six new genera, the remains of two previously known genera were found. Only one of these ancient fishes has a living relative.

Dr. Schaeffer has been alerted to the presence of the fish beds by geologists who were investigating the distribution of uranium ores in the Colorado Plateau. The beds are located in remote areas in Dolores Canyon near Bedrock, Colorado, and in Big Indian Valley, Utah.

The Texas fossils come from a Triassic-pond deposit near Big Spring in Howard County.

During the Upper Triassic period, the areas where the fossils were found were part of a vast lowland flood plain with streams and shallow ponds. The climate was semi-tropical with alternating wet and dry seasons. Many of the fishes were concentrated in drying streams and ponds. At one locality in Big Indian Valley, Utah, the underside of a rock overhang was covered with 25 to 35 fish per square foot.

Dr. Schaeffer describes his fishes as rather small, with characters that suggest most of them were browsers or grubbers. The only large fish is a coelacanth, which probably reached a length of three feet. It is the only fish among his discoveries that has a living relative today.

The most exotic member of this ancient assembly is a deep-bodied creature that has scales only on the front of its body. The absence of scales on the posterior portion probably increased flexibility of this area and provided greater forward thrust.

A character shared by some of these primitive fishes is a bony snout covered with tubercles. One well-preserved skull from Texas shows the pointed tubercles particularly clearly. According to Dr. Schaeffer, they may have been embedded in a fleshy upper lip.

The fish are in all stages of preservation ranging from the actual bone to impression in the rock. Some are complete skeletons but others are represented by isolated skull parts, scales, or fins. Almost all of the specimens were compressed by the weight of the overlying sediments.

In comparing these fishes to Upper Triassic specimens

from the north-eastern United States some 1,700 miles away, the American scientist found that two of the genera are identical, while several others are closely related.

The southern aeshna dragon-fly

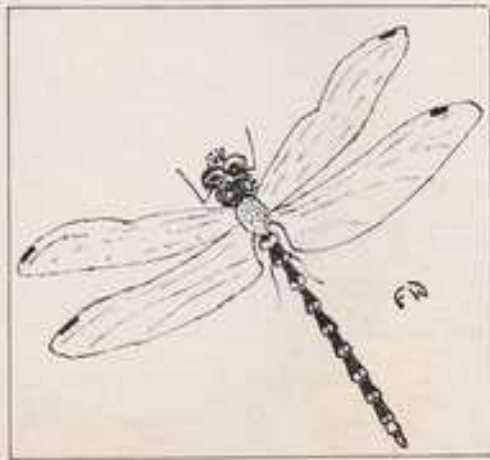
By F Wilmot

THIS large dragon-fly is one of the "Hawker" species and its main colourings are dark brown and either blue, yellow or green, according to sex and age. There is sufficient of the lighter colouring, however, to make it a brilliant dragon-fly.

The southern aeshna, as its name implies, is common over most of Southern England also the Midlands, but is not found in Scotland or Ireland. It is found in most of Europe, also in parts of North Africa and Asia Minor.

Besides "hawking" over stretches of water *Aeshna cyanea* occasionally turns its attention to patrolling lanes and hedgerows, when a butterfly will sometimes be one of its victims. It is also sometimes seen flying in towns, and will even occasionally enter houses.

This dragon-fly is usually on the wing only from early July to early September, but will sometimes be visible (if the weather is suitable) up to late October. The nymph (or immature form) is coloured brown and green, and lives in ponds and other still water. It seems to have no objection to living under crowded conditions, and can often be found in very small garden ponds.



THE AQUARIST

What is your opinion? No. IV

By B. Whiteside

IN the second article of "What is your opinion?" I posed problems on (1) how to grow *Cabomba* and *Linnophila*, and (2) results obtained by using different forms of aquarium lighting.

From Mr. N. A. Clark of Abbey Wood, London, came the first letter telling of his 36 in. x 15 in. x 12 in. tank which is fitted with a power and an undergravel filter, and which has the water kept slightly acid by using two commercial brands of aquarium liquid preparations every fortnight. Mr. Clark's aquarium receives a little natural light which is supplemented by artificial illumination each evening for two hours with two 25 watt bulbs. He cannot grow *Cabomba* although other plants, including water wistaria, grow quite well. Mr. Clark is amazed when he enters his local pet shop and sees tanks with an abundance of *Cabomba* looking magnificent.

Mr. J. V. Jeffery of Southbourne, Bournemouth, has had little success worth writing about in growing *Cabomba* or *Linnophila* (*Ambulia*). In answer to the second question, Mr. Jeffery has found by experience, that there is no hard and fast rule as regards lighting aquaria but thinks that the best place in which to set up aquaria is somewhere where natural sunlight never falls directly upon them. He decided to move his tanks to a fish house, the windows of which he fitted with curtains. He now only opens the curtains when he is working in his fish house. This has cut down the growth of algae and any abnormal growth is the direct result of incorrect top lighting. Mr. Jeffery has experimented with tungsten bulbs of varying wattages for varying periods but finds that results also vary a lot. He also used tungsten strip lighting but found that, although there was a more even distribution of light, the strip lighting gave no apparent benefit to the plants.

Another letter which I received came from Dr. C. D. K. Cook, of The Hartley Botanical Laboratories, The University of Liverpool. Dr. Cook is at present professionally engaged in writing a monograph of the genus *Cabomba*, and has studied it in its native habitats in South America and in cultivation at The University of Liverpool. He states that in nature *Cabomba* is a large plant but does not necessarily need deep water. He has found plants growing in water from 6 ft. to 6 in. deep. When mature, the stems are up to 10 ft. long and the plant seems to grow best when the stems straggle in a tangled mat along the water surface although, as Dr. Cook states, this state is hardly desirable in the aquarium as the stems that are rooted in the bottom are almost invariably without leaves.

Dr. Cook continues by saying that in the aquarium, plants of *Cabomba* must be constantly repropagated by breaking off apical parts of the plants when they reach the water surface, and replanting these apical portions in the bottom of the aquarium. He has tried many different

methods of cultivation of *Cabomba* and has discovered that, despite what two famous authorities say, all species grow best in the following conditions:—(1) Depth of water: immaterial—he uses a depth of 6 in. to 9 in.; (2) Potting medium: as the plant feeds through its roots, he uses John Innes potting mixture (lime-free) and plastic plant pots. The surface of the compost is covered with between $\frac{1}{2}$ in. and $\frac{3}{4}$ in. of granite (lime-free) chips to prevent the compost from clouding the water; (3) Water: he uses tap water filtered through peat, which gives a pH of about 5.5. Although, as Dr. Cook says, this is very acid, he finds that the following fish thrive in these conditions, *Xiphophorus* (*Platypleurois*), *Gymnocorymbus*, *Puntius*, *Apistogramma* and *Acanthophtalmus*. He continues by observing that *Cabomba* seems very sensitive to most dissolved inorganic salts, and very small quantities of calcium will cause it to become brittle and die; (4) Temperature: a wide tolerance, 18°C (65°F)—35°C (95°F). He uses mostly 26°C (78°F); (5) Lighting: Dr. Cook finds this is very important. If insufficient light is given, the plants soon become "leggy" and one cannot propagate from "leggy" stems. Natural sunlight is best (in a heated greenhouse—it does not like cold draughts). He has experimented with many kinds of artificial lighting. Gro Lux tubes (in answer to my second question) are the best type of light on the market but they have a rather low light intensity and for best results should be mounted touching and kept about 2 in. above the water surface, i.e. eight 4 ft. tubes for one 12 x 48 tank. This, as Dr. Cook says, is somewhat expensive and he finds that mixing Gro Lux with de lux Warm White is just as effective. He continues by stating that *Cabomba* will not last more than a few months with tungsten lamps alone.

Dr. Cook has ordered a number of different species of *Cabomba* from dealers but so far has only obtained *C. caroliniana* and *C. planyensis* from British firms. He does not believe it possible to determine the species of *Cabomba* without flowers, despite what the books say.

Linnophila (*Ambulia*) he says, is a very good aquarium plant and will grow under a wide range of conditions as long as it gets enough light. As soon as the stems of *Linnophila* reach the water surface, they should be cut off near the base, or the stems will leave the water and grow in air. In nature, it is a weed of the rice fields and grows most vigorously above the water surface. It is best propagated as a land plant in a tropical greenhouse. *L. senflora* is, perhaps, Dr. Cook considers, the best species. He ends by saying that although it is rarely offered for sale under this name, this is the species which one usually gets.

Continued on page 155

Champion of Champions contest



The interest created by the various announcements which have appeared has already highlighted this contest as the outstanding event in the aquarist world this year. All entries for the contest will come from the winners of the "Best Fish in the Show" award at the Open Shows. The "Champion of Champions" contest will be held at Belle Vue, Manchester on the 28th-29th October.

A list of those so far eligible for entry at the time of this issue going to press, appears on page 159.

The awards which will be presented to the winners are shown below.

Award to winner of THE CHAMPION OF CHAMPIONS CONTEST

The winner of the 'Champion of Champions' contest will be awarded a Hall-marked 9ct gold lapel pin in the shape of *The Aquarist* badge inscribed—"Champion of Champions". Laurels support this badge to differentiate between the 'Champion of Champions' and the 'Best Fish in the Show' awards. A cash prize of twenty guineas together with an inscribed plaque will also be awarded.

The first prize in the contest will be an oxydised silver-plated plaque mounted on a hand made Indian Rosewood back, a cash prize of 20 guineas and a solid gold pin as described above.

Second prize. An oxydised silver-plated plaque mounted on a hand made Indian Rosewood back together with a cash prize of thirteen guineas.

Third prize. A plaque similar to that of the second prize and a cash prize of seven guineas.

The plaques are inscribed with the name of the recipients and the position gained in the contest.



The blind cave characin

by Michael St. John



The blind cave characin



IN one sentence, the blind cave fish is unusual but inexpensive, completely amiable to all but the smallest fish in a community tank and comparatively easy to breed and raise.

An attractive fish, *Aplocheilichthys jordani* is silvery-pink in colour and has an adipose fin which is typical to many of the characins. *A. jordani* is thought to have evolved from *Astyanax mexicanus* when some of the latter got lost in some dark Mexican caves where the use of eyes was no longer needed. Where the eyes once were, there now remains only two empty sockets. But don't for one moment feel sorry for him. *A. jordani* has such highly developed senses of touch and smell that he rarely bumps into anything and makes an excellent scavenger by systematically scouring the bottom of the tank for food missed by the other inmates.

Spawning is a fairly simple affair. I use a 12 or 15 gallon tank with a double layer of marbles, or one of the other recognised egg-saving devices, as the breeders will eat every exposed egg. Plants are not needed. I have found that water which has an approximately neutral pH and a fairly high DH at about 75 F. to be very satisfactory.

With a maximum length of about 3½ inches, the blind cave Characins are easy to sex, the females being much plumper than the males. A well-conditioned pair, at least 2½ inches long, should be placed in a dark or dimly-lit aquarium. They might circle each other for some time but will eventually come together and as they rise to the surface, the female expels her eggs and the male fertilises them.

Providing the fish are removed as soon as spawning is completed, there could be as many as 800 eggs left. The

same fish should be ready to breed again in a month.

Within 72 hours hatching is complete and after six days all the fry should be free-swimming. They grow fast on a first food of "liquifry" for egglayers and after three or four days on this they will readily take newly hatched brine shrimp.

One slight setback: growth is seldom uniform but I have found that sorting the fish by size easily overcomes the problem and in four or five months the fish are ready for the dealers' tanks.

What is your opinion? No 4

continued from page 153

I would like to thank the writers of the above letters for the information with which they have supplied us. I will not add any of my own views as the information supplied by Dr. Cook is as comprehensive as we could wish for.

Let us have your opinion on the following two questions for the next article:—(1) **How do you deal with the problem of unwanted snails in your aquaria?** and (2) **What success have you had in breeding some of the more "difficult" kinds of fish such as neons, cardinals etc.?**

Breeding of the lake Malawi cichlids

by Jack and John Cooper, Joint Show Secretaries, Mid-Herts. Aquarist Society



◀ *Pseudotropheus auratus*
—the female of the
species

LAST year, by mutual consent, we decided that our 1966 holiday would be the year that we would make a grand tour of as many dealers' establishments as possible, to try and find some unusual fishes to attempt to breed with—just something that had not been heard of before, so that we had to start from scratch when trying to get them to breed—no text books to give the right line.

What a hope, I thought to myself but on a visit to a well-known dealer in Birmingham who deals mostly in marines, I saw some fishes that were so colourful to look at that I turned to my son and said "More marines I suppose", but on enquiring from the 'guvnor' of the establishment was informed that these were the new Lake Malawi cichlids which had just been imported from Germany and gathered that as far as was known, these fish had not been bred at that date. Oh! what a chance! Maybe the price is best left out of the picture, but I assure you that two very happy men left this establishment with two pairs of these fish in two different species, namely *Pseudotropheus trewavasae* and *Pseudotropheus auratus*.

Right, now we had the fish, what was likely to be their spawning habits? Would it be in the usual cichlid fashion? But first things first—your fish must be happy as it is our contention that a happy fish is much more

likely to spawn, and as we have found that cichlids normally like flower pots to spawn in we put two in each tank, one at each end. These the fish took to immediately and seemed to settle down fairly easily. So far so good; now what about the water? Let's try hard alkaline water with an additional small amount of sea salt to bring up the mineral content, the reaction of the water was pH 7.2 hardness 230 p.p.m. with a temperature of 78°F.

Pseudotropheus trewavasae

These fish are about four inches long. The male is a beautiful electric blue with a vivid red dorsal fin. The female in comparison is rather drab, being a mottled tan brown with some black.

We found that this pair were very peaceful towards each other and did not dig up plants. By the end of December 1966 we had spawned this pair of fish twice resulting in a first brood of sixteen and a second brood of thirty six. These fish are mouth-breeders and incubated their eggs for 32 days.

Pseudotropheus auratus

These are a completely different "kettle of fish", being

both extremely aggressive and avid diggers and will not tolerate plants. If any are introduced into the tank they will immediately uproot them.

Of all the new Malawi cichlids we think that these are the most beautiful of them all, the female being predominantly bright yellow with jet black longitudinal lines, with a black edge to the dorsal fin, whilst the top half of the caudal fin has numerous black spots with the lower half a clear deep yellow. The male when in breeding condition is similarly marked with the exception of the lower half of the body which is a very dark navy blue with a single pale yellow spot on the tip of the anal fin, similar to the other mouth-breeding species.

Unlike the *tremasias*, we were not able to leave this pair together and their 36-inch tank was divided in half with a glass partition allowing the fish to become accustomed to each other without any damage being done. The tank was set-up with numerous rocks and a flower pot in each compartment and with a gravel base. The water reaction was left at pH 7.2 and hardness 230 p.p.m. with a temperature of 78°F. The fish were conditioned on tubifex worms, white worms, daphnia and scraped beef—what appetites!

When it was noticed that the female appeared full of roe we removed the glass partition and awaited results, only to see the hen bullied to such an extent that the male would surely have killed her if we had not separated them. About two hours afterwards we noticed the female, with her ovipositor slightly down, trying to get to the male and

the male on the other side trembling violently with his body slightly curved as though displaying to his partner. The partition was immediately removed and this time harmony reigned with the male continually displaying to his partner, periodically trembling violently on a steep incline he had made with the gravel, after a few minutes the female swam to this incline and started to make a typical cichlid laying run with the male following close behind—but NO eggs—next time round—success—eggs appeared, about five in number; these were opaque fawn in colour and about $\frac{1}{32}$ nd of an inch in diameter. They were immediately fertilized by the male with the female following close behind, gathering the eggs into her mouth. Ten or twelve runs occurred in this manner and by the end of the spawning the female's mouth was really bulging with eggs. The male then started to get very aggressive again and so had to be removed.

The incubation period took 23 days, during which time the female refused food completely. When the youngsters appeared they were exact replicas of the female and approximately a quarter of an inch in length. Unlike the youngsters of the *tremasias*, the young *auratus* showed no inclination to return to their mother's mouth, in fact, when she approached they scattered. For the first two days the young were fed on newly hatched brine shrimp, progressing to chopped tubifex and white worms and within a fortnight they had almost doubled their size. At the time of writing this article 55 youngsters of *Pseudotropheus auratus* seem to be progressing very well.



◀ *Pseudotropheus auratus*
—the male of the
species

The White Cloud Mountain Minnow

by Jack Hems

A pair of White
Cloud Mountain minnow



ONE of the smallest members of the largest and most widespread of all freshwater fish families—the Cyprinidae (carps)—is the White Cloud Mountain minnow. This little fish is elegantly shaped, charmingly coloured, active, hardy and peaceful. In addition to these desirable qualities, it has a life-expectancy of about three years and breeds freely. In fact, if a pair of White Cloud Mountain minnows are given a spacious, densely planted and snail-free aquarium to themselves, they will deposit eggs every so often at most times of the year.

The fry, that look like animated slivers of blue-green luminescent glass, dart to and fro in the middle and upper levels of the water and pick up enough infusorians (some always exist in a thickly planted aquarium) and minuscule dried food to tide them over for the first few weeks of their lives. Thereafter most of the food introduced for their parents will prove acceptable and growth is rapid.

From this you will gather that the parent fish are not dedicated cannibals. As a rule, they take little or no interest in their fry. But they will eat some of the eggs within easy reach. The fry themselves are more of a problem for the larger ones will worry—maybe devour—some of the smaller ones. The answer to this, of course, is to remove large fry to another tank every now and again and leave the smaller ones to grow on in peace (that is if you wish to build up a stock of White Cloud Mountain minnows). But more about the subject of breeding later.

In the natural state *Tanichthys albanus*—to give this species its scientific name—inhabits the relatively cool streams that gurgle or tumble or meander sinuously about the uplands just beyond Canton (the White Cloud Mountains, China). Be this as it may, captive specimens flourish well in any small body of still water provided it is well-aerated and kept free from swirling particles of sediment. Another thing, water that is slightly hard and alkaline suits this species better than water that is soft and acid.

Of even greater importance than the quality of the water is temperature: this should be maintained in the sixties or lower seventies (°F). For excessive heat, say, in the eighties (°F), especially if it is prolonged, leads to increasing lassitude, wasting, and premature death. Feeding is no problem at all; for almost anything alive or dried and is small enough to be swallowed is taken. Food is usually taken before it reaches the bottom; rarely from the bottom.

The general colour is brown on the back shading to milk white with a faintly silverish sheen on the belly. A dark olive band above which a greenish blue to greeny gold stripe (the colour of this stripe varies according to the strength and direction of the light entering the aquarium) extends from the eye to the root of the tail, where it terminates in a black spot on a vivid red ground. This glowing colour is also present on the base of the forked caudal fin. The lobes of this fin, and the anal and ventral fins, are a nondescript yellowish white. Sometimes,

Award to winner at OPEN SHOWS



The illustration shown is the gold-plated pin awarded to the winners of the "Best Fish in the Show", particulars of which have been published in recent issues.

As it is possible that some winners have not received a pin, they are requested to apply to the secretary of the Open Show where they won the award, for the appropriate form. If in difficulty these forms are obtainable direct from *The Aquarist*, The Butts, Brentford, Middlesex.

Upon receipt of the completed form an award pin will be sent direct to the winner. Up to the time of going to press the following have been presented with the award.

Name	Club	Species of Fish	Open Show
R. Acherton	International Marine Scuba Society	<i>Somiphagus argus</i>	Stockton-on-Tees A.S.
F. Ritchie	Scottish A.S.	Red Hills Swordtail	Lancashire A.S.
Mrs. J. A. Dunstan	East Dulwich A.S.	Great Australian Rainbow	Fresno A.S.
K. Parkes	Harpenden A.S.	Tidial Barb	Mowden T.F.S.
Mrs. P. Pearce	Trowbridge & Dist. A. & P.S.	Moonlight Gourami	Trowbridge & Dist. A. & P.S.
J. Sellwell	Portsmouth A.S.	Lepomis Gibberus	Brighton & Southern A.S.
J. & H. Dennis	Workop A. & Z.S.	Rainbow	Pomfret & Dist. A.S.
C. W. Eaton	Weymouth & Dist. A.S.	Red Pigeon	Salisbury & Dist. A.S.
D. Sides	Chapelton A.S.	Albino Claricut	Althorp & Dist. A.S.
A. Maxwell	Workop A. & Z.S.	Rainbow	Glossop A.S.
R. J. Thorne	Hounslow & Dist. A.S.	Cichlasoma Severum	Lidbridge & Dist. A.S.
R. J. Thorne	Hounslow & Dist. A.S.	Cichlasoma Severum	Canford A.S.
A. Phillips	East Linn A.S.	Black Moor	Slipton & Dist. A.S.
J. Robinson	Harpenden A.S.	Platy	Harpenden A.S.
R. J. Harvey	Ilton A.S.	Finch	Leamington & Dist. A.S.
L. Andrews	Bournemouth A.C.	Silver Shark	Gosport & Dist. A.S.
A. Moxon	Workop A. & Z.S.	Rainbow	Workop A. & Z.S.
L. W. Jordan	Brockton A.S.	Aequidens Latrums	Bairnsdale & Dist. A.S.
F. Brown	Bristol A.S.	Tiger Cat Fish	Chilveston & Dist. A.S.
D. C. M. Durrant	Thurrock A.S.	Betta Splendens	Sunder & Dist. A.S.
C. W. Eaton	Weymouth & Dist. A.S.	Pony Maculatus	Bournemouth A.S.

however, the anal fin has a good dash of red in it. The perky dorsal fin is red at the top and yellow at the bottom. The pectoral fins are clear.

In regard to size, the White-Cloud Mountain minnow which, for the record, was first introduced to aquarium keepers in 1938, attains a length of about 1½ in. In mature specimens, the male is straighter in outline (more streamlined) than the female. Furthermore, he is slightly brighter coloured of the two. All the same, young fish, and some adult fish not in the best of condition, are far from easy to sex (for the beginner, anyway).

But to return to breeding. That is, breeding to order. For the ordinary hobbyist, a tank measuring 18 in. by 10 in. by 10 in. is simply large enough. The water need only not reach about halfway up the sides. Plants such as Java moss (*Vesicularia alabamica*) or nitella, anchored to the bottom, are ideal for offering what protection is necessary for the eggs. Light should be bright, preferably sunny.

Before placing the fish in the tank, separation of the sexes for about nine days to a fortnight is recommended. For separation, combined with a diet rich in live and/or meat food, invariably brings them into the pink of condition. This is indicated by the fuller and more satiny appearance of the female and the brighter colours of the male. The temperature for conditioning and spawning this fish should average around 72°-74°F.

The actual spawning procedure is quite simple. The male drives the red-distended female into the plants or

into an algae-festooned bottom corner of the aquarium, and there, to the accompaniment of twitching fins and close pressings of bodies, some eggs are laid. The couple repeat this performance at frequent or infrequent intervals over a period of several hours, or days. While driving is taking place, a much-relished live food should be introduced into the aquarium. This helps to turn the attention of the fish away from their eggs. As soon as spawning is over, the parent fish should be removed to another tank. Make certain, however, that the fish are not subjected to any change of temperature. It seems hardly necessary to add that a spawned-out female is easily recognised by her flatter sides and underparts and diminished colours.

Incubation of the eggs takes up to three days. The newly hatched fry, so small that you have to strain your eyes to see them, cling head-up to the sides of the aquarium and the plants. But before a week is out, they become free-swimming and need plenty of food. Although the fry grow fastest on microscopic live food (*Infauna*), flour-fine dried food may be offered as a substitute. As they grow, introduce such things as micro-worms, tiny *Daphnia*, and brine shrimps into their diet.

Under good conditions, the fry reach full size in about six to nine months. For the first few months of their lives they display colours which, for their brilliance, rival even those worn by a neon tetra. Altogether, then, *T. albanus* is a most praiseworthy little fish.

The Higo carp—for larger ponds

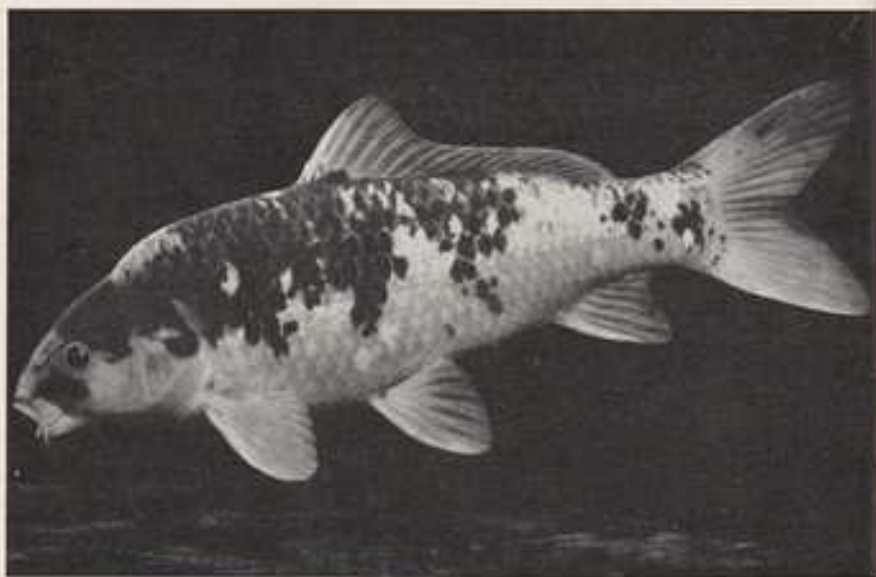
by A. Boarder

THE Higo is a fine fish for the larger pond as it can grow to a large size compared with goldfish. These fish can become very tame and can become accustomed to feeding from the hand. In many large ponds or small lakes some fine specimens may be seen. Under good conditions Higo can grow to eighteen inches long and weigh over four pounds. In general shape these fish are rather similar to the ordinary goldfish but differ mostly by having four barbels, arranged in two pairs. The body is somewhat longer than that of a goldfish and the finnage is also rather more developed.

The usual colour is red or yellow although some are found with varied colours including blue. Some strains have some very attractive colours. Although some fishes have the colours rather similar to a shubunkin they are completely scaled and not calico as in the shubunkin.

and needs to be a fair size before doing so. The feeding habits are according to the usual carp methods and they are omnivorous. The general rules for feeding goldfish will apply to these fish; they will eat the usual dried foods as well as many live foods such as garden worms and Tubifex. The Higo is hardy in this country but it will appreciate a well oxygenated water during the winter especially when the surface is frozen over. During the winter they become almost torpid, moving around and feeding very little. They are not a fast swimming fish but resemble the common carp in their lazy actions.

I have no knowledge that standards have been provided for this fish under the newer standards but a set of standards was given in the 1947 issue by the Federation of British Aquatic Societies. Under these standards the fish was to have a minimum body length of six inches excluding the



Small specimens can be kept in a fair sized tank or in a small garden pond but as they can make rather rapid growth under good conditions it is advisable to include these fish in a medium pond if it is realised that they may one day grow too large for such a pond. However, their rate of growth is controlled considerably by the swimming space available as well as the food they are given.

The Higo carp breeds in a similar manner to the goldfish

caudal fin. This compares with the three inches for common goldfish and two for most of the short bodied fancy goldfish.

Under these standards points are allotted as follows: Body, 20; barbels, 5; dorsal, 6; caudal, 5; pectorals, 3; pelvics, 3; anal, 3; colour, 30; condition 15 and deportment, 10. It can be seen from the above that great stress was placed on the colour as this was practically the only

feature which was likely to vary very much in various fish.

The Higo (*Cyprinus carpio* var. *auratus*), is on the whole a very worthwhile fish to include in any pond with a minimum size of about 20 by 10 feet and a depth of not less than 2½ feet. Many fine specimens can be found in the large ornamental lakes of country mansions.

The common Carp (*Cyprinus carpio*), is also often kept in ponds but as it is mainly bronze it does not show up to advantage, especially in a deep pond or one where the water is rather green with Algae. The Crucian carp (*Carassius auratus*), and the Mirror carp can also be kept in the garden pond but both can grow fairly large and like the Common carp they are not likely to be seen very often although on warm days they can be found browsing near the surface or just under water lily leaves. The Mirror carp has a few very large shiny scales on the body which make this fish rather more attractive than the other carp but unless the water was clear these special markings might not be seen.

A newer type of fish for the ornamental pond has come from Japan. This is the Koi carp and a type is known as the Nishiki-koi carp. I have not had personal experience with these fish so far but have seen pictures of them.

They certainly look very attractive and I do not doubt that they will become very popular when more are available. Whether they will be quite hardy I do not know at present as it is rather early days to be sure. I think attempts are already being made to breed them in this country and no doubt we shall hear a lot more about them later on. They appear to be fairly normal in shape but it is in their colours where they are so striking. The usual goldfish varieties colours can be found but as well as the reds, whites and blues some have brilliant gold or silver colourings. This gold must not be confused with the so-called gold of the goldfish which after all is not gold at all but a kind of reddish-orange, but some of the Koi carp have the proper shining gold as for the actual metal. It is possible that most of these imported fish have been bred under rather warm conditions and so if any are purchased I suggest that care is taken to ensure that the pond water temperature is not much lower than that of the water in which they have been kept.

I expect that in a year or two there will be standards for these fish and we may see some fine specimens on the show bench. Meanwhile they will be shown in the class for any other variety or species of coldwater fish.

Sea of delight for hotel diners



All first-class hotels in Hong Kong boast of a panoramic view of the Colony's famed "fragrant harbour". And the Miramar is no exception. But this wasn't enough, the management felt. So, in typical Chinese fashion, they ordered a huge glass tank, filled it with exotic tropical fishes and hung it on the ceiling of their penthouse restaurant, the Ondine Room. This, explained the management, is to create an atmosphere of an underwater paradise. Some paradise. It had cost the hotel something like HK\$100,000 (£6,250 Sterling). Shaped like a huge diamond, the tank has a circumference of 30 feet, 5 feet deep and contains nine tons of water. So it is at the Ondine Room today—a "sea of delight" to dine in anytime.

our readers



write

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

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

Cabomba—A tropical aquarium plant

MR. B. WHITESIDE'S article in the March issue of *The Aquarist* interested me considerably because I, like him, tried unsuccessfully for years to grow Cabomba.

While the conditions he has outlined for the successful growth of this beautiful plant in aquaria are probably ideal, I have over the last few months succeeded in almost the same conditions both he and I had previously found unsuitable.

This I attribute mainly, if not entirely, to the change from Tungsten bulbs to Gro-lux.

I have two aquariums sizes 42 in. x 18 in. x 10 in. and 18 in. x 10 in. x 18 in. Both are planted with Cryptocoryne, Water Wistaria and Cabomba. The larger of the two being set up about three years ago.

Gravel: Untreated
Lighting: Large Aquarium 36 in. x 30 watt Gro-lux tube
Small Aquarium 18 in. x 15 watt Gro-lux tube
Duration 12 hours
Water: Hardness 17° GH
pH 7
Temperature 74°

Feeding: Live food only
I do not use filters but every two weeks I syphon one third of the water and refill direct from the "Ascot".

Yours faithfully,
M. J. SENELET.

The Hendon Congress

I WOULD like to inform your readers, through the medium of your journal, that it is with pleasure that we again announce that Hendon will be putting on another Congress. A Congress that we believe will be as successful as those we have held in the past. The venue remains unchanged (i.e., Whitfield Secondary Modern School, Claremont Road, Hendon, London, N.W.2). The date will be Saturday evening, 11th November, 1967, and will start at 6.00 p.m. We have chosen this date with some forethought; (a) it does not seem to clash with any other national aquatic gathering, and (b) it is the same day as the Lord Mayor's Show. We felt that the many friends we

have outside the London area may wish to enjoy a full day by seeing the Lord Mayor's Show in the morning, visiting the many fish establishments in the afternoon and rounding off the day by coming to see us and our show.

It is with great excitement that we announce that our speaker for this year's Congress is none other than Colonel Jørgen Scheel of Copenhagen, Denmark.

I am sure the Killifish Associations (that now happily abound in our sceptred isle) will agree with us that Colonel Scheel is the uncrowned king where egg-laying toothcarps are concerned. We have had a private preview of some of the pictures he will show. They are of the same high professional standard as those of Arend van den Nieuwenhuizen—who was a guest of ours in recent times, and, we hope we do not upset anybody by saying we have never seen better photography. Pictures aside, Colonel Scheel is an expert in his own right. Among other things he will be telling us about a recent expedition he led to Central Africa, the keeping and breeding of egg-laying toothcarps. There will, again, be something for all. I should add that Colonel Scheel speaks English fluently.

We hope again to have many of the important personalities in the hobby attending, and they will be available to discuss the various aspects of fishkeeping. There will also be the opportunity to renew friendships with some of the other aquarists who regularly attend this aquatic occasion.

Refreshments will be available for early arrivals and again during the long interval. Previous visitors to our Annual Congress need no introduction to the facilities available: easy to reach, good refreshments, and ample parking space for cars and coaches.

We are sorry that we have had to raise the admission to 5s. but because of the cost of our speaker's air flight and the various other expenses that seem to increase every year we felt that we would not break even this time if we left the admission charge unaltered. Juniors will of course be admitted at half price. We hope you all feel that a speaker of such eminence is worthy of the increase we have had to make.

Colonel Scheel's services will not be available again outside this Congress and we urge you not to miss this unique opportunity.

Please drop me a line if you are interested. We suggest you let us know in advance if you wish to attend.

Yours very truly,

KATH PERROCK,
Hon. Sec.

Worm-Breeding

HAVING read *The Aquarist* for a considerable number of years I still find the many and varied subjects extremely interesting.

I do, however, disagree with the article by R. Whiteside in the July issue regarding the breeding of white, grindal and micro worms in a communal container. I acknowledge that even the most unusual occurrences do happen from time to time in isolated cases, but my own experience, on three completely separate occasions, and incidentally all by accident, micro worms were seen in both grindal and white worm containers and in a month neither white nor grindal worms were in evidence, only micro.

This proved to me that the conditions were superb for the latter and what happened to the grindal and white worms I just do not know. I feel sure that other readers will have other comments to make of their experiences, so please let us have a few more readers' letters.

Yours faithfully,
V. ROBINSON.

With-it Stickleback

HAVING just read the article on sticklebacks in the July issue of *The Aquarist* I feel I must write and tell you of my own experience. Last year my two young sons spent most of their summer holidays constructing a wild pond in the garden. Quarrying completed, my husband lined the pond with a double layer of Visqueen 1000 and the boys stocked the pond with plants and sticklebacks from the local river.

Spring showed that we had two lovely males and several large females. The males, of course, promptly divided the pool into halves, with odd skirmishing in the centre. The largest and most noticeable male chose to make his nest on the slope at the side of the pool and proceeded to have a thorough spring clean; no odd bits near his domain; all was clean and shining. Whenever I glanced into the pool there he was in full view of the cat but bearing a charmed life building the nest to end all nests. The water level in the pool started to drop slightly but still the nest building went on, now even nearer to the surface. Soon the hose was running at a steady trickle to keep the nest under water at all, and still he kept building. A few days more found us shopping for a fibreglass pool in a desperate effort to rescue our wild pond.

The trouble became obvious as soon as we emptied our pond. The days of mammoth effort were explained by the small square of Visqueen Mr. Stickleback had chosen for his roof, a piece virtually a complete square. How he did remove that 1 in. square is a mystery but do it he must have, for his nest was right over the hole. There was no leak when he started building and certainly no-one moved his nest, cut out a piece and gave it to him, then put the nest back. The odd point of it all is the fact that any fry hatching would have had sole access to the water which had

reached the second layer of plastic, a layer which only had a tiny hole which I made during the original lining, and that well up the edge.

Our fervent dad is still guarding his nest in its new pond, and let's hope he can't chew fibreglass or its back to the river for him!

In closing I would like to ask your advice on getting rid of blue green algae. It is only in the end tank of three placed on a window sill it is true, but all 3 tanks are backed with a thick layer of plastic. Removing the plastic foam only made matters worse, and even when completely blacked out the soft mass continues to spread.

I have emptied the tank, scrubbed it out thoroughly with hot water and set it up again with new plants and gravel, forming the plants themselves into a light shielding row, and getting them well established before putting the tank back, in fact for months I have tried everything I can possibly think of, short of giving up and moving the tank and that, through lack of space I cannot do.

Yours faithfully,
MRS. VERA DRAKE.

Aquarist Literature Wanted

I AM working towards establishing an International Aquarists' Library and among items essential to our magazine collection are old copies of *The Aquarist* and *Pondkeeper*, *Water Life*, *Fishkeeping* etc. I shall be pleased to hear from anyone who possesses any copies of the above and who wishes to sell them.

NEAL TETTLER,
Secretary, American Goldfish Society,
62-60, 99th Street,
Rego Park,
New York 11374.

P.S. If possible start with January 1967 issue of *The Aquarist*.

Book review

The Observer's Book of Pond Life by John Clegg published by Fredk. Warne & Co., Ltd. at 6/-

The wonderfully comprehensive range of this series must be familiar to everyone and the handy pocket size coupled with the astoundingly low price (an increase of only a shilling over current prices for books in this series more than twenty-five years ago!) makes them a very attractive acquisition. The volume under review is aimed at the water-life lover and to browse through its pages (over 200 of them) and enjoy its 32 colour and 10 black and white plates is the next best thing to donning a pair of waders and striding in amongst the water-boatmen and crayfish. Very readable, concise in its descriptions but yet not skimpy, this book is both a reference for identification as well as a key to habitats and the reader would be advised to obtain two copies—one for the shelf and one for the pocket when on watery excursions for it's much too handsome a little book to subject to the constant thumbing by the pondside at the eventual expense of its attractive appearance.

Going marine Part 8—Ozone in the aquarium

by T. Ravensdale, F.B.I.S., F.M.S.S., A.M.Z.S.

OZONE in the coral fish aquarium is practically universal nowadays and yet many enthusiasts are not only ignorant of its theoretical properties but of its use and adaption. They know that it should be fitted into the air stream but not at what strength or period. In short they know it *must* be used but not how or why.

Ozone can be used in many ways and strengths and the best usage of it can only be decided by the individual, for all aquarium societies are different. First and foremost the aquarist should realise that Ozone is *poisonous*. The difficulty is in deciding what the Ozone should be allowed to kill and how much intensity is required for the job. In order to be able to assess this it is first necessary to know exactly what Ozone is. Without defeating the description by being over-technical and omitting many important aspects, Ozone can be best understood in its natural form.

The World is surrounded or encased in a 'shell' of Ozone which prevents many elements from leaving the atmosphere. It actually stabilizes time itself by acting as a barrier which prevents any drastic changes in our Planet's make-up. Without this Ozone belt the earth would be constantly changing form in many ways and life would probably not be able to stand such upheavals.

Technically speaking Ozone is an active form of oxygen gas produced by the ultra-violet rays emitted by the sun. As this gas nears earth it is de-concentrated at each atmospheric level until, at the surface, it occurs only at the rate of .05 parts per million. Electric storms, however, allow greater amounts of Ozone to reach the ground and this can be detected by the human nose. That strong, fresh, healthy smell which follows a thunder-storm is in fact Ozone. Ozone air condition units are simply 'burning up' the bacteria in the air and the reason one cannot smell the powerful odour emitted by the animals in the London Zoo's Elephant house is because Ozone units installed there have 'burnt up' the bacteria causing the smell. Ozone, however, artificial or otherwise, does not differentiate between wanted and unwanted bacteria and our only primitive means of assessing to a mild degree that we are not destroying 'wanted' bacteria is to simply go easy on the strength used. Until the day comes when we will be able to differentiate between the good and the bad we must simply 'burn' them all together and hope for the best.

Ozone will kill all bacteria, spores and viruses regardless and is the most powerful oxidising agent known to man, and this should not be forgotten. It will not cure damaged parts on a fish but will aid the healing of injuries by preventing infection from taking over and allowing the damaged cells time to repair without opposition. Foods may also be sterilised by the use of Ozone. A surgeon 'washing' his hands under a black lamp is simply 'rinsing' in Ozone.



A mild strength of Ozone may be run continuously through the aquarium air supply. This will increase the height of Redox Potential and render the water similar to that of a coral sea which is baked by tropical sunshine for long hours each day. Ozone is best supplied to the aquarium via a piston pump and not a vibrator type.

There are three Ozonisers available and all are made by Messrs. Sander of West Germany and marketed by South Coast Aquatic Nurseries of Colerbrook. They give proportionally ten, twenty-five and fifty milligrams of Ozone per hour. The first model is not adjustable and preference should be given to the latter model which is well worth the extra money. A further three types are also available and can supply up to 1,000 m.g. per hour, but compressors are needed for these units and they are therefore only suitable for professional aquarists. Wear is negligible as all units are fitted with water repellent electrodes—useful in the humid atmosphere of a fish house.

Ozone application

(a) Water clarification

Turbid or murky water is usually so due to an excess of bacteria. This can be alleviated by the use of Ozone at full strength, regardless of model used, for up to three hours. It should however be used in conjunction with a reactor tube or the dead bacteria will be stirred up



Far left—*Chaetodon fasciatus*
 Centre top—*Dascyllus carneus* from East Africa
 Centre bottom—*Abudedefduf sardidus* from the Indo-Pacific region
 Top right—The puffer fish *Tetraodon lineatus*

by the movement of fishes and render the water murky again. This operation is best performed without fish in the tank at all.

(b) Live food sterilisation

All foods should be sterilised and this is done by simply running Ozonated water through the food container for ten minutes or so at full strength.

(c) Allment cures

Many diseases can be cured by the careful use of Ozonated water but fishes should be protected from the Ozonated air stream by a reactor tube, especially if periods of use exceed thirty minutes per day.

(d) Epidemic prevention

Most of the common marine fish diseases run through a stock like wildfire and the continuous use of Ozonated water can prevent the outbreak of epidemics, but in this case a reactor tube must be used. The tube not only keeps the Ozonated water from direct contact with the fishes but acts as a skimmer for the removal of dead bacteria killed by the process.

Ozone reactor tube

This simple but effective instrument collects the 'burnt' bacteria into a tube and lifts it into a skimming cup where it can easily be removed and disposed of. It must be fitted so that the water inlet holes are one inch below the surface. Air bubbles from the stone at the bottom of the tube must fill the whole width of the cylinder and must

be turbulent, bubbling at full blast.

For bacteria to form at all the water must be organically overcharged and this condition cannot exist where Ozonated water is present. Epidemics are therefore most unlikely if Ozonated water is used in the described manner continuously. New specimens however should never be placed into the community aquarium without being first subjected to strict quarantine. No efforts to keep coral fishes will succeed if quarantine is omitted.

Ozone strength

It is extremely difficult to determine exactly how much Ozonated water to use but I have personally found that, with my water and conditions, one half a milligram per hour per gallon of water is sufficient for normal use. Therefore, a 24 in. x 12 in. aquarium requires five milligrams per hour and a twenty gallon tank needs ten milligrams per hour. An unhealthy attitude from the fishes is followed by an immediate change to one milligram per hour per gallon and an increased air supply, but great care should be taken not to increase Ozonated water if that may be the cause of the distress although it is unlikely.

New fishes should not be placed directly into an aquarium high in Ozonated water immediately after quarantine. Turn down the Ozonated water slowly a few days before introduction. When it is at all the new fish may be introduced and the Ozonated water supply gradually increased by one milligram per day until the normal strength is reached.

TERMS of an AGREEMENT BETWEEN the FEDERATION of BRITISH AQUATIC SOCIETIES (F.B.A.S.) and the GOLDFISH SOCIETY of GREAT BRITAIN (G.S.G.B.) as FINALISED on 19 JULY, 1967.

(Discussions were held at 35 Steeles Road London, N.W.3 on 9 February, 2 March, 3 May, 5 July and 19 July between Messrs. C. A. T. Brown, E. Jessopp and F. Stone for the F.B.A.S. and Messrs. L. C. Betts, G. H. O'Neill, W. L. Wilson and Mrs. Wilson for the G.S.G.B.)

"It is agreed that:—

"Each organisation will support the other in their aims and aspirations for the furtherance of better fishkeeping and the welfare of the aquarium and pondkeeping hobby.

"One universal set of Standards for Goldfish is best for the hobby and the Standards as laid down by the G.S.G.B. meet this requirement. The F.B.A.S. will incorporate G.S.G.B. Standards with their own and the F.B.A.S. will formally withdraw their own Goldfish Standards in favour of those of the G.S.G.B.

"The G.S.G.B. will place their panel of Judges at the disposition of the member societies of the F.B.A.S. on the same terms as at present exist for F.B.A.S. Judges. The G.S.G.B. agrees to the use of the existing F.B.A.S. Coldwater Judges providing they use the G.S.G.B. Standards in the spirit that it intended and without reservations. Where distance, cost and the smallness of the Show do not justify an official Judge, lay Judges may be used providing G.S.G.B. Standards are operated.

"Adequate quantities of the G.S.G.B. Standards being available for distribution, the F.B.A.S. agrees not to publish these in whole or in part. When a reprint is necessary, the matter will be a subject for negotiation. Meanwhile, copies will be available to the F.B.A.S. at a discount.

"To safeguard the mutual interests of both parties at any future time, should it be found necessary to terminate this agreement, this can be brought about by twelve months notice on either side.

"It is further agreed that:—

"G.S.G.B. Standards and Judges will be used at competitive Goldfish Shows staged by the Goldfish Society. Open Shows staged by other Societies under F.B.A.S. auspices will be judged to G.S.G.B. Standards by G.S.G.B. Class A Judges and existing F.B.A.S. Coldwater Class A Judges. Organisers of these Shows may include classes for Comets and Veiltail Moors. Closed Shows organised by these Societies may be judged by G.S.G.B. Class A and Class B Judges and F.B.A.S. Coldwater Class A and Class B Judges.

"The F.B.A.S. will continue to appoint Class B Coldwater Judges.

"The F.B.A.S. and the G.S.G.B. agree that Guides and Standards shall be available for Coldwater Fishes other than Goldfish and will jointly collaborate to this end.

"The F.B.A.S. will be competent to raise matters relevant to this agreement with the G.S.G.B. and if required such matters will be jointly considered. The converse also to apply.

"And further it is agreed that:—

"The G.S.G.B. will produce a Standard for the Comet for

publication by the end of 1967 and will recommend to the F.B.A.S. a Standard for the Veiltail Moor which the F.B.A.S. will publish by the end of 1967. If popular demand warrants it the G.S.G.B. will subsequently include it in its 'Popular Varieties'.

"Clubs and Societies requiring a Goldfish or Coldwater Judge may make a personal approach to any Judge or Judges on the published list. The G.S.G.B. will appreciate being advised of such bookings. The G.S.G.B. will nominate a Judge if requested. Judges who are both 'Goldfish' and 'Coldwater' will be so indicated on the published list.

"It is recommended that this agreement shall operate from 1 January, 1968."

Cutting glass

by B. Fry

CUTTING glass—the lighter weights, anyway—should not be beyond the skill of the average aquarist.

The essential requirements are a cutter (the ordinary wheel cutter, which costs about 3s. 6d. will give just as good a performance as the much more expensive tool fitted with a diamond in the head), a wooden straight-edge to serve as a guide, and some paraffin or thin machine oil to dip the wheel of the cutter into before use. It is necessary, too, to provide a perfectly smooth, flat surface covered with several sheets of newspaper to rest the glass on. Wetting the straight-edge and the newspaper will help to prevent any sliding away from the glass.

The right degree of pressure on the wheel when making a stroke is all important. If the pressure is too light the sharp edge of the wheel will not bite into the glass. On the other hand, if the pressure is too heavy and, worse still, fumbling, the glass will crack. The wheel must, repeat must, be drawn inwards with the right degree of pressure from one edge of the glass to the other. And see that you make one quick scratching stroke.

To break the glass where needed place it so that the scratch protrudes just beyond the edge of the bench or table. Then press down sharply. The glass should break evenly all along the scored line. Apart from learning how to handle the cutter correctly, breaking the glass without cracking it comes more easily with practice, and several trial strokes and breakings on old pieces of glass is advised before you start to glaze a small tank or vivarium or renew a badly fitting or broken cover glass.

THE AQUARIST



from AQUARISTS' SOCIETIES

RECENT highlights at North Warwickshire A.S. meetings have been a talk and film show given by friend members Mick Reynolds and Dave Bennett. Mr. Reynolds gave a very interesting talk on fish photography and the pictures he had taken. During the latter part of the evening Mr. Bennett showed pictures of some of the new varieties of Livebearers being produced in America.

At the July meeting Mr. Sid Swadlow the society's chairman gave a very interesting talk on keeping and breeding cichlids and was able to solve most of the members' problems.

Mr. Keith Walls, last year's Table Show winner, is again heading this year's table.

THE table show of Leamington and District A.S. for July resulted as follows: Corydoras Catfish, 1, Mrs. J. E. Smith; 2, P. N. Thomson; 3, P. Underwood; A.O.V. Goldfish, 1, D. G. D. Lucas; 2, Master D. Beard; 3, Master A. James; 4, Mr. J. Beard; 4, Master A. Collier; Dwarf Cichlids, 1, Master A. James; 2, D. G. D. Lucas; 3, Mrs. J. E. Smith; 4, J. Thomas.

MEMBERS of the Newport A.S. were among the prizewinners at the annual show of the **Llanwrthwl Aquarists' Society**. Mrs. M. Burgess was awarded the trophy for the Best Furnished Aquarium. Mr. R. J. Meen received first and second awards in the Guppy Breeders' Class, with Mr. J. T. Bangwin placed third. Mr. M. J. Parry was awarded second place in the Snowball Class, and fourth position in the Labrynth class.

At the Chesham upon show Miss P. Morgan was placed second in the Catfish Class, Mr. M. J. Parry second in the Snowball Class and Mr. T. G. Wall fourth in the Livebearers Class. At the society's July meeting Mr. Louis Bannerman gave a brief talk on the "do-it-yourself" aspects of aquarist manufacture, which was followed by a talk from the show secretary, Mr. Michael Parry, on the society's forthcoming open show to be held at the Duffryn Junior High School, Snow Hill, Newport on Saturday 12th September.

The results of the table show, judged by Mr. Parry for two classes, **Aur Vasey Catfish** and **Aur Vasey Cichlids** were as follows—A. V. Catfish, 1, Miss P. Morgan (Pseudocoraspiopsis); 2, Mr. T. G. Wall (Corydoras aeneus); 3, Mr. A. J. Parry (Moxostoma spp.); A.V. Cichlid, 1, Mr. L. Sadler (Brown Aces); 2, Mr. J. Overland (Brown Aces); 3, Mr. J. Lowndes (Brown Aces); 4, Mr. A. L. Perry (Robusta). Meetings of the society are held on the first Tuesday of each month at the R.A.O.B. Club, Havelock Street, Snow Hill, Newport, commencing at approximately 7.45 p.m. Visitors and prospective members are always welcome, further details see circulars from the general secretary, Mr. I. G. Phillips, 34, Brungrange Crescent, St. Julian's, Newport, Mer.

THE results of the Open Show of the Brighton and Southern A.S. were as follows—A.V. Parry; 1, C. Follenham (Clapham A.S.); Red Parry, 74 pts.; 2, G. Greenwood (Kingston A.S.); Marigold Parry, 72 pts.; 3, G. Aylard (Kingston A.S.); Red Parry, 77 pts.; 4, V. Adis (Brighton & Southern); Red Parry, 76 pts.; A.V. Seward; 1, E. Cummins (Brighton & Southern); Red Icyed Red, 79 pts.; 2, C. S. D. Swinburne (Swordfish); 74 pts.; 3, E. Cummins (Brighton & Southern); Red Icyed Red, 77 pts.; 4, L. Underwood (Gosport A.S.); Red Sward, 73 pts.; A.V. Mollie; 1, S. C. H. Smith (Mid-Sussex); Black Mollie, 76 pts.; 2, D. Ellis (Kingston A.S.); Black Mollie, 74 pts.; 3, C. Follenham (Clapham A.S.); Black Mollie, 74 pts.; 4, A. G. Hare (Mid-Sussex); Green Mollie, 71 pts.; A.V. Mole Guppy; 1, G. B. Bass (Reigate & Redhill A.S.); 82 pts.; 2, G. B. Bass (Reigate & Redhill A.S.); 79 pts.; 3, T. J. Crocker (Brighton &

Southern); 79 pts.; 4, K. Clough (Gosport A.S.); 78 pts.; A.V. Female Guppy; 1, G. B. Bass (Reigate & Redhill A.S.); 74 pts.; 2, T. Crocker (Brighton & Southern); 71 pts.; 3, G. Aylard (Kingston); 72 pts.; 4, T. J. Crocker (Brighton & Southern); 71 pts.; A.O.V. Livebearers; 1, R. H. A. Partridge (Crawley); Merry widow, 79 pts.; 2, Renee Stuart (Reading A.S.); Linné Oranda, 78 pts.; 3, T. D. Smith (Hendon A.S.); Half Beak, 76 pts.; 4, G. Greenwood (Kingston A.S.); Blue Linné, 76 pts.; A.V. Characin; 1, H. Armitage (Portsmouth); Blue Gery, 82 pts.; 2, R. Duley (Brighton & Southern); Pencil, 81 pts.; 3, L. W. Jordan (Bracknell); Red Icyed Tet., 78 pts.; 4, D. Ellis (Kingston); Long Tail, 77 pts.; A.V. Berlin; 1, L. Perrain (Gosport); Dora Berlin, 78 pts.; 2, R. McMillan (Reigate & Redhill); Half Banded, 74 pts.; 3, L. Armitage (Brighton & Southern); Chequer Berlin, 73 pts.; 4, L. Follenham (Gosport); Berlin Bicolorata, 71 pts.; Dario Carp Mollies; 1, A. G. Hart (Clapham); Giant Danos, 81 pts.; 2, Roy Bagg (Kingston); Golden Danos, 79 pts.; 3, L. Follenham (Gosport); Giant Danos, 73 pts.; 4, S. C. H. Smith (Mid-Sussex); Zebra, 70 pts.; Rainbow; 1, D. Ellis (Kingston); Schemmali, 70 pts.; 2, R. E. A. Partridge (Crawley); Bas. Borastomus, 78 pts.; 3, Roy Bagg (Kingston); Saurastomus, 73 pts.; 4, M. J. Eilick (Gosport); Harlequin, 72 pts.; A.V. Fajhrer; 1 and 2, C. Follenham (Clapham); A.O.V. Labrynth; 1, L. Armitage (Brighton & Southern); Thick Leaved; 79 pts.; 2, G. B. Bass (Reigate & Redhill); Daezel; 77 pts.; 3, J. A. G. (Brighton & Southern); Lotus; 75 pts.; 4, J. E. Hill (Brighton & Southern); Lotus, 71 pts.; A. V. Tooth Carp; 1, D. Ellis (Kingston A.S.); A. Chrissy, 81 pts.; 2, R. Copper (Kingston A.S.); P. P. P. (P. P. P.); 80 pts.; 3, D. Ellis (Kingston A.S.); S. Mollie, 79 pts.; 4, H. Armitage (Portsmouth A.S.); P. P. P.; 74 pts.; F.R.A.S. Championship Class, Dwarf Cichlid; 1, L. Follenham (Gosport A.S.); Rainbow, 76 pts.; 2, G. Aylard (Kingston A.S.); Rainbow, 74 pts.; 3, M. A. Carter (Bracknell A.S.); Rainbow, 74 pts.; 4, C. Follenham (Clapham A.S.); Orange Chameleon, 74 pts.; A.O.V. Cichlid; 1, E. Cummins (Brighton & Southern); 77 pts.; 2, G. Aylard (Kingston); Firmosus, 75 pts.; 3, L. W. Jordan (Bracknell); Brown Aces, 74 pts.; 4, L. W. Jordan (Bracknell); Blue Anata, 74 pts.; Corydoras Catfish; 1, T. P. Gorman (Crawley); Peltostoma, 78 pts.; 2, Roy Bagg (Kingston); Peltostoma, 77 pts.; 3, H. Armitage (Portsmouth); Jolly, 74 pts.; 4, T. D. Smith (Hendon); Jolly, 73 pts.; A.O.V. Tropical Cat; 1, Brian Green (Reading); Amouré Cat, 79 pts.; 2, J. B. Hare (Mitcham & District); Leach, 77 pts.; 3, G. Greenwood (Kingston); Carina; Pteropichthys, 76 pts.; 4, D. Ellis (Kingston); Pteropichthys, 76 pts.; A.O.V. Tropical Egg-layers; 1, C. S. D. Swinburne; Labro Bicolor, 76 pts.; 2, A. G. Hart (Clapham); Siamensis, 74 pts.; 3, M. A. Carter (Bracknell); Bass; Salminali, 73 pts.; 4, C. S. D. Swinburne; Bass, 68 pts.; Vertical Breeder Livebearers; 1, G. B. Bass (Reigate & Redhill A.S.); Guppies, 76 pts.; 2, J. E. Hare (Mitcham & District); Red Wag Plater, 75 pts.; 3, S. C. H. Smith (Mid-Sussex); Mollie, 74 pts.; 4, C. Follenham (Clapham A.S.); Moon Pleasa, 74 pts.; Tropical Breeder Egg-layers; 1, G. B. Bass (Reigate & Redhill); Leo Geronno, 80 pts.; 2, A. G. Hart (Clapham A.S.); Hamatus Macginnis, 78 pts.; 3, Mrs. J. H. Partridge (Crawley A.S.); Mal. Macginnis, 74 pts.; 4, A. G. Hart (Clapham A.S.); Corydoras, 74 pts.; 5, C. S. D. Swinburne; Goldfish; 1, W. Leach (Reigate & Redhill A.S.); 78 pts.; 2, D. C. Dudley (South Park Aquatic Study Society); 74 pts.; 3, Mrs. P. Whittington (Reigate & Redhill); 73 pts.; 4, W. Ryder (Portsmouth); 69 pts.; A. V. Shuboshan; 1, R. M. Whittington (Reigate & Redhill); 78 pts.; 2, B. M. Whittington (Reigate & Redhill); 78 pts.; 3, W. Leach (Reigate & Redhill); 77 pts.; 4, R. M. Whittington (Reigate & Redhill); 74 pts.; A.O.V. Fancy Goldfish; 1, Miss D. Morris (Reigate & Redhill); 80 pts.; 2, W. Leach (Reigate & Redhill); Comet, 78 pts.; 3, T. P. Gorman (Crawley A.S.); Nympha, 77 pts.; 4, Miss D. Morris (Reigate & Redhill); Oranda, 75 pts.; A.V. River and Pond; 1, J. Stillwell (Portsmouth A.S.); Lepomis Gibbosus, 84 pts.; 2, R. D. Smith (South Park Aquatic Study Society); Mirror Carp, 79 pts.; 3, D. C. Dudley (South Park Aquatic Study Society); Dugfish, 77 pts.; 4, R. D. Smith (South Park Aquatic Study Society); Golden Oris, 75 pts.; Best Fish in the Show; Brighton Trophy and "Aquarist" Pin, Mr. J. Stillwell (Portsmouth A.S.); Lepomis Gibbosus.

AT the Nottingham and District A.S. monthly meeting the members were entertained to a film show. The table show for Chameleons resulted as follows—1, Mrs. R. Goodfellow; 2, Mr. K. Brier; 3, Mr. C. Hill. Recently members of the Breeder's Section visited Mr. and Mrs. Doreen Saltmore at Workshop and this made a very pleasant evening's outing.

THE Chesham and District A.S. held their first Open Show for Tropical and Gold-water Fishes recently. A plaque was presented for the Best Fish in the Show to Mr. F. Brown of Brent A.S. A medal was also presented by Chesham and District A.S. to Mr. Brown together with a special award from the Aquarist and Fishkeepers. This latter award enables Mr. Brown to compete in the "Champion of Champions" contest to be held in conjunction with the British Aquarist's Festival at Belle Vue, Manchester on the 28th and 29th October.

The results of the Tropical Classes were: Bestward Egg-layers; 1 and 2, Mrs. King (Bath); 3, Mr. R. Heydon (C. & D.A.S.); 4, T. Young (M.A.P.S.); Breeder Livebearers; 1 and 2, Mr. and Mrs. Delves (Bath); 3, T. Young (M.A.P.S.); 4, C. Idles (C. & D.A.S.); Berlin; 1, Mrs. King (Bath); 2, Mr. S. Atney (Newport); 3, F. Brown (Brent A.S.); 4, Mr. Hall (Dulton); Dwarf Cichlids; 1, Mr. and Mrs. Delves (Bath); 2 and 3, Mr. J. B. Powell (Tate); 4, L. Tomlin (C. & D.A.S.); Large Cichlid; 1, D. Andrews (Haden); 2, N. Bingham (C. & D.A.S.); 3, W. Hall (Dulton); 4, N. Hughes (C. & D.A.S.); Characins; 1, Mr. Hall (Dulton); 2, G. Wilton (Haden); 3, Mr. Jones; 4, M. Underwood (Leamington); Livebearers; 1, Mr. and Mrs. Delves (Bath); 2, M. Compton (C. & D.A.S.); 3, M. Underwood (Leamington); 4, T. G. Wall (Newport A.S.); Anabantids; 1, L. L. Baggan; 2, Mr. J. Parry (Newport); 3, Mrs. King (Bath); 4, P. W. Duff, Catfish and Loaches; 1, F. Brown (Brent A.S.); 2, Mrs. P. Morgan (Newport A.S.); 3, D. Andrews (Haden); 4, G. Wilton (Haden); Danos; W.C.M.M. and Rainbow; 1, Mrs. J. K. Smith (Leamington); 2, F. Brown (Brent); 3, Mr. and Mrs. Delves (Bath); 4, St. Paul's College (C. & D.A.S.); Fishers; 1 and 2, Mrs. King (Bath); 3, C. Idles (C. & D.A.S.); 4, T. Young (M.A.P.S.); A.O.V. Tropical; 1, St. Paul's College (C. & D.A.S.); 2, R. Heydon (C. & D.A.S.); 3, G. H. Brocklebank (Covey); 4, E. Verzatat, Guppies; 1, M. Underwood (Leamington); 2, Mr. Hall (Dulton); 3, N. Lounell (Cradle); 4, F. Brown (Brent A.S.).

The results of the Goldwater classes were: 1, V. Hayes (C. & D.A.S.); 2, T. Young (M.A.P.S.); 3, C. Idles (C. & D.A.S.); 4, Mr. and Mrs. Delves (Bath); 5, V. Hayes (C. & D.A.S.); 3, Mrs. J. K. Smith (Leamington); 1, D. Lucas (Leamington); 2, D. Beard (Leamington); 3, St. Paul's College (C. & D.A.S.).

THERE were fifty members present at the July meeting of the Ayrberthorpe and District A.S. and the entertainment for the evening was an interesting lecture on "Making Drift Foods for the Aquarium" given by Mr. Waterburn. The usual Table Show was held with the following results: Cichlids (Jannet); 1 and 3, Master K. Lacey; 5, Master D. Lawton, Cichlids (Novice); 1, Mr. G. Colman; 2, Mrs. A. Iwan; 3, Mrs. G. Colman, Cichlids (Special); 1, Mr. R. Linn; 2 and 3, Mr. J. Whitley; A.O.V.; 1, Mr. J. Whitley; 2, Mr. B. Maggart; 3, Mr. B. Linn; 4, Mr. J. Whitley. The award for the Best Fish of the Month went to Mr. J. Whitley.

THE first meeting of the **Hull A.S.** in July was taken up with preparation for the Hull Show. A tape was accepted by the members and appointed on "Pools and Pools".

The hon. secretary, Mr. Storer, had unfortunately been compelled to resign owing to heavy pressure of work and his recent ill health. At a subsequent meeting vacant offices for secretary, assistant secretary and assistant show secretary were filled. Mr. J. Wacker was appointed as hon. secretary for the remainder of the year, Mr. Mitchell as assistant secretary, and Mr. Holt as assistant show secretary.

ONCE again **Bradford and District A.S.** has proved its capabilities of producing first class aquaria by winning the A.Y.A.S. award for three years in succession, an award of which any society could be proud. This award is presented to the society that gains most points at the Association of Yorkshire Aquarist Societies Open Table Shows.

The July Table Show results were as follows: Goldwater: 1 and 3, Mr. J. Hooper; Mr. P. Moorhouse. A.O.V.: 1, 2 and 3, Mr. P. Moorhouse.

THE officers elected at the third Annual Meeting of the **Cardiff A.S.** were as follows: Chairman: H. E. Humphreys; Hon. Secretary: N. A. Cozzani; Treasurer: E. W. Townsend; Hon. Show Secretary: N. J. Cozzani; Librarian: R. S. Chard. Also the members saw a set of slides and listened to a tape on "The American Scene." At the following meeting a Knockout Competition was held, the results being as follows: 1, H. E. Humphreys (Half-Banded Barb); 2, R. S. Chard (Rory Barb); 3, D. Wainwright (Fighting); 4, G. Churchill (Spot). Members were also told that preparations would soon commence for the organization of the Club's Open Show in 1966.

Meetings of the club are held on the last Thursday of each month at The Old Arcade Inn, Church Street, Cardiff, commencing at 8 p.m. Visitors can be assured of a warm welcome and further details can be obtained from Mr. N. A. Cozzani, 29 Llanmorris Road, Gethin, Cardiff.

AT the July meeting of the **Pontefract and District A.S.** members were entertained by Mr. R. E. Hampson of Horsforth who put on a tape-recording and film-show on exhibits from the U.S.A. Mr. Hampson judged the Table Show the results being: Breeders Egg (yeps): 1, Piper & Goodall; E. R. Hunt; 3, R. Cohen. Breeders Livebearer: 1, Piper & Goodall; 2, A. Toyn; 3, D. Cohen. The next meeting of the society will be on 11th September.

THERE was a large increase in the number of entries for the **Hutton Grammar School A.S. Junior Open Show** and the results were as follows: Livebearer: 1, I. Ince (Chorley) 70 pts; 2, W. Booth (T.A.B.) 66 pts; 3, N. D. Swindell (Hutton) 65 pts. Characine: 1, W. Booth (T.A.B.) 71 pts; 2, N. D. Swindell (Hutton) 70 pts; 3, J. H. Bradley (Hutton) 68 pts. Minnow and Barb: 1, Miss J. McKay (Ossett) 72 pts; 2, F. Chadwick (Blackburn) 71 pts; 3, N. D. Swindell (Hutton) 68 pts. Livebearer: 1, Miss J. McKay (Ossett) 74 pts; 2, Miss J. Hayward (Chorley) 73 pts; 3, W. Booth (T.A.B.) 70 pts. Goldfish: 1, Miss J. Hayward (Chorley) 73 pts; 2, W. Booth (T.A.B.) 69 pts; 3, J. Yorke (Chorley) 62 pts. Catfish and Loach: 1, W. Booth (T.A.B.) 70 pts; 2, N. D. Swindell (Hutton) 69 pts; 3, W. Booth (T.A.B.) 68 pts. Goldfish: 1, J. Whitworth (Hutton) 61 pts; 2, C. Lees (Hutton) 60 pts. A.O.V.: Tropical: 1, Miss E. Ramsbottom (Chorley) 73 pts; 2, W. Booth (T.A.B.) 72 pts. Pais (Livebearer): 1, W. Booth (T.A.B.) 74 pts; 2, N. D. Swindell (Hutton) 70 pts; 3, J. Ince (Chorley) 64 pts. Pais (Galgarron): 1, W. Booth (T.A.B.) 74 pts; 2, Miss E. Ramsbottom (Chorley) 70 pts; 3, N. D. Swindell (Hutton) 67 pts. Breeders (Livebearer): 1 and 2, N. D. Swindell (Hutton) 70 pts and 68 pts; 3, J. H. Bradley (Hutton) 62 pts. Breeders (Egg yeps): 1 and 2, W. Booth (T.A.B.) 74 pts and 73 pts. Best Fish in Show: W. Booth (T.A.B.) Male of pair Egg yeps 76 pts. Best Fish shown by

member: N. D. Swindell 70 pts. Competitive with most points: W. Booth. Society with most points: T.A.B.

THE Annual General Meeting of the **Midland Aquarist League** was held recently when five clubs were present. These were: Adlestropes, Goveney, Loughborough, Rugby and Northampton. A new member this season will be **Bedworth Aquarist and Pool Society**, their application to join being carried unanimously. The clubs will be as follows: September, Rugby; Arabiamids, Cichlids, Egg yeps, Breeders, Octobis, Atherine; Catfish, Loaches, Barbs, Danios, W.C.M.M. Livebearers, Breeders, Killifish, March, Northampton; Barbs, Characins, Egg-layers, Breeders, April; Loughborough; Guppies, A.O.V., Livebearers, Livebearers, Breeders, May; Coventry; Goldwater, A.O.V., Tropical, Egg-layers, Breeders.



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

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AT the Annual General Meeting of the **Hutton Grammar School A.S.** the Chairman, Dr. R. Tomlinson, in giving his report on the past year's work said that the interest shown at meetings has been very encouraging. In referring to the second Junior Open Show, he said it was ambitious for a small school society to stage an open event and a great deal of useful experience had been gained by those taking part in such a venture. One of the distinctive features of the aquarist society is its ability to arrange its own affairs, and this of course suggests well for the future. The secretary, N. D. Swindell, mentioned a few of the events held during the year and followed up by thanking the members for making his first job somewhat easier. The treasurer, R. J. Stronger, said that the accounts were very healthy.

Following a very successful year, all the officers were unanimously elected to continue in office for a further year. The position of chairman was left vacant until one of the new members taking up appointments in the school could be approached. The present chairman, Mr. R. Tomlinson, was leaving to take up a new appointment in Warrington. The members wished him well and preserved him with a look on fish. Officers for 1967/68: Secretary, N. D. Swindell, 25 Hemel Lane, Watton-Se-Dale, Preston, Lancs. Phone 17070; Treasurer, R. J.

Stronger; Equipment Officer, J. S. Mainland; Assistant Secretary, J. H. Bradley.

THE chairman of the **High Wycombe A.S.**, Mr. R. F. Baynton, gave a most encouraging report for the year at the annual general meeting. Membership has increased and the club functions have included three very successful excursions as well as table shows, talks, and inter-club competitions. Earlier this year Mr. E. Chatfield who has been a member for many years was made a life member and elected an honorary vice president.

The officers elected at the general meeting were: Chairman, Mr. R. F. Baynton (re-elected); Vice Chairman, Mr. A. Wilkinson (re-elected); Secretary, Mrs. P. R. Baynton, 135 Herbert Road, High Wycombe, Bucks.; Treasurer, Mr. A. Wilkinson (re-elected); Librarian, Mr. E. Chatfield (re-elected); Publicity Officer, Mr. P. H. Halliwell; Equipment Officer, Mr. R. Thomas, and Committee members: B. Pearce, C. Barrie, B. Collins; Show Secretary, Mr. C. Pike, 16 Ashley Drive, Tyler Green, Bucks. During the Annual General Meeting members were reminded that the Society has rejoined the Three Counties Group Society. The High Wycombe Society is looking forward to another successful year with even more challenges in inter-club competitions. It is hoped that many new members will be forthcoming and these will be most welcome in this friendly society.

The Society's Annual Open Show is to be held on 2nd September on The Rye, High Wycombe, Bucks. This will include a guppy show organized by the Three Counties section of the Federation of Guppy Breeders Societies. Details are obtainable from Mr. C. Pike, 16 Ashley Drive, Tyler Green, Bucks.

JULY was a busy month for the **Rosemead A.S.**. The first meeting was a Table Show for Livebearers and Labrynthia, the winners of the first class being 1 and 2, N. Richards; 3, Mr. Linsay, and in the second the placings were: 1, T. Kemp; 2, J. Murchant; 3, A. Gigg. The club recently staged an exhibit of fish and equipment in the local Hobbies show run as part of the Staines Carnival. The second meeting was an Inter-Club Table Show with Rocknall A.S. the results being a win for Rosemead by 910 to 923 points; first was Mr. Perry (Rosemead) and second and third Mr. and Mrs. Carter (Rocknall). While the fish were being judged the members watched a film and tape show loaned from Hendon A.S.

THE July Table Show results of the **Aireborough and District A.S.** were as follows: Specialized Class: 1, Mr. Lister; 2 and 3, Mr. Whitley, Novice Class: 1 and 3, Mr. Colson; 2, Mrs. Irem; A.O.V. Class: 1, Mr. Whitley; 2, Mr. Muggson; 3, Mr. Lister, Junior Class: 1 and 3, Master Lister; 2, Master Lawson, Best Fish of the Month Cup: Mr. Whitley.

A MEETING of the committee of **Bedworth A. & P.S. and Nuneaton A.S.** has been held recently to form an inter-club competition. Two shows have been arranged for this year, one in September and one in October (four classes per show). Points for winning fish will be on a 4, 3, 2, 1 basis.

The following are the results of the latest Table Show of **Bedworth A. & P.S.** held at Bedworth recently: Guppies, catfish and loach, Grade 1 Guppy: 1 and 2, Mr. and Mrs. B. Scully; 3, Mr. H. Coombes; 4, Mr. R. Tedds (all venials); Catfish and Loach: 1 and 2, Mr. and Mrs. B. Scully (Corydoras Shubia and Myxer); 3, Mr. R. Tedds (Bronze Corydoras); 4, Mr. H. Coombes (Bronze Corydoras); Grade 2 Guppy: 1, Mr. B. Gudge; 2, Mr. A. Slade; 3, Mr. T. Richards; 4, Mr. D. Cannon (all Venials); Grade 2 Catfish and Loach: 1, Mr. D. Tompkin (Kohli Loach); 2, Mr. C. Philmore (Kohli Loach); 3, Mr. R. Vardon (Stone Loach); 4, Mr. D. Montgomery (Bronze Corydoras).

THE results of the third Open Show of the **Stone A.S.** were as follows: Plany A.V. Aquarist: 1, E. G. Leadley (Stone); 2, I. Hough

(Stone); 3, C. Barlow (Stone); 4, H. G. Leadley (Stone); Breeders Livebearers: 1, Mr. and Mrs. R. T. Scully (Bedworth); 2, K. Pinner (Bedworth); 3, Mr. and Mrs. R. T. Scully (Bedworth); 4, Mr. and Mrs. D. T. Davies (Bedworth); Breeders Egg-layers: 1, 2 and 3, J. Lee (North Staffs.); 4, K. J. Harvey (Stone); Pair Livebearers: 1, W. Smith (Merseyside); 2, A. Foster (North Staffs.); 3, J. Lee (North Staffs.); 4, Mr. and Mrs. R. T. Scully (Bedworth); Pair Egg-layers: 1, P. Underwood (Leamington); 2, D. Wilkes (Haydon); 3, D. Thomas (Merseyside); 4, H. L. Hand (Tamworth); Guppies: 1, P. Underwood (Leamington); 2, 3 and 4, P. J. D. Saunders (Nottingham); 5, District: Parties: Mrs. S. Underwood (Leamington); 2, R. Todd (Bedworth); 3, W. Merrill (Derby Regent); 4, Mr. and Mrs. R. T. Scully (Bedworth); Swordtails: 1, Mr. and Mrs. D. T. Davies (Bedworth); 2, H. L. Hand (Tamworth); 3, G. Robin (Widnesbury); 4, Mr. and Mrs. H. T. Scully (Bedworth); Mollies: 1, G. Robin (Widnesbury); 2, H. Coombes (Bedworth); 3 and 4, Mr. and Mrs. R. T. Scully (Bedworth); Rainbow: 1, D. Thomas (Merseyside); 2, T. Payne (Stone); 3, G. Scott (North Staffs.); 4, Mrs. S. Davies (Derby Show Group); Danos: W.C.M.M. Rainbow: 1, Mr. and Mrs. D. T. Davies (Bedworth); 2 and 3, E. Sheehy (Coventry); 4, R. Parnell (Stone); Luchcarps: 1, D. Parsons (H.K.A.); 2 and 3, T. Payne (Stone); 4, K. J. Harvey (Stone); Fighters: 1, 2 and 3, M. Davies (Derby Show Group); 4, J. Lee (North Staffs.); A.D.V. Amateurs: 1, W. Merritt (Derby Regent); 2, A. Peake (North Staffs.); 3, H. L. Hand (Tamworth); 4, Mr. and Mrs. D. T. Davies (Bedworth); Barbs (under 1-inch): 1, D. Thomas (Merseyside); 2, H. Shakerpear (Bedworth); 3, P. Underwood (Leamington); 4, 1. Bishop (Stone); Barbs (over 1-inch): 1, A. Peake (North Staffs.); 2, T. Debono (Leamington); 3, J. Lee (North Staffs.); Goldfish (Dwarf): 1, Mr. and Mrs. D. T. Davies (Bedworth); 2, W. Merrill (Derby Regent); 3, Mr. and Mrs. R. T. Scully (Bedworth); 4, E. G. Leadley (Stone); Cavendish (Large): 1, W. Merrill (Derby Regent); 2, F. Clowes (Leak); 3, J. Smart (North Staffs.); 4, K. J. Harvey (Stone); Characins (under 1-inch): 1, T. Payne (Stone); 2, G. Robin (Widnesbury); 3, T. Stannin (Derby Regent); 4, G. Robin (Widnesbury); Characins (over 1-inch): 1, E. J. Harvey (Stone); 2, T. Stannin (Derby Regent); 3 and 4, D. Thomas (Merseyside); Labors and Sharks: 1, H. L. Hand (Tamworth); 2, F. Clowes (Leak); 3, K. J. Harvey (Stone); 4, J. Smart (North Staffs.); Corydoras Catfish: 1, G. Scott (North Staffs.); 2, H. Shakerpear (Bedworth); 3, T. Payne (Stone); 4, E. Sheehy (Coventry); A.O.V. Catfish: 1, J. Smart (North Staffs.); 2, T. Debono (Leamington); 3, E. Sheehy (Coventry); 4, J. Lee (North Staffs.); Loaches: 1 and 2, M. Davies (Derby Show Group); 3, A. Peake (North Staffs.); 4, Mr. and Mrs. W. Merritt (Derby Regent); A.O.V. Tropical: 1, T. Stannin (Derby Regent); 2, D. Thomas (Merseyside); 3, M. Davies (Derby Show Group); Judo Trophy for the Best Fish in the Show awarded to W. Merrill of Derby Regent A.S. with a Pike Gichid class. Total entries 277. Secretary: Mr. D. G. Leadley, 19 Firhill Lane, Walton, Stone, Staffs.

AN evening inter-club Show was held by **Stretford and District A.S.** recently and this was well attended by members from Belle Vue, Gorton, Hale, Stockport and Tropical Aquarist Breeders. Over 150 fish were displayed in six classes, judged by Mr. B. Brown, F.N.A.S. Prizes were awarded to each class winner and a shield for best in show was won by Mr. A. B. Wilks (Stretford) with his Sen. The Stretford club gained the most points with four firsts, four seconds and five thirds, followed by Gorton Aquarist Society. The results were as follows: Livebearers: 1, Mr. Prescott (Belle Vue), 76 pts; 2, Mr. Allen (T.A.R.), 74 pts; 3, Mr. Kilbride (Stretford), 69 pts. Barbs: 1, Mr. Prescott (Belle Vue), 69 pts; 2, Mr. Price (Gorton), 65 pts; 3, Mr. Booth (T.A.R.), 49 pts. Characins: 1, Mr. Price (Gorton), 89 pts; 2, Mr. Price (Gorton), 76 pts; 3, Mr. Wilks (Stretford), 75 pts. Luchcarps, Rainbow and Danos: 1, Mr. and Mrs. Charlton (Stockport), 70 pts;

2, Mr. Ogden (Stretford), 66 pts; 3, Mr. Wilks (Stretford), 63 pts. Sharks and Poies: 1, Mr. Johnson (Stockport), 73 pts; 2, Mr. Collins (T.A.R.), 69 pts. Amateurs: 1, Mr. Allen (T.A.R.), 75 pts; 2, Master Blackwood (Hale), 74 pts; 3, Mr. Greenwood (Gorton), 69 pts. Catfish: 1, Mr. Karshaw (Stretford), 69 pts; 2, Mr. Kilbride (Stretford), 83 pts; 3, Master Hodgkinson (Gorton), 80 pts. Carfish and Loaches: 1, Mr. Smith (Stretford), 84 pts; 2, Mr. Wilks (Stretford), 78 pts; 3, Mr. Middleton (Gorton), 75 pts; 4, Mr. Wilks (Stretford), 92 pts; 5, Mr. Hodgkinson (Gorton), 75 pts; 6, Mr. Madden (Stretford), 74 pts. Coldwater: 1, Mr. Greenwood (Stretford), 83 pts; 2, Mr. Greenwood (Stretford), 70 pts; 3, Mr. McClements (Stretford), 69 pts.

THE annual open show of **Southampton and District A.S.** attracted so many entries from all over the south that both halls had to be hired at St. Peter's Church. One to accommodate the tropical fish entries, and the second for goldfish and other coldwater varieties.

Public support, however, did not match the enthusiasm of the competitors, and it is difficult to say whether lack of publicity or our climate was responsible for so many people missing an extremely colourful and delightful exhibition.

Successful exhibitors were: A.V. female guppy: 1, N. Wright; 2, D. V. Jones; 3, C. Fleming; A.V. male guppy: 1, G. Gilard; 2, D. V. Jones; 3, P. Puckney; A.V. guppy: 1, A. Nikolic; 2, G. Gilard; 3, N. Wright; A.V. livebearer: 1, K. Clough; 2, J. Wilson; 3, W. Nepton; A.V. characin: 1, P. Puckney; 2, P. Puckney; 3, P. Puckney; A.V. barbs: 1, K. Brown, Jr.; 2, L. Follington; 3, I. Perman; Dwarf minnow and exorbis: 1, D. V. Jones; 2, G. Gilard; 3, A. Williamson; A.V. fighter: 1, M. Corbett; 2, N. Slosser; 3, N. Slosser; A.O.V. labrynth: 1, R. Brown, Jr.; 2, I. Perman; 3, N. Wright; A.V. cichlid: 1, L. Follington; 2, I. Perman; 3, W. Nepton; A.V. catfish or loach: 1, I. Perman; 2, P. Puckney; 3, A. Williamson; A.O.S. tropical fish: 1, W. Clough; 2, G. Gilard; 3, N. Wright; A.V. plant: 1, V. Hunt; 2, V. Vesper; 3, V. Vesper; Tropical breeders category: 1, D. V. Jones; 2, D. V. Jones; 3, N. Wright; Tropical breeders livebearers: 1, N. Wright; 2, G. Gilard; 3, W. Nepton; Common goldfish: 1, V. Vesper; 2, D. V. Jones; 3, V. Vesper; Shadblow: 1, Mrs. Vesper; 2, P. Puckney; 3, P. Puckney; Fantail: 1, H. Gilbert; 2, H. Gilbert; 3, H. Gilbert; A.O.V. fancy goldfish: 1, V. Hunt; 2, Mrs. Vesper; 3, S. Rowe; A.O.V. pond and river fish: 1, J. Kilbride; 2, V. Vesper; 3, V. Hunt.

Furnished tropical tank, club entry: 1, Southampton and District A.S. Furnished cold water tank, club entry: 1, Southampton and District A.S. Furnished tropical tank, individual entry: 1, Mrs. J. Jones; 2, A. Williamson; Furnished cold water tank, individual entry: 1, H. Gilbert. Best tropical fish in show: 1, Follington. Best coldwater fish in show: 1, Sellwell.

A PUBLICITY OFFICER has been appointed by the **Federation of Scottish A.S.** He is Mr. James Turner, 13, Greenmount Drive, Dumfriesshire, 196.

THERE is a change of venue and meeting dates of the **Bracknell and District A.S.** The new details are as follows: Club nights on the first and third Mondays in each month at the "Admiral Cambridge", Princes' Square, Windsor Road, Bracknell, Berks.

AQUARISTS' CALENDAR

2nd September: High Wycombe A.S. Annual Open Show at the Rye, High Wycombe. This will include a Grayer Show staged by the Three Counties section of the F.G.B.S. to be judged under their rules. Details for both sections from Mr. C. Pike, 16 Ashley Drive, Tylers Green, Penn. Bucks.

2nd September: Yate and District A.S. Post Open Table Show. Schedules from Show Secretary, Mr. J. B. Powell, 114 Cranleigh Court Road, Yate, Glos.

3rd September: Hartlepool A.S. annual show, Labour Hall, Park Road, Hartlepool. Show Secretary, Mr. R. Hay, Hartlepool A.S., 84 Portland Avenue, Billingham, Co. Durham.

3rd September: Reigate and Redhill A.S. First Open Show. Secretary (Show): Mr. E. Ikin, The Yew, Westcott Road, Epsom.

3rd September: Valley A.S. Second Open Show, Civic Hall, Rampton, Lancashire. All details from the Secretary, Mr. J. Burnworth, 25 Brookside Crescent, Greenmount, Nr. Bury, Lancs.

3rd-10th September: Nottingham and District A.S. Open Show at the Drill Hall, Triumph Road, Nottingham.

10th September: Huddersfield Tropical Fish Society. Fish Open Show. Secretary, Mr. L. Kaye, 6 Totnes, Hudders, Huddersfield.

15th-16th September: Bristol A.S. Annual Open Show at Bishopston Parish Hall, Gloucester Road, Bristol. Hon. Secretary, Mr. W. G. Ham, 18 Imperial Road, Bristol, 4.

16th September: Newport A.S. Annual Open Show, Duffryn Junior High School, Know Hill, Newport. Show Secretary, Mr. M. J. Parry, 45 Western Drive, Gabaith, Cardiff.

16th September: Hounslow and District A.S. open show, Balustrade School, Hounslow, Middlesex. Show schedules are obtainable from Mr. Derek Woodward, 18 Elvstone Road, Hounslow, Middle.

17th September: Atherton A.S. Open Show. Show Secretary, Mr. A. W. Spencer, 11 Orchard Close, Witherley, Atherton, Cheshire.

17th September: Bradford and District A.S. annual Open Show at The Terma Hall, Weirgate, Bradford, 1.

17th September: Federation of Scottish Aquarist Societies Convention, Co-operative Society Halls, Canal Street, Perth, Scotland. Mr. D. McInerney (McInerney's Aquarists).

22nd September: Bracknell & District A.S. Open Show, Victoria Hall, Bracknell, Berks. All available details from Show Secretary, Mr. B. Johnson, 18 Highfield Close, Coven, Farnborough, Hants.

24th September: Blackpool and Pylde A.S. Open Show at Haywardside School, South Promenade, Blackpool.

26th September: Madbury A.S. Open Show, St. John Fisher School, Ordance Street, Chatham. Schedules are obtainable from Mr. S. Brown, 5, Allison Avenue, Gillingham, Kent.

1st October: Heywood and District A.S. Open Show at Labour Club, Bridge Street (opposite Seven Stars), Heywood, Lancs.

7th October: Mid-Herts. A.S. Open Show at The Pudding Hall, Vicarage Street, St. Albans. Show Schedule available from J. L. Cooper, 22 Poodfield Crescent, St. Albans, Herts.

7th October: East London Aquarist and Pondkeepers' Association Annual Open Show. Show Schedules available from Mr. G. Green, 70 Barton Avenue, Bush Green Road, Barnford, Essex.

21st October: Goldfish Society of Great Britain Open Convention, Chelsea Community Centre. Schedules can be obtained from Mrs. F. Whittington, The Grange, Coach House, Southey Road, Herts, Surrey.

25th-26th October: British Aquarists' Festival, Belle Vue Zoological Gardens, Manchester. Details from Mr. G. W. Cooke, Spring Grove, Field Hill, Busby, Yorks.

12th November: N.E.L. Aquarist Society. Secretary, Mr. R. West, 99 Warrick, East Kilbride.

18th November: Droylsley and District A.S. Third Annual Open Show. Venue details, etc to be announced later.

25th November: Fur, Feather and Aquaria Show organized by the Borough Council of the Lushan Borough of Hackney, King's Hall, Lower Clapton Road, E.5.

26th November: Leeds and District A.S. Open Day Show.

1st December: Ayrborough & District A.S. Annual Open Show.

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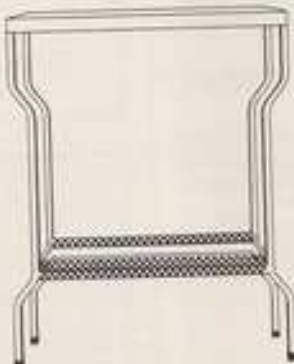
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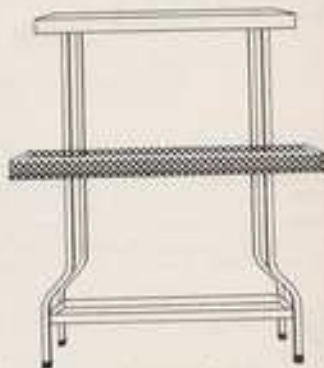
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