

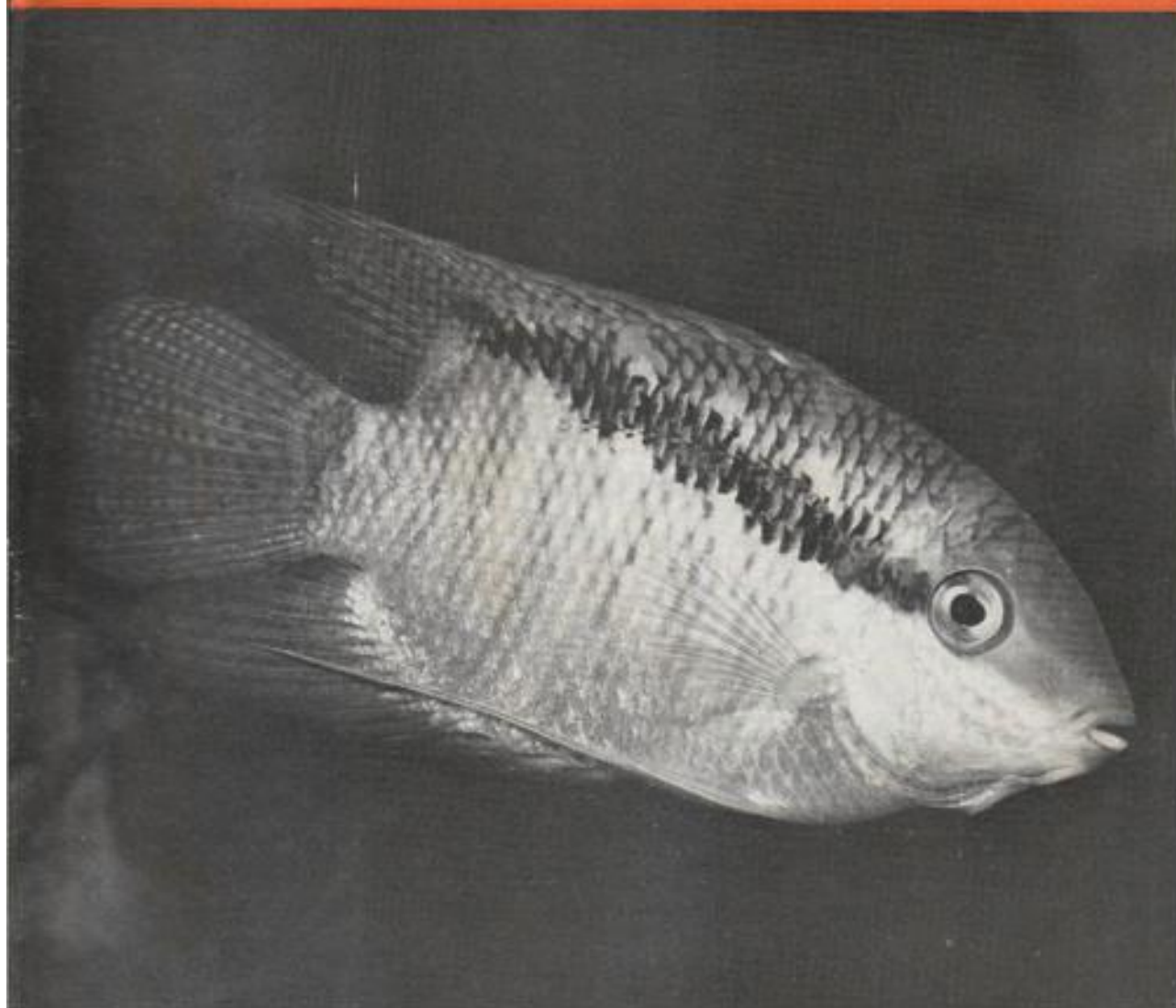
November  
1968

*the*

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monthly

# *Aquarist*

*and Pondkeeper*



# the Aquarist

and Pondkeeper

Printed by Buckley Press  
THE BUTTS, HALF ACRE  
BRENTFORD, MIDDLESEX.  
Telephone: 01-560 6221.

Subscription Rates The Aquarist will be sent post free  
for one year to any address for  
£1 15s. 0d. Half-yearly 17s. 6d.

MSS. or prints unaccompanied by a  
stamped addressed envelope cannot be returned and no re-  
sponsibility is accepted for contributions submitted.



Founded 1924  
as 'The Amateur Aquarist'  
Vol. XXXIII No. 8, 1968.

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The Editor accepts no responsibility for views expressed by contributors.

Editor: Laurence E. Perkins

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# Saltwater Cleaners

by Trevor Wild

THE ABOVE TITLE may be confusing to some aquarists and so a slight clarification might be an advantage. In the warm oceans of the world abound many minute parasitic crustaceans and they must prey on other creatures to obtain their nourishment. Often this involves burrowing under the skin of their host. When this occurs in a fish then it is very uncomfortable as the tunnelling action of the parasite causes irritation of the skin. As the fish has no appendages with which to deal with the itching such as arms or legs, it has to find another method of removing the disturbing guest. In the case of bottom-dwelling fishes they rub themselves against any solid objects to be found, such as stones or coral blocks. When skin-irritating parasites manifest themselves in a shoal of open-water fish then there really is havoc. The poor creatures attempt to rub against each other or leap out of the water in order to relieve the pain.

Nature, however, has created certain fishes and invertebrates to deal with the sufferings of the other fishes. These fishes swim up to their prospective clients and swim all over the body of the customer. Searching every scale, they pick out every creature they find and devour it with apparent relish. The customer all this time remains perfectly motionless, often in very peculiar positions (sometimes upside down) and do not move a fraction during the entire period the operation is being performed.

Very few fishes indeed are exempt from the attentions of the cleaner fishes, although a few do exist. The various species of lion fish are, however, not particular favourites of the cleaner fishes due to the fact that the lion fish will kill the diminutive cleaner. Cowfish also do not get on very well with a few types of cleaners. However, nearly every other fish will attempt to receive the prophylactic services of these sanitarians. Gener-

ally living in pairs the cleaners have their own 'surgery' on a particular spot on the reef. All the inhabitants of the surrounding area will come to these piscine surgeons and will wait in queues until it is their turn for a consultation. The giant barracuda will wait meekly along side the damsel fish which is only inches away from the mouth of a five hundred pound grouper. The tiny cleaners slide all over the patient, even going so far as to enter the gills and mouth to clean inside. Why the fish is not molested as it scours the mouth out is a complete mystery. Parasites living on fins are also unsafe from the cleaners as they go about their jobs. Up and down the fins, in and out of the mouth and gills and over every part of the body.

There exists in the Caribbean a blenny *Aspidontus taeniatus* which is a perfect replica of the genuine cleaner, *Labroides dimidiatus*. This blenny even swims like the cleaner and can even mimic different sub-species of the cleaner. However, the blenny's function is completely different from that of the cleaner's. This imposter swims up towards the unsuspecting fish which remains where it is so the cleaner can get on with the job. Contrary to the client's beliefs, however, the blenny sinks its teeth into the surprised fish which pretty soon has filigreed fins and a mutilated body. These blennies, fortunately, are rarely imported so the aquarist need not be worried about buying a cleaner fish. The chances of it being a blenny are very small.

There are about fourteen different fishes which can perform the cleaning operations but only five or six of the fourteen actually clean all types of fish all their lives. Some only clean their own species and only when they are young. Many of these fish make admirable community fishes and will remove any fungus or parasites the other inmates might have. Here it is my intention to discuss the various species available and their merits. In most articles of this kind, when the fishes are discussed it seems nothing more or less than a list, and so I hope the reader will bear with me here.

Firstly a few notes about the cleaner fishes in general. As has been mentioned previously, the cleaners work in pairs. It would be a good idea then, to obtain two when you are buying your fish. More than

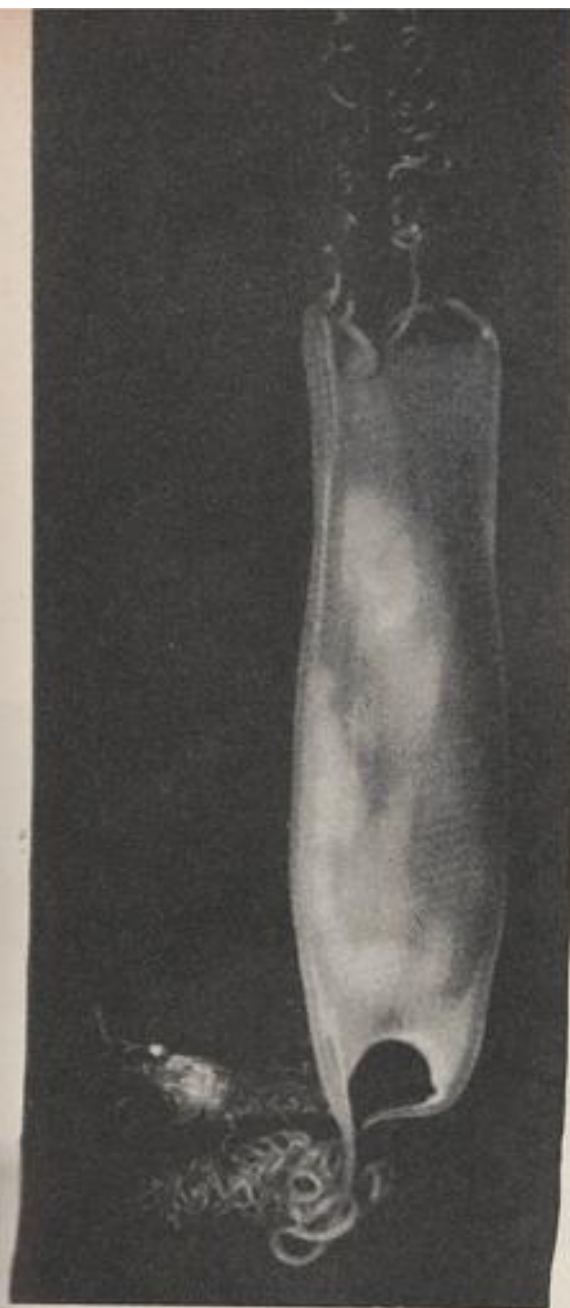
two will lead to trouble as they can be woefully pugnacious towards one another. As soon as your pair is placed in the tank they will immediately make for the bottom where a tiny crevice in the coral or a shell will be the makings of their neat abode. They soon settle down to normal tank routine and can be seen sliding in and out of the coral and other decorations.

All cleaner fish are hearty eaters and are not at all fussy about what is fed to them. Dried foods are eaten, but fresh food such as brine shrimp, white-worms, etc., are greatly appreciated. Chopped fish (not oily types) and shredded shrimps and the like are among the cleaner's favourites as they resemble the parasites in taste. Adult brine shrimp are taken ravenously and are preferred to cleaning fishes for food so it might be wise to bear this in mind if you want the cleaners to do their jobs with utmost efficiency.

As yet marine fishes have not been bred successfully but one of the first to be offered as "home-bred" will be the cleaner fishes. Many have spawned in captivity and have even hatched but the minute fry succumbed to the far from perfect conditions of the home aquarium. Perhaps there was something missing from the water, or there is some substance lacking in the foods offered. Success in moderation has been achieved with hard boiled egg and the tubed liquid fry foods.

All cleaners are quite tough provided the tank is maintained at a constant temperature of about 80 degrees F. If this precaution is not taken, they are rather susceptible to white spot. Cleaners can be either wrasse or gobies and there are one or two butterflies which clean others when they are young. The most commonly kept cleaner is the neon goby, (*Elactineus oceanops*) which hails from the Florida Keys and other coral islands in the Caribbean area. Its name is derived from its similarity to the freshwater neon tetra so beloved by our freshwater brethren. The size of the goby is about three to four inches and is very eel-like in shape. The entire body is black with the notable exception of a large, bright blue strip which runs the whole length of the body. The neon goby, like many of its cousins is scaleless and has no lateral line. The pelvic

Continued on page 609



## What is it?

answer on page 602

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## Dolphins to oust vintage cars

*Brighton Evening Argus, Sussex*

BECAUSE of the huge success of the Brighton Aquarium's new dolphin pool, a £125,000 delphinarium is to be built in the old Princes Hall there which now houses a motor museum.

Mr. Frank Glover, managing director of the Aquarium, which is leased from Brighton Corporation, said that subject to corporation consent, a new dolphin pool arena, seating 1,000 people, would be ready by Easter, 1969.

The motor museum, which has been at the Aquarium since 1961, will be moved, and there is a possibility of it being housed on the West Pier.

Mr. Anthony Webb, managing director of A.V.P. Ltd., in Brighton, who owns the pier, said today: "We are investigating the possibility of having the motor museum on the pier."

### Great asset

The existing dolphin pool, situated at the western end of the Aquarium, was opened at Easter as a pilot scheme. But only about 250 people at one time can see the dolphin displays.

Mr. Glover said: "The new pool, to be constructed in the old Princes Hall, will cost £125,000. We shall be the first seaside resort in Britain to do things on such a scale, and it will be a great asset to the town.

The pool would be 80 ft. long and 30 ft. wide. The public would be able to walk round the sides of the pool and see the dolphins at play under water through observation windows.

A stadium area would be built above this concourse enabling 1,000 seated spectators to watch dolphin and seal displays.

Mr. Glover added that the new pool was part of his modernisation scheme for the Aquarium. In future every fish tank would have its independent filtration system, and modern decor for the tanks was being introduced.



# Large cichlids for the Aquarist

by J. M. Parry

WITHIN THE AREA in which I reside (South Wales) a great renewal of popularity is being experienced in the keeping of large cichlids, a family of bony, perch-like fish native to South American, Africa and parts of Asia. Several of the commoner species available to the hobbyist will be discussed in due course but let us, firstly, examine the necessary requirements for the successful keeping of large cichlids, in order that these may be fully understood before the embarkation on this branch of the hobby.

To my mind one of the greatest requirements for keeping all fish in good health, and particularly the

cichlids, is tank space. The question of how many fishes to a tank and the allied problem of absorbed oxygen in the water was dealt with in an excellent article by Mr. Peter Dendy (*Aquarist*, July, 1962). Dendy suggested that the formula  $2L^2 + 4$  should be used in the calculating of surface area requirements for various lengths of fish, L being taken as the length in inches that the fish is ultimately expected or hoped to attain, such measurement being taken from the tip of the nose to the caudal peduncle, the caudal fin itself being ignored. From such a formula the following was evolved:

A fish 1 inch long requires 6 square inches

A fish 2 inches long requires 12 square inches

A fish 3 inches long requires 22 square inches

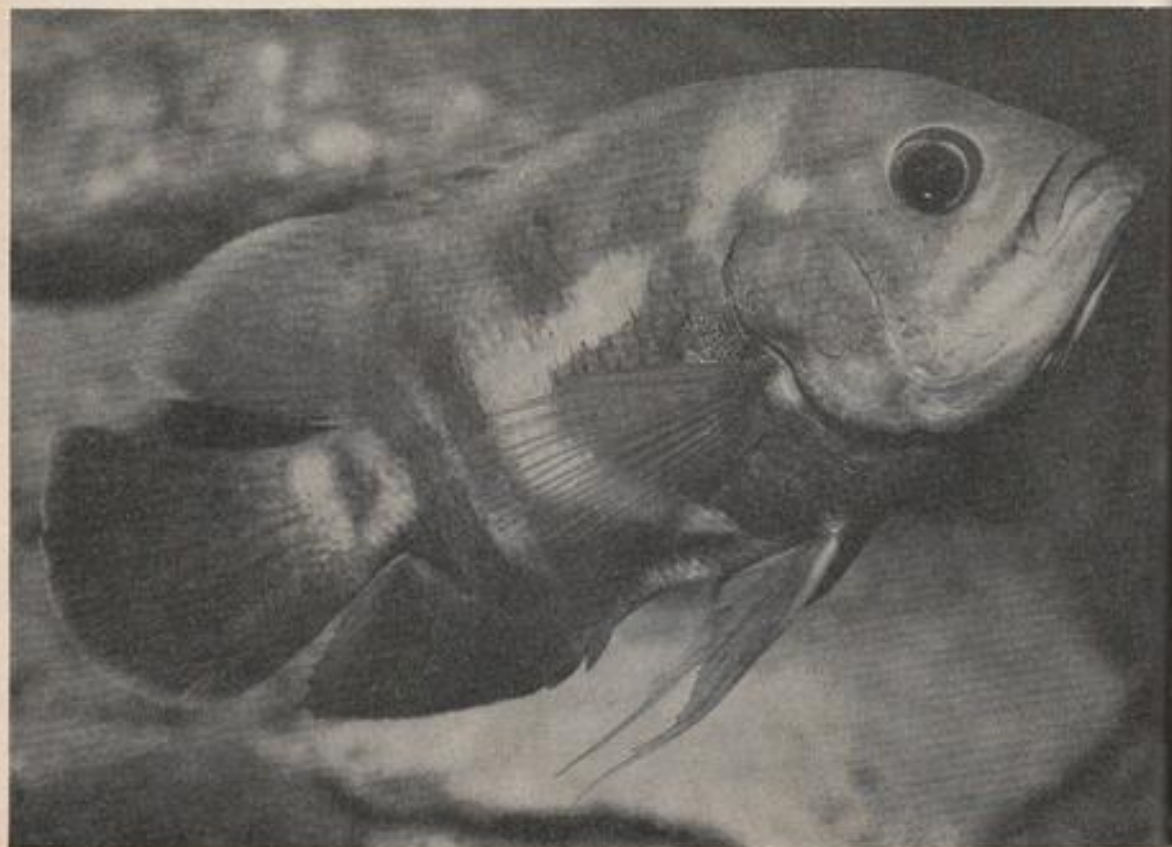
A fish 4 inches long requires 36 square inches

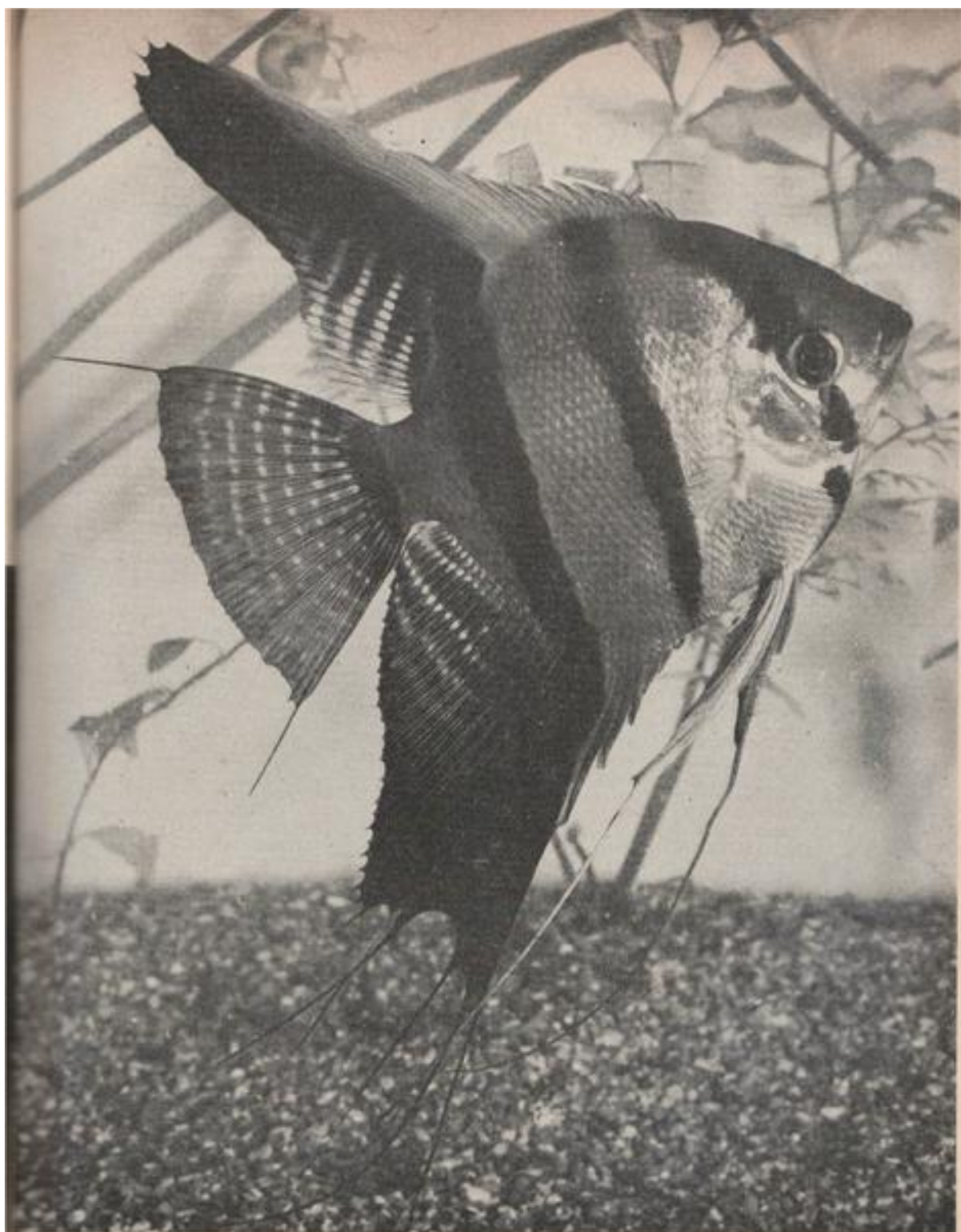
A fish 5 inches long requires 54 square inches

A fish 6 inches long requires 76 square inches

A fish 7 inches long requires 102 square inches

From this, therefore, it will be seen that a tank 3 ft. long  $\times$  12 in. high  $\times$  12 in. wide, having a surface area of





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# Large Cichlids for the Aquarist

continued from page 584

432 square inches will safely accommodate 12 fish of a length not exceeding 4 inches, or approximately 5 fish of a length not exceeding 6 inches. A 3 ft. aquarium should be regarded as the minimum sized tank to be used for cichlid keeping, particularly if any exhibiting is to be done.

Actual water conditions should not particularly worry the cichlid keeper, though it may be noted that the family has a preference for acid water with an approximate p.H. of 6.8. Almost every member of the family is exclusively carnivorous in diet, *tubifex*, white worm, whole or chopped earthworm, liver, cooked white fish, etc., filling the bill admirably. All too unfortunately many cichlids destroy aquatic plants, so it is best that rock-work forms the only tank decoration. A method of planting the back of the tank, and dividing such vegetation from the fishes' living quarters with a piece of glass is sometimes employed, which proves most effective, adding to the attraction.

Turning to the occupants of the aquarium, the Angel Fish is probably the most widely-kept member of the family, and one that has been in favour for many years. It is a fish of peaceful temperament and for this reason it is, when young, often sought after as a fish for the "community tank". This small, attractive fish soon makes itself very much at home, agreeing most amiably with the other occupants of the tank. It is, however, very unfortunate, that it grows so quickly, as within a year it is possible for a 1 inch fish to have grown into a 6 inch giant. Even at this length it is not necessarily aggressive, though one must agree that it would look completely out of place with regard to the size of its tank mates.

The genus is native to the Amazon and comprises three species, *Pterophyllum eimekei*, *P. scalare* and *P. altum*, which, together with a further four colour varieties offers great scope for selection. *Eimekei* and *scalare* have been extensively interbred and are almost indistinguishable. The third, *P. altum* is exceeding rare. In feeding habits the fish has a more catholic taste than many of its cousins,

dried food being accepted with equal relish. As far as possible, however, this diet should be supplemented with live, meaty food.

A relative of the aforementioned species, being similar in shape, is the Pompadour or Discus Fish (*Symphodon aequifasciata*). Regarded by many as the king of all freshwater fishes. It is a native of the Amazon Basin and Central Amazon Region of South America, found in two colour varieties, blue and brown. It is, on the whole, an expensive fish, small specimens around 1 inch costing upwards of £1, with large specimens costing as much as £20 or more per pair.

The Discus is not an easy fish to keep in good health, water condition in particular being the criterion. The water should be soft and acid, p.H. in the region 6.00-6.4, with the temperature maintained at 75°F. It has been stated by several knowledgeable authors that the water in the Discus' living quarters should never be allowed to become "old" as it is in this type of water that the dreaded "discus disease" is likely to occur. The advice given is that 25% of the water be changed weekly, great care being taken to ensure that the fresh water added is of the same temperature as that previously withdrawn.

I recently paid a visit to a well-known aquatic dealer, who proudly informed me that he had, that day, sold a pair of Discus to an enterprising young aquarist, who had further bought a 3 ft. bow-fronted aquarium in which to house the species. The owner, with some experience of keeping Discus, stated that he believed that the only way of maintaining them in good health was, as his customer intended, to house them in a tank exclusively to themselves where the attempt could be made to provide the required conditions for the maintaining of their good health, without having to "strike a balance" as is normal when keeping a motley selection of fishes together that have a wide range of temperature and water tolerance. A varied diet is necessary for maintaining good health, *tubifex* worms being seemingly a good basic food,

provided that it is thoroughly cleansed beforehand.

One of the larger cichlids is the Marbled (*Astronotus ocellatus*) which is found naturally throughout Central South America, in particular in the Amazon and its tributaries. The species grows to a length of approximately twelve inches, and is one that certainly cannot be trusted with any fish less than half its size. It is an effective destroyer of aquatic vegetation, and has a seemingly insatiable appetite for live worms and fish. In its favour, however, it is a handsome species, not too difficult to propagate, having a life span of upwards of eight years. Coloration would appear to vary depending upon age, the basic body colouring being an undertone of pale yellow, heavily mottled by a rich brown, sometimes interspersed with scarlet spots.

Other interesting possibilities for the mixed tank include the Jewel Fish (*Hemichromis bimaculatus*) a native of Africa (in particular the Nile and Congo rivers) which has the unfortunate reputation of being possibly the most pugnacious of all cichlids, though also has the attraction of being one of the most beautiful; the Blue Acara (*Aequidens latifrons*), one of the more common members of the family, and which is sometimes maintained in the average community tank along with such fish as the Swordtail (*Xiphophorus helleri*), Three-spot gourami (*Trichogaster trichopterus*), Paradise Fish (*Macropodus opercularis*) and Ted-tailed Black Shark (*Labeo bicolor*) without any aggressive tendencies being displayed; the Jack Dempsey (*Cichlasoma biocellatum*), which, as its name implies is a born "fighter" always willing to spar with any aquarium inhabitant; and, finally, three extremely placid species (for cichlids), the Banded Cichlid (*Cichlasoma severum*), the Flag Cichlid (*Cichlasoma festivum*) and the Keyhole Fish (*Aequidens maroni*).

With the exception of the various species of "mouthbreeders" (*Tilapia* spp.), a group in which the eggs are carried in the mouth of one of the parents, the Cichlid family may be said to have a standardized breeding

procedure, although, of course, minor differences occur, dependant upon the species being bred. It is most unlikely, however, that they will breed in the company of other aquarium occupants, so it will always be found a wise policy to set up a separate breeding tank, affording them conditions as near the ideal as is possible. This, in the main, consists of acid water, with no aquatic vegetation being present. A flower pot with the bottom knocked out should be placed in one of the rear corners, as it is on this kind of surface that the fish are most likely to spawn. After suitable conditioning of the potential breeding pair has been effected they may be

safely introduced into the breeding quarters, and from there on nature should be allowed to take its course.

In due time, provided that everything is to their satisfaction, the male will commence to chase a fleeing female around the aquarium, displaying his colours to true brilliance. Eventually the female will be seen to enter the flower-pot, laying her eggs in single layers along its internal base, followed by the male, ejecting his milt upon them as a means of fertilization.

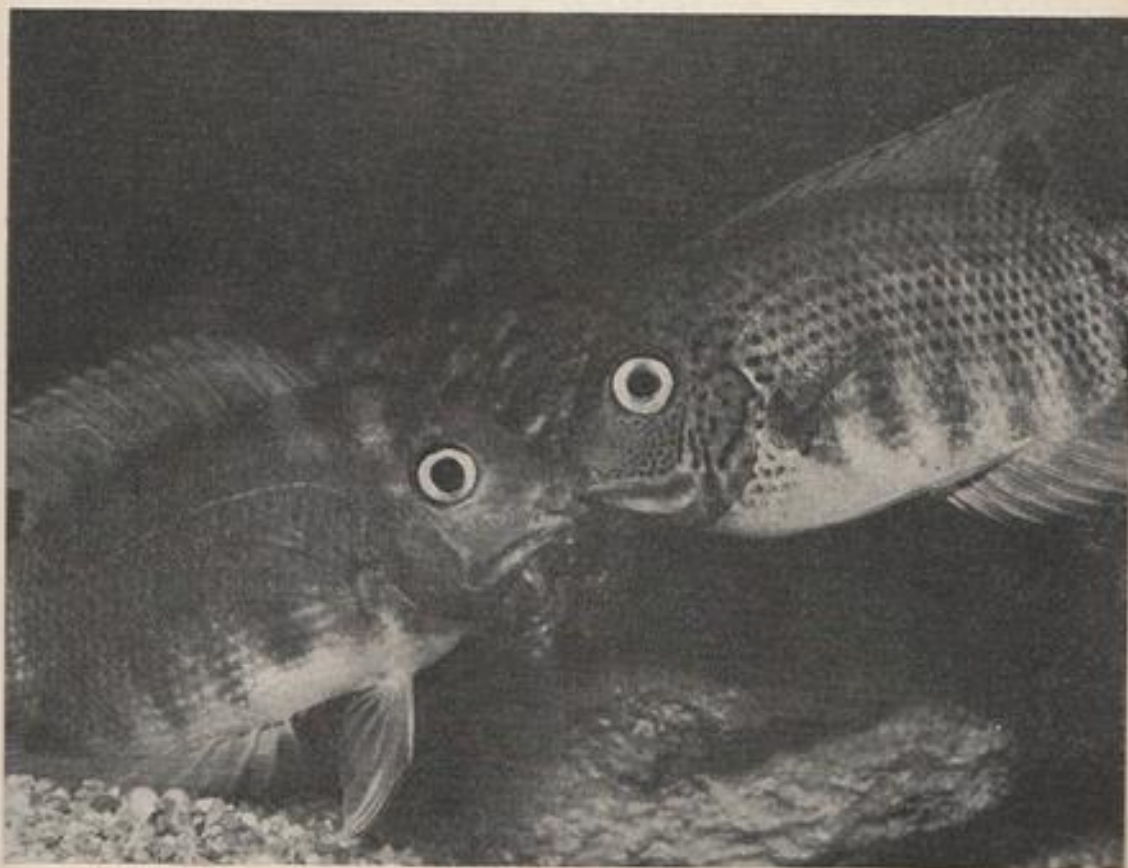
Hatching occurs within three days at a temperature of 80°F, when the fry will be noticed as a "jelly-like" mass swimming around the inside of

the flowerpot. The parents will take good care of their offspring, constantly picking them up into their mouths, rolling them around, and then expelling them, thus ridding the fry of any dirt or other such substance attached to their bodies. Upon free-swimming the first feeding will be necessary, which should be brine shrimp, followed in turn by finely-sifted *daphnia*, micro worm, chopped *tubifex*, chopped earthworm, etc.

**Page 584** *Astronotus ocellatus*

**Page 585** *Pterophyllum eimekei*

**Below** a pair of *Cichlasoma severum*





## Coldwater queries answered by A. Boarder

**My goldfish have spawned five times in the past month and I would like to know if this is unusual? Also I have a male black moor among them. Shall I get crosses with the goldfish?**

Goldfish will sometimes spawn once every month in the right conditions. It may be that it was a different female which was spawning or that only a few eggs were released at each occasion. The moor can breed with the goldfish as it is just a variety of the goldfish not a separate species. All the fancy goldfish can breed together but the young from such spawning are not likely to be of any value. Even though a good fish of either parent may crop up it is very unlikely that such a fish will ever produce anything worth while in future.

**Some of my fish in the garden pond are being attacked by something which brings blood and is afterwards covered with a white substance like wool. What is the trouble please?**

It appears that your fish are attacked by fish lice, *Argulus*. These attach themselves to a fish and suck its blood. A small wound is caused which is then attacked by fungus disease. You might be able to pick the lice from the fish with tweezers but an easier way is to immerse the fish in a disinfectant for a short time when the lice will leave the fish. The solution can be a mild one of Dettol or T.C.P. Do not make it too strong, about a quarter-teaspoon to a gallon of water. Watch the fish whilst in the solution and remove it if it looks in trouble.

**I have lost a female goldfish after it had been chased by males. I expected some eggs but have found none. The female fish which died was very bloated and the scales had mostly come off. What is the trouble?**

Where there are a number of males to a female it is sometimes found that the female may be so harrassed by the

males that it can be injured and die. This is more likely in a concrete pond or one where there are many rocks. It may be another reason, such as the female may be suffering from dropsy. This causes the fish to swell up and the scales protrude or even fall off. The male fish have noticed the

### OUR EXPERTS' ANSWERS TO YOUR QUERIES

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

swollen body of this female and have been encouraged to chase the female to encourage it to lay eggs. It is well known that a fat fish will start off the males chasing such a fish. If you have too many males to the females it would be a good plan to change the relationship by either introducing some more females or reducing the number of males. One male fish could fertilise all the eggs of dozens of females.

**I have a splendid oranda which I hope to show. It has developed what appears to be small white growths on its gill covers and the front edge of the pectoral fins. I am sure this is not white spot or sex tubercles and would be grateful for your advice?**

I do not know why you should say that you are sure that these are not sex tubercles as I am sure that they are. Your excellent sketch bears out this quite definitely. You may also find that besides the white tubercles on the pectoral fins the front edge of the fins or the first rays are also very enlarged as to give the impression that the fins are deformed. I think that your fish is in grand condition and for goodness sake do nothing to upset it.

**I have bred a number of goldfish fry this year and have them in a good-sized tank. There is plenty of growing plant life in the water and the fry are growing although very slowly. I have to go away from home for about four days and wonder what to do about feeding them while I am away?**

Do nothing at all. The fry will be quite all right whilst you are away and the surest way to lose them would be to ask a kind neighbour to come in to feed them. This way spells trouble with a big "T." You will find that the fry can find plenty of food off the water plants and will be none the worse from the lack of artificial feeding. I have been away for two occasions of a week and eight days and have left hundreds of fry unattended during that time. No fish was lost during my absence.

**How can I clean off blanket weed from the side of my pond?**

A short growth of this weed is not detrimental as it is an oxygenating plant. However, if it gets too long it can be removed by twisting a broken stick among it.

**I have a number of fry which I have raised from my goldfish in a pond. Can I keep them through the winter in a converted coal bunker, 4 feet by 2 feet deep?**

If the coal bunker is freshly galvanised it could be dangerous to the fry. An old one might not be as dangerous. I have had in use for over twenty years a number of galvanised cisterns but they have been floated over with a cement wash so that they are now safer. The zinc in the galvanising could be poisonous to fish.

**I have a lot of water snails which have bred in my pond. What can I feed them on?**



Do not trouble to feed the snails specially as they will find plenty of food in the pond among the water plants and the food you give for your fish. These are a mixed blessing in a pond and most experienced pond-keepers do without them.

I bought a water lily and some of the stems were broken when it arrived. I have planted it in a special container but it does not appear to be growing. Is there anything I can do to encourage growth?

Lilies are easily broken in transit as their stems are very tender. It would be very unusual if this damage actually killed your plant. It is possible that you set it too deeply in the water to start with. It should be raised to within a few inches of the surface of the water until growth commences. This can be done with a couple of bricks. As the leaves develop the pot can be lowered.

I have kept common goldfish and now intend to keep fancy varieties. Is there any difference

in the diet of the two types?

There is no difference whatever. All fancy goldfish come from the original goldfish stock and can eat and digest the same foods.

Are there any standards for pointing native fish?

Standards are unnecessary for British coldwater fish as they are all alike. The only difference between fish would be their condition and size. If a fish is not deformed and is in good condition, its colour and deportment will be satisfactory.

## Tropical queries answered

My 3 ft. tropical aquarium is lighted by two 25-watt lamps and my greatest problem is brown algae. Also, very few of the plants I have introduced from time to time stay alive for long. Please tell me what to do to overcome these difficulties?

Your greatest need is a higher-intensity light for a longer day. In a word, if you allow 40-watts of ordinary electric lighting for roughly every square foot of bottom area, and keep this lighting switched on for at least ten hours a day, then you should see a marked improvement in the appearance of your freshly and, we hope, generously planted aquarium within the space of a month or two.

Is it true that the young of large-growing fishes kept in a medium-sized aquarium without artificial aeration will stay small or dwarfed permanently?

Not always. The fry of some species will continue to grow under the most adverse conditions. But bear in mind that the health and comfort of all fishes is determined by the oxygen available, and fast-growing fishes use up oxygen very rapidly.

I am remaking a concrete path which has had rough use over the past ten years. Some of the small broken pieces, well-worn by the weather, would look attractive in an aquarium. Would it be safe to use them without running the risk of making the water excessively alkaline?

Very little, if any, free lime should work out of concrete which has been

exposed to the buffeting of wind and rain over several years. All the same you would be well-advised to test for alkalinity. To do this, spot the scrubbed and well-soaked concrete (left wet) with drops of hydrochloric or sulphuric acid and then hold it close to an ear. If you hear a fizzing sound then you can be certain free lime is present.

Up to the time of writing I have been supporting my cover glass on two iron wires hooked at the ends over the top angle bars of my aquarium. But last night a friend told me that there is nothing I can do to stop drops of water impregnated with the metal falling into the aquarium and poisoning the fish. What is your opinion?

It is not a good thing to have metal in contact with aquarium water. But there is a way out of your difficulty. Just insert the wires inside lengths of plastic or rubber tubing. This will safeguard the wires against rust and the fishes against metal poisoning.

I used ordinary window putty to fix the glass sides into my aquarium frame, but after filling the tank an oily scum has appeared on the water. Is there any preparation on the market I could use to paint over the cement to prevent the oil working out?

If you draw sheets of newspaper across the surface of the water over the next few days you will rid your aquarium of this nuisance.

My blue acara has developed a fungoid growth on the iris of one

eye. Can you tell me of a suitable treatment?

Occasionally a cure for this trouble has been effected when the eye has been swabbed on alternate days with castor oil. You may have to continue treatment for about a week to nine days.

I have just brought a young *Ghanna asiatica* and would be grateful for any information you can give me regarding the disposition of this fish and its care.

*G. asiatica* is too quarrelsome and pedacious to keep with other fishes. It is prettily marked, however, and makes quite a showpiece in a single-species aquarium. It calls for plenty of worms and meat in its diet and a temperature of about 75°F (24°C). A tank measuring 24 in. by 12 in. by 12 in. is about right for a pair.

My domestic heating system maintains a temperature of 70°F (21°C) what ever the weather outside. Please give me the names of plants and fishes which would flourish in a well-lighted tank placed in my lounge and not given any additional heating.

The vallisnerias, sagittarias, spatterdocks, milfoils and *Elolea densa* are among those plants that would flourish at a temperature in the middle sixties to lower seventies (°F). As to fishes, the following should do well: White Cloud Mountain minnows, Australian rainbow fishes, golden and pygmy barbs, half-striped barbs, neon tetras, guppies, *Corydoras aeneus* and *C. paleatus*. But all fishes taken from a warm tank

Continued on page 98



# Queen of the Amazon

by Philip Swindells

IN THE YEAR 1801 an adventurous botanist called Haenke came across an enormous waterlily growing in a sluggish backwater of the river Amazon deep in the heart of Bolivia. In 1838 after much argument and discussion amongst eminent botanists, this aquatic giant was finally given the distinguished name of *Victoria amazonica*, in honour of the reigning monarch. Two years later the first seed was collected and sent to the Royal Botanical Gardens, Kew, but despite every care and attention the seed failed to germinate. Subsequent attempts failed with regular monotony until in 1849 a Mr. Paxton of Chatsworth finally managed to raise a plant. This eventually flowered in the early November of that year, whereupon an exuberant Mr. Paxton presented both a leaf and a flower to the delighted Queen Victoria.

Nowadays a lot more is known about the fads and fancies of this most remarkable plant and consequently it is more frequently seen adorning heated pools in the larger botanical gardens and public aquaria.

It is doubtful whether few, if any but the most affluent amateur gardeners or aquarists have suitable accommodation in which to successfully grow a Victoria, but the botanical characteristics and the method employed by various institutions in cultivating these giants is in itself a most fascinating and enthralling subject.

The seeds, which are about the size of garden peas, usually ripen during November and December. They are stored in water or saturated green sphagnum moss in a test tube until required for sowing during early March. They are then sown individually in three inch clay pots in a compost equivalent to John Innes No. 1, but devoid of the base fertiliser, as this tends to foul and cloud the water. A mixture of dried blood and bone meal usually proves to be a suitable substitute. A thin layer of clean silver sand is then

spread over the surface of the compost and the pots are submerged in water maintained at a temperature of 75°F in an aquarium or similar receptacle. After about three weeks the seeds germinate and push up two or three small hastate leaves which lie just under the surface of the water. The fourth or fifth leaf usually proves to be the first floating leaf and is some six or eight inches in diameter. At this stage the plant should be repotted in an eight or ten inch pot and stood in the pool with about eighteen inches of water. During the next month, round juvenile floating leaves will be produced regularly at the rate of two or three a week, gradually increasing in size until reaching some two feet across, when the characteristic upturned edge will become evident. This is the true adult floating leaf, and its production usually indicates that the plant is ready for repotting. As this waterlily is a gross feeder, the new compost should be considerably enriched with well-rotted animal manure and the plant potted in a container of ample dimensions and replaced in the pool with the water level raised a further six or nine inches. After a few days the searching roots penetrate the rotted animal manure and a great surge of growth takes place. New leaves are produced; rapidly increasing in size until they are upwards of six feet across with an upturned edge six to nine inches high. It is at about this time that the first flowers are produced.

Few people have seen the expanded blooms in their full glory, for they are nocturnal and very short-lived;

lasting for only two nights. Each flower is a very complex structure some twelve inches in diameter and consisting of well over 150 petals. When the young buds break the emerging petals are pure white, but turn to an agreeable shade of pale pink by early the first morning. The following night the pale pink flower opens and emits a delicious aroma reminiscent of fresh pineapple, which increases in its intensity as the night wears on until finally the ageing flower, which by this time is a deep plum colour, disintegrates. Pollination of the flower under natural conditions is by water beetles which get trapped in the petals as they close after the first night. This is a method of pollination which is difficult for man to simulate in the artificial environs of a glasshouse, and which no doubt accounts for the marked shortage of viable seed available to amateurs and institutions alike.

In its natural habitat the Victoria reaches much nobler proportions than could ever be achieved under cultivation; the enormous leaves attaining a diameter of some eight or ten feet. These are armed with very sharp spines and provide an ideal landing and nesting place for the Spurwings (*Parra jacana*). The South American natives also take advantage of the Victoria, gathering the ripe seeds which they roast and then consume with great relish. Consequently the plant is held in high regard, and always referred to by them as Yrupe, which translated literally means Water Platter, a most ample and fitting name for this truly magnificent aquatic.

## Find the Fish

by Doreen Thiel

The first is in BED but not in COT  
The second is in CANTER but not in TROT  
The third is in WRITTEN and also in READ  
The fourth is in BUTTER and also in BREAD  
The fifth is in SUNSHINE but not in RAIN  
The sixth is in TWIST and also in SPRAIN  
The seventh is in TOWN and also in CITY  
The eighth is in HELP but not in PITY  
The ninth is in TRUMPET and also in GUITAR  
The tenth is in PIANO and also in SITAR  
The last is in LOVE, HONOUR and OBEY

see page 602



1

## “Picture guide to Installing a Butyl Rubber Pond”

Photos: by Brian Turner



2



3



4



5



6

- 1 Putting final touches to the excavation
- 2 Here sledge peat is being raked over the base to provide a “pad”. Fine sand, sawdust and sifted soil—even newsprint may also be used
- 3 Newsprint has been used at the sides and on the shelves to prevent any sharp stones from piercing the liner
- 4 The liner is stretched over the hole
- 5 Slabs of stone, the garden roller and other weighty objects hold the liner in position during filling with water
- 6 The mature pool three months after completion



# The crayfish is a confused crustacean

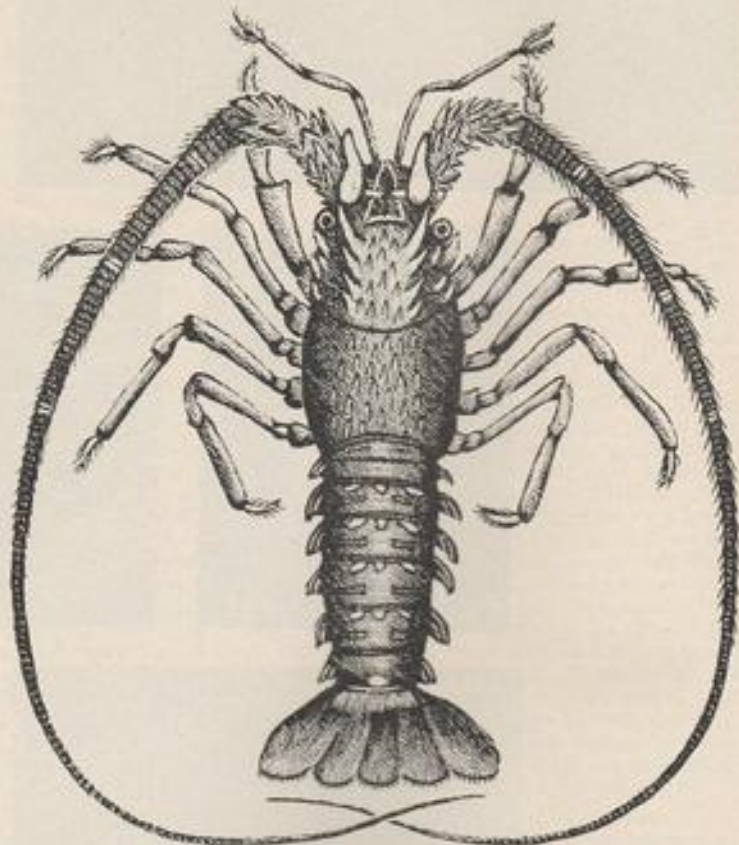
by Eric Hardy

FROZEN CRAYFISH TAILS, the expensive delicacies of American gourmets in particular, are neither crayfish nor tails. Though I've stressed in the trade journals of the fishing industry for years that crayfish are freshwater crustaceans, and that these are the frozen abdomens of crayfish or spiny rock-lobsters, the confusion seems to be fixed in the books for ever.

Specimens of the bright orange, spiny crayfish aren't so easy to obtain as are the blue, big-clawed lobsters which haunt most of our rocky shores. Larger than the common lobster, with contrastingly long, slender claws, it has such an enormous, stilt-like second pair of long, stiff feelers that it less frequently enters ordinary lobster-creeks though it is sometimes entangled in long lines and dip-nets offshore, especially the weedy, rocky patches of shallow sea. Raked out of the water, the crayfish grunts by rubbing these feelers against its "shell" or carapace.

Nocturnal, like its other stalk-eyed relatives, this crustacean, clad in a coat of mail like a knight of the sea, is a most attractive member of the marine aquarium. More southern in distribution than the common lobster, favouring the Channel Isles, Devon, Cornwall and South Wales up to Strumbles Head, and the weedy patches of Cardigan Bay, it is not the lobster's deep blue colour but a reddish orange, often mottled with black and white. The wooden French crabbers which work off our west coasts in summer are another source of supply when they put into port for water, but specimens may have been caught too long to make suitable aquarium introductions.

Anyone interested in keeping these crustaceans in aquaria will find much useful information about the composition of seawater and specific gravity, and also artificial seawater for their tanks, in Laboratory Leaflet 13, published by the Ministry of Agriculture and Fisheries' laboratory at Burnham on Crouch in 1966, entitled: "Lobster Storage and Shell-



fish Purification." Salinity, lowest in winter surface water and low water of neap tides, is most conveniently tested by taking the specific gravity with a hydrometer. This is highest in summer deep water and during spring tides and the last hour of flood tides. This 15-page laboratory leaflet has a large graph inserted for reading salinity at different temperatures, with minimum safety-levels for keeping shellfish. Even common table-salt can be used to top-up waters of not less than 1.019 S.G., but a full artificial mixture is necessary for those of less S.G.

Because of their nocturnal habits, avoid a tank in sunlight. Circulation

must be maintained in the water, which should not be shallow water which warms up quickly and stagnates. After heavy rain the inmates may die if the water is diluted and remains desalinated too long. The water has to be kept from 30 to 50°F, free from copper, zinc or lead contacts. These creatures are most sensitive and weak when they have newly cast their skins. Ice put into tanks to cool them in summer makes the water fresher. For 50 gallon tanks a solution can be made with sodium chloride (11 lb. 11 oz.—14 lb. 2 oz.), magnesium sulphate (2 lb. 14 oz.—3 lb. 7½ oz.), magnesium chloride (2 lb. 4½ oz.—2 lb. 12 oz.),



calcium chloride (9½—11½ oz.) and potassium chloride (4½—5½ oz.).

Where replenishment of the seawater is difficult, oxygen can be maintained by bubbling air through porous stone breakers. Dirty water must always be filtered through a filter box of cotton gauze or cotton waste, rinsed daily, but not glass-wool whose loose fibres injure the occupants.

Crawfish and lobsters have the habit of crowding the darkest corners and may suffer shortage of oxygen. This was overcome in a Canadian-designed tank measuring 7 ft. 4 in. by 3 ft. 3 in. of double walled, green fibreglass, reinforced with polyester resin, containing a refrigeration evaporator coil on the bottom, and a fibreglass perforated filter. The tank counteracted the crowding with green-roofed plexiglass shelters, distributed evenly over the floor of the tank; but a much cheaper way is with short, 4 in. diameter lengths of tile.

Though offshore the rock-lobsters' haunts contain about 3% salt compared with 3½% in the open ocean, they can usually tolerate from 2½% to 4½% if the change isn't too sudden. They survive best at 35 to 40° F, but at this temperature they are rather sluggish, and 40 to 50° sees more activity. They die quickly at 60° and above. Next to tanks of running seawater, the Canadian Fisheries Research Board's circular 21, on "Holding Live Lobsters in Aerated Artificial Sea Water" (1953) will be found useful.

The larvae of crawfish, borne on the currents, metamorphose through 11 stages. Large numbers of larvae are taken in plankton-nets in certain waters. Many drift far out to sea and return at a later stage to offshore reefs to settle down as immatures. The free-swimming larvae migrate to the surface of the sea at night and descend to as much as 50 fathoms by day; but the early, leaf-like larvae move to the light, it seems, for surface drifting.

They feed on calcareous food, including other crawfish, as well as dead worms, prawns, crabs, sea-urchins and seaweed-algae. Crabs and shrimps sharing an aquarium with crawfish aren't eaten, but dead crabs and crawfish are eaten though dead specimens more than a day old seem to be avoided. Normally they are scavengers. They grab food by the first walking legs and the maxillipedes, then back into their shelter before eating it. Fish (fresh) is more attractive than mammal flesh. But they remain dormant most of the day, becoming active in the late afternoon and remaining so most of the night. They will eat the ground-up remains of molluscs. It is when food is scarce that they resort to cannibalism.

They don't feed when moulting, of course, and this is a process to allow not only for growth but to renew the chitinous parts of the superficial sensory organs. The female usually moults just before egg laying in September and like female lobsters appears to breed in alternate years.

A "white" crawfish may be a newly-moulted adolescent "red". While they favour all types of rock from granite and limestone to sandstone, crawfish do not like muddy, silty or moving sand bottoms. The fixed sand-gravel of an aquarium is different if the circulation and the aerator don't disturb it. A female will carry 180,000 eggs for 70 days, by the way.

Numerous species of crawfish, spiny or rock-lobsters, or French langouste, inhabit the deep rocky inshore and offshore waters of temperate, Mediterranean and tropical coasts. More specimens become available as the fishing industry expands in many countries to supply the trade in "frozen crayfish tails". From the Caribbean to Australia, from the lobstermen landing a few with their catches at Aberdaron in North Wales to the Japanese fishermen with their "barking" crawfish which knock the heavy basal joints of their stubby antennae against two smooth-lined cavities, this is a fascinating group of crustaceans whose attractions have so long been overshadowed by the commoner and more easily obtained lobster. Our bright orange British spiny crawfish ranges to Tunis and Greece and is sometimes trawled so far north as Loch Drimbuie in western Scotland. At night these animals comb the eel-grass and seaweed for sea-snails, which they crush between their mandibles, which is why they favour the seaweed-covered, rocky beds of the shallower patches out in Cardigan Bay.

## Science finds the bath water fish

Extracts from the Bournemouth Evening Echo

A HOT-WATER fish of a species new to science has been located in the first major biological study for more than 70 years of the Simpson desert in Australia's "dead heart".

The home of the fish is an oasis on the fringe of the desert, a large area of arid sandhills. The desert has only twice been crossed by white men since this country was colonised.

The discovery of the rare fish was made by a team from the South

Australian museum which also discovered the oasis. The fish, six inches long, was found when the team spent three weeks on an intensive scientific investigation of springs, bores and waterways in South Australia's far north.

### Near-Boiling

According to the team's leader, Mr. C. J. M. Glover, curator of fishes at the South Australian museum, the oasis is teeming with the hitherto unknown fish. Its home is the near-boiling water of hot springs and pools.

Resembling a "hardyhead," the fish was described as darker in colour, stouter in profile than that species and able to withstand a wide range of water temperatures and salinity.

Mr. Glover said that at the oasis there was a group of between 30 and 40 hot springs which flowed into bath-temperature pools many yards long.

Moves to have the area declared a reserve are expected soon.—Reuter.

## Golden pheasant

On page 541 of our September issue, under the heading Correction, we stated that the fish known to aquarists as *Aphyosemon ijostedti* should now be called *A. coeruleum*, but by some oversight we got the names reversed. The name *A. ijostedti* should have read *A. coeruleum* and the name *A. coeruleum* should have read *A. ijostedti*. We apologise for this unfortunate error.



# Water Lilies

by Dorothy Rasmussen

THIS, FOR MANY OF US living on modern housing estates, is the day of the mini-garden, but although we may lack growing-space, quality of plants plus aids to cultivation do much to compensate for this.

With the fashion for small ornamental ponds, many an ambitious gardener must fancy owning one of the choice varieties of water lilies once only viewed on lakes in the grounds of stately homes or city parks. There is a jewel like fascination about these lovely blossoms floating upon the limpid surface of a quiet pool that gives them an individual charm all of their own.

Curiously enough, they are not apparently members of the lily family at all, but own kinship to the humble buttercup which seems to have relations amongst many of our more exotic garden flowers. On remote lakes and tarns, wild water lilies can still be found, for once established they are able to increase themselves by dispersing their seeds upon the water unlike the majority of plants which

rely upon animals and the wind to scatter their fruit. The water lily seed has a special spongy growth called an aril which gives the seed buoyancy on the water until it gradually soaks and sinks into the depths of

## THE JUNIOR AQUARIST

the lake or river where, after a period to germinate it will, if successful, produce a new plant.

The wild white water lilies are perhaps best known to us, for frequently they appear on coloured illustrations, like so many of our well established flowers, herbalists of long ago attributed them with special

powers. They claimed that the blossoms added to distilled water would remove freckles whilst a syrup compound from the petals produced soothing properties.

If you hear country children talking about finding Brandy Bottles on the water, they are referring to the wild yellow water lilies known by this name in certain areas because of their odd smell; in Scotland these are sometimes known as "Bobbins" because of the dancing motion of the flowers when the breeze ripples the surface of the water.

The legends about flowers must be as numerous as the folk tales of different countries; indeed they are often a part of them and when you think that the proud Lotus Blossom also claims a link with the water lily and that Indians, Chinese and Egyptians have a special regard for their exotic blooms, it is pleasant to think that even in our small "do-it-yourself" gardens we may be able to capture a little of the water lily's mystic charm for our very own.

## Tips for the beginner

COVER THE FLOOR of your aquarium with a planting medium of well-washed coarse white sand or fine grit to a depth of about 2 in.

To fill the aquarium without disturbing this compost pour the water gently onto a sheet of clean paper spread over its surface.

Use water direct from the mains and not from the hot-water storage tank.

It is advisable to let the water stand in the aquarium for a day or two before introducing any fish or plants.

A temperature of from 72 to 75°F. is warm enough for most tropicals. But always protect your fishes from an abrupt change of temperature.

A newspaper or scarf may be used to lessen heat loss from a jar or plastic

bag used to carry tropicals home from a dealer. When you reach home, float the carrying container in the aquarium itself so that the two temperatures will equalize. After about ten minutes, let the waters mingle and the fishes swim out.

Plants should mask most of the back and ends of the aquarium. Apart from providing shelter and a natural-looking surrounding for the fishes, plants perform the useful service of utilizing their waste products (excreta and carbon dioxide gas) as food. And some plants give out plenty of oxygen.

Plants are easily anchored into position with the aid of planting sticks obtainable from your dealer. Or you can make do with two thin canes with a v-shaped notch cut in one end of each cane.

Recommended plants for the beginner are *Cryptocoryne affinis* (for tropical tanks only), *Sagittaria subulata* and *Elodea densa*. The first two must be planted with the part where the leaves and stems join the roots just clear of the sand. The stems of *Elodea* and similar plants sold by the stem are merely inserted some 3 in. into the compost. Within the space of a week or two they will develop roots.

A glass cover raised very slightly off the top of the aquarium will prevent rapid evaporation, dust getting in and excitable fishes jumping out.

Light entering the aquarium must be bright enough to keep the plants in a flourishing condition. Electric lighting is as good as, if not better than natural light because it can be controlled. Allow 40 watts ordinary



electric lighting for every square foot of bottom area, or 20 watts warm white fluorescent lighting for a 2-3 ft. long tank. From eight to ten hours a day is about the right length of time to keep electric light switched on.

Provided you do not overcrowd your tank with fishes, or give them too much food at a time, there is no need to buy an air-pump (not at the beginner's stage, anyway) or change the water for years.

About twenty 1-1½ in. tropicals will flourish without artificial aeration in a well-planted tank measuring about

24 in. by 12 in. by 12 in. But as coldwater fishes make greater demands on the oxygen available in an aquarium than tropicals, it is not possible to support more than four 3 in. goldfish in a 2 ft. tank unless artificial aeration is used. Even so, there is no need to keep an air-pump working all day. If the pump is put into operation last thing at night and switched off first thing in the morning, the fish should keep in a healthy condition.

Fishes kept in an indoor aquarium should be fed every day, well-nourished fishes can go for several days without food and suffer no ill effect.

The merest pinch of dried food twice or thrice a day is all that is needed until you learn by experience how much your fishes can clear up within the space of a minute or two without leaving any to sink to the bottom; for food left to decay on the bottom is something to avoid.

A dip-tube purchased from your dealer will enable you to take up uneaten food and other unwanted matter and so prevent pollution of the water.

To keep fishes in good health live food, or a substitute for live food such as tiny pieces of raw red meat, should be offered every now and again. B.F.

## Tropical queries continued from page 589

will have to be acclimatized very gradually to the cooler conditions.

### What is an anchor worm?

The anchor worm is a parasitic crustacean with a worm-like shape. The female of the species clamps herself to a fish, upon which the parasite feeds, by means of hooked appendages. The wounds made by these hooked appendages almost always lead to the development of bacterial and fungal complaints. It follows, therefore, that even if the fish is not killed by the parasite itself, death will result sooner or later from these secondary infections.

### How can I prevent tubifex worms establishing themselves in the sand on the bottom of my aquarium?

A couple of hard-working compost-sifters such as *Corydoras aeneus* will soon clear tubifex out of the sand, but prevention is better than cure; so make certain that the fishes are not given too many of the worms at a time, and delay the worms entry into the water by covering the bottom of the perforated feeder with a good thickness of nylon wool.

### Can algae kill fish?

Thick growths of thread algae can trap and smother small or delicate

fishes. Also, as free-swimming algae dies down it sometimes results in a build-up of poisonous gases and this, in a balanced aquarium not freshened up by the addition of clean water, may lead to the rapid extinction of all higher forms of animal life.

### Would you recommend *Aplonechilus lineatus* for a community tank?

*A. lineatus* is not to be trusted with much smaller fishes. But young (small) specimens are no danger at all and even larger ones are seldom any trouble if their companions are too large to be swallowed and keep to the lower levels of the water.

## What is your opinion

by B. Whiteside

A LETTER FROM a regular writer, Mr. D. R. Hubble, of Sheppey in Kent, expresses some views on recent questions. In the July article I said that Mr. Cook might have an important point when he suggested that dirty cover-glasses might have an effect on plant growth.

Mr. Hubble says that he has used cover-glasses and has done without them, with no appreciable difference in plant growth or species tolerance. He says that when cover-glasses were used, algae did not develop, and the glass was cleaned periodically. Mr.

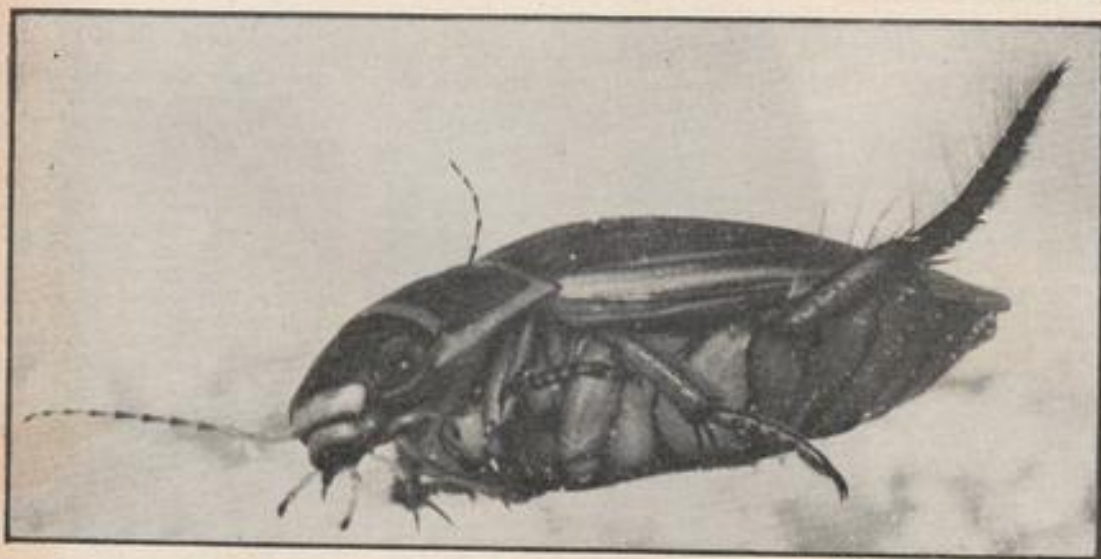
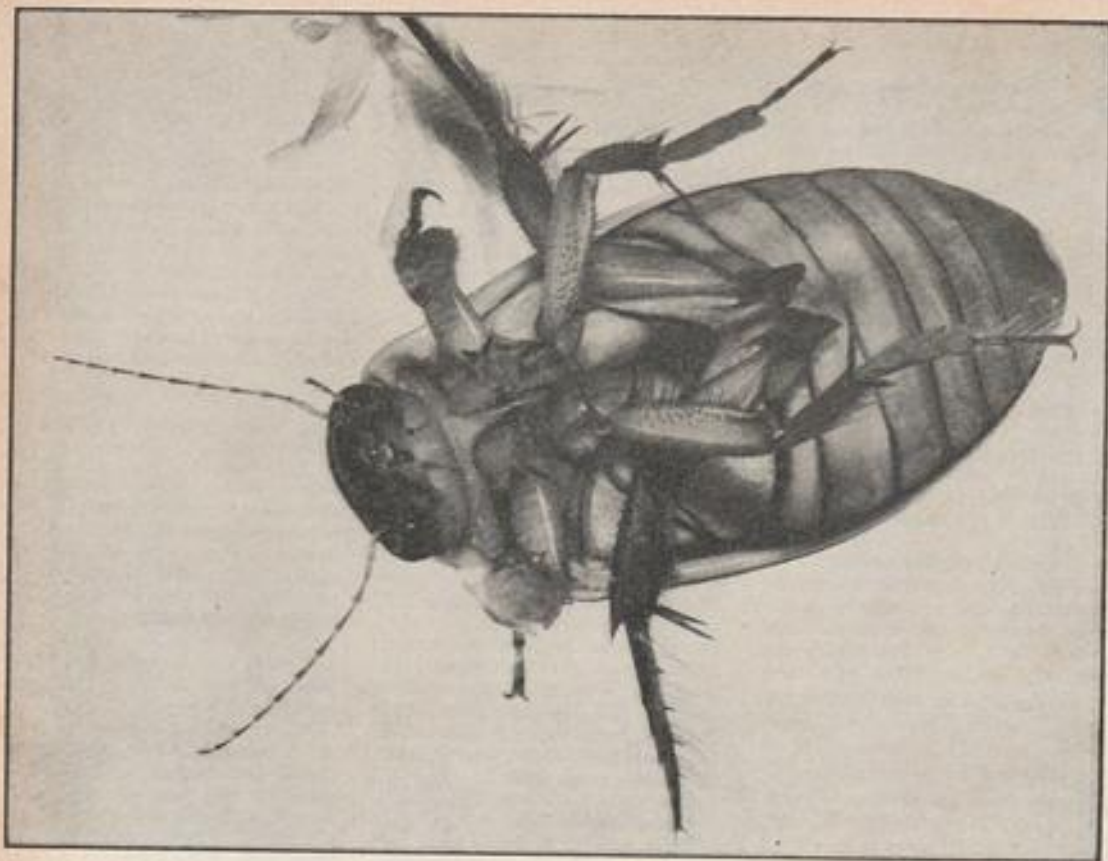
Hubble goes on to say that he has found recent letters interesting and enlightening but says that few of the letters get to the crux of the matter. This, Mr. Hubble thinks, is the point—that any plants or animals, whether aquatic or otherwise, must be given time to adapt to new and usually unnatural environments. Leaves drop from many of our trees in Britain, but seldom are they thought of as being dead, as is often the case with some of the *Cryptocorynes*. Mr. Hubble goes on, "Caboomba, even when given its apparent preference for soft, acid water which, in answer to Master T. D. Kearsley, seems to be best suited to most aquarium plants, is a plant which is often far from ideal 'set-ups,' takes sometimes many months of above-gravel 'death,' before it grows new leaves and comes back from the

'dead'."

Mr. Hubble continues by saying that little appears to be published on whether or not annuals, biennials and perennials etc., exist in aquarium plants, therefore needing different treatment in our aquaria. He ends by saying, "Leave them alone and you'll find the 'root' of the trouble, not only a pun, but possibly good advice," and requests readers to keep sending in their opinions.

Please let us have your opinion on: (1) Which is easier to keep clean and decorative, a small aquarium, e.g., 20 in. x 10 in. x 12 in. or much larger tanks in the 30 in. to 48 in. range? (2) How often, on average, do you clean the glass and base of, and how often do you change part of the water in, your aquaria. (Give details of size, temperature, number of occupants, etc.).





# The Great Diving Beetle

By Sagittaria

THIS INSECT, UNLIKE so many other species which have become rarities, is still readily available in natural ponds and its capture presents little difficulty. To the eyes of anyone who appreciates the very practical construction of insects generally, and beetles in particular, *Dytiscus marginalis* is especially attractive. Its moderately large size (1½ in. overall length) and rich brown and ochre coloration make it most distinctive and invite closer examination under controlled conditions. A sexed pair may be comfortably housed in a small



**Above right:** male *Dytiscus marginalis* claspng female in pairing embrace showing males foreleg pads gripping female's head and thorax.

**Above left:** underside of male *D. marginalis* showing pad on lower foreleg.

**Bottom left:** male *D. marginalis* swimming.

**Above:** *D. marginalis* larva feeding on *Gammarus* (freshwater shrimp).

aquarium of 10 in. × 8 in. × 8 in. but a cheaper vessel such as an accumulator jar or a plastic food container make excellent substitutes. A couple of small but thick clumps of *Lagarosiphon muscoides*, var. major (for preference) or *Elodea canadensis* will provide cover, resting supports and egg depositories. A floor of sand or small gravel completes the set-up apart from a perforated aquarium lid or sheet of glass raised on matchsticks.

Sexing the insects is quite simple since the elytra of the female are conspicuously ridged along their length in contrast to the male's smooth and glossy wing-cases. A further sexual difference is embodied in the male's forelegs which have an enlargement of the first three segments of the tarsi to form discoid pads which facilitate the male's grip upon the female during pairing.

In the wild *D. marginalis* feeds upon any creature which its powerful jaws are able to tackle and this includes many which are larger than itself.

The subjects of the accompanying colour reproduction were pairing (with periodic breaks) for a couple of days

and eggs were subsequently laid in slits which the female cut in the stems of *L. muscoides*.

The larval form can be kept similarly under controlled conditions when its interesting feeding habits may be observed at close quarters. Garden worms may be fed as with the adults although almost any living creature of a reasonable size will be taken. Unlike the imago insect, which is equipped with powerful jaws, the larva has a pair of sickle-shaped mandibles which are sunk deep into the victim's tissues. A fluid is then pumped into the prey's flesh and results in the tissues being dissolved so that they can be sucked up for the ultimate nourishment of the predator. This pumping action can be seen quite clearly through the transparent walls of the larva's head and thorax as it rests, head down and absorbed in its gruesome pursuit of keeping body and soul together.

Retaining the larval state for almost a year, *D. marginalis* pupates in the damp soil at the pond's edge and at the end of about three weeks it emerges in the adult state during late spring.



## Some *Trichogaster* Species

By Jack Hems

GOURAMIS OF THE genus *Trichogaster* have most of the qualities essential to a good tropical aquarium fish. All are pleasingly coloured, easy to feed, active, hardy within the limits of their temperature range, which is from about 68°F (20°C) to 86°F (30°C), and in general are well suited to life in a well-planted community tank. Plants are of prime importance for two reasons. For one thing, they furnish the fish with the sort of surroundings they are used to in the wild. For another thing, a male gourami at breeding time becomes ill-disposed towards his companions including the female of his own species, and plenty of plants along the back and ends of the aquarium is the best precaution against too-vigorous chasing.

The proper place for a pair of gouramis in breeding condition—the male showing intensified colours and the female fuller sides—is a tank to themselves. A tank measuring 18 in. × 12 in. × 12 in. will do. But a larger tank is recommended.

*Trichogaster* males blow a bubble nest at the surface. A nest is usually attached to, or near, floating vegetation. It is more or less a slightly domed raft composed of beads of froth bound together by an agglutinatory secretion. Spawning takes place at any time of the year but it is more likely to occur in late spring or summer than during the autumn or winter. What is needed to bring a couple into spawning condition is a bright toplight, a temperature in the neighbourhood of 78°F (25°C), and plenty of the right sort of food, that is to say live *Daphnia*, washed chopped tubifex, gnat larvae, and the like. Sexing of mature fish is easy (even when they are not in breeding condition); for the dorsal fin of the male is long and pointed; that of the female is shorter and rounded.

During egg-laying there is an actual embrace between the sexes.



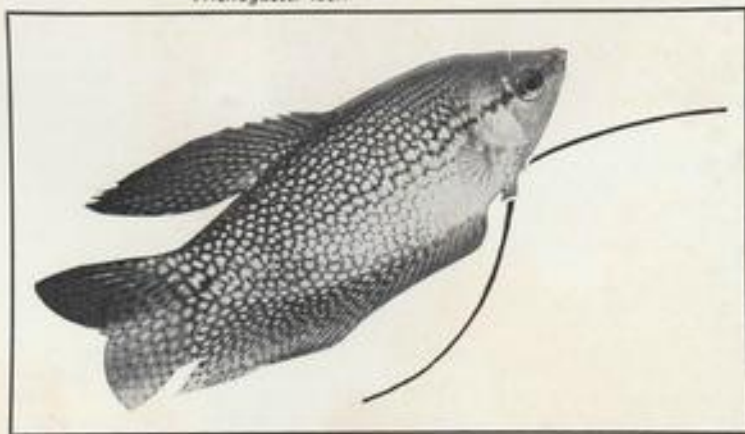
*Trichogaster trichopterus* (3-spot gourami)

The male wraps his body round that of the female, seemingly applies pressure, and the excitement engendered by this and the preliminary overtures—chasing and display on the part of the male—causes her to release eggs. Most of these ascend into the nest of their own accord, but those that start to float towards the

bottom or sides are gathered up in the mouths of the fish and then blown out again in the right direction. The energetic male does most of the work.

When spawning is over it is desirable to take the female out of the tank to safeguard her against too much bullying, though separation of the sexes is not vital if the tank is a large

*Trichogaster leeri*



one (the importance of shelter plants has been mentioned above). Almost always both sexes are interested in the welfare of their offspring. The eggs hatch in under three days. The fry, which start to move about two days later, may be fed on freshly cultured *Infusoria* and flour-fine dried food. The male need not be removed until the fry have made good headway. A glass cover is essential to prevent cool air blowing across the surface.

Of all the *Trichogaster* spp. usually

available *T. leeri* is, perhaps, the one with the most beautiful markings. But the delightful blues are close runners-up. They are sub-species or aquarium-produced sports of *T. trichopterus trichopterus*, a silvery olive fish with two black-brown spots on the sides—the original two-spot gourami that ranges from Bengal, India to the Malay Archipelago. The spotted fish with delicate blue sides and paler markings on the blue fins is *T. trichopterus sumatranus*, which may

or may not be a geographical race of the type, or a fish developed after years of selective breeding in captivity in Sumatra.

The blue fish with inky-blue markings extending from about the middle of the body to the tail-base is the opaline or Cosby gourami, which is said to have been developed by an American breeder some twenty-five years ago. Blue gouramis seldom grow larger than 5 in., if that. They may live for upwards of three years.

## The Rudd

by B. Fry

THE RUDD, OR red-eye, is extensively found in Europe, though it is said to be absent from central and northern Scandinavia, southern Italy, and the Iberian peninsula. In England it is common in East Anglia. It is found in Wales, but not in northern Scotland. It is quite widely distributed in Ireland.

The scientific name of the rudd is

*Scardinius erythrophthalmus*. Essentially the fish is an inhabitant of weedy, slow-moving or still waters over a soft bottom and is therefore by nature quite suited to life in a rather confined space. It may reach a length of about 12 in. and a maximum weight of some 3½ lb. It has a life-span, in captivity at any rate, of five or six years.

The back is brown with a brassy sheen, brassy green to gold on the sides and silvery white on the belly. The fins, or rather the outer margins of the fins, are red. Sometimes the lips are red too. The iris of the eye is a warm reddish gold. Decidedly *S. erythrophthalmus* is a most handsomely apparelled fish, far more

attractive in appearance than the roach (*Rutilus rutilus*), with which it is frequently and rather easily confused.

The rudd is chiefly distinguished from the roach by its projecting lower lip, the position of the dorsal fin, which originates behind the ventral fins (in the roach this fin is above line with the ventral fins), and its keeled belly (the belly of the roach is round). In waters in which rudd, roach and bream meet, cross-breeding occasionally takes place. The offspring of such matings are called genus hybrids. Scale-counts and the position and structure of the fins enables the expert to sort them out.

In the natural state the food of the rudd consists principally of aquatic larvae, small crustaceans and worms, but in captivity it will prosper on a mixed diet of live, flesh and dried food.

The spawning season extends from April to June. A well-grown female may deposit some 100,000 adhesive eggs among the plants. The breeding procedure is typically carp-like (the rudd is, of course, a member of the huge family *Cyprinidae*), the excited male or males driving the ripe female into the sun-warmed and weedy shallows. Out of the breeding season the sexes are not easy to tell apart. At mating time, however, the male shows tiny pimples or tubercles on the head and fins and the female assumes bloated sides.

Young rudd do very well in a generously planted and properly tended coldwater aquarium. But four 2½–3 in. specimens are enough for a 24 in. × 12 in. × 12 in. tank. This size tank with these measurements will provide sufficient space for some growth, but sooner or later one or two will need to be removed to give the remaining fish a chance to survive.



November, 1968

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# The Secretive Slow-Worm

By Eric Gillingham

*Anguis fragilis* is an aberrant lizard which has elongated his body-length somewhat and shed his limbs in order to facilitate burrowing into thick vegetation rather than into the soil, and has retained the viviparous method of reproduction.

Undamaged specimens occasionally reach eighteen inches in length, but this is very rare in Britain. Many large specimens have truncated tails, due to the ease with which these appendages may be broken-off. It is well known that this facility serves to promote survival in several quite unrelated groups of lizards—all of the Geckos, many of the lacertids and some of the skinks. As the food of this little lizard is almost entirely composed of slugs, small snails and earth-worms there has been no necessity for any extensive modification of the jaws; similarly the eye-shields (sclerotic) are still protected by the conventional lizard-type eyelids, which move up from the bottom in order to close, contrasting thus with the mammalian scheme. The external opening to the outer-ear has also been covered-up.

I have referred to this harmless reptile as the secretive slow-worm on account of its retiring disposition. It relies entirely upon concealment in order to survive; it is scarcely even truly nocturnal, as it feeds chiefly in the early morning and early evening and at least when gravid the females are often to be encountered basking in the July sunlight particularly on top of those low loose-stone walls which are so typical a feature of the south-western counties wherein the slow-worm abounds. While we are surveying its distribution, it must be observed that *Anguis fragilis* enjoys a very wide range indeed: not only is it one of Europe's commonest reptiles, but as far as Great Britain is concerned, I suggest that it has secured a position of numerical supremacy over all the other five native reptiles together. It ranges from Southern



Group of Slow-Worms of different ages showing colour variation

Sweden to Western Russia, England, Scotland and Wales (but it is absent from Ireland). Through France, Switzerland, Germany to Hungary and parts of Yugoslavia, it reaches into North Africa and South East Asia. Despite this enormous range, many people who live where it abounds, seldom, if ever, see it.

Now let us review this creature from the stand-point of the vivarium-keeper. For the young enthusiast, it is the beginner's selection, *par excellence*. For a start it is never aggressive: if we agree to exclude the nuptial love-bites with which the male addresses his bride, we may safely say that no slow-worm has ever bitten anyone larger than a slug so that it is safe with other reptiles—except adders and smooth-snakes which feed upon slow-worms! It does not move very fast and its climbing abilities do not compare with those of the snakes or of the quadrupedal lizards so that it does not often escape. Its personal requirements are readily supplied—a dry retreat, under a piece of bark, or a

flat stone, a source of drinking-water (incidentally, they prefer to absorb droplets of water from leaf-surfaces, and these they usually obtain from dew). The food is almost universally obtainable. Small worms and slugs are to be taken for the asking in most localities, even in urban surroundings. Many slow-worms adapt themselves after a time to less familiar provender and will take the larvae of the meal-beetle (*Tenebrio molitor*), gentles, and even in some cases, strips of raw meat dipped in beaten raw egg; this last occurrence, is however unusual. By the way, do not offer wood-lice to reptiles or batrachians, as they are useless from the point of view of nutrition, and in my experience only toads will accept them, and even these do not thrive on them, and often reject them.

Another reason for recommending this little anguid is its sheer longevity: specimens which have survived more than fifteen years in captivity are relatively common, and there are well-authenticated instances of over thirty years!



*Anguis fragilis* reproduces itself freely in captivity, if the natural conditions are carefully simulated. These requirements are relatively simple. It will be necessary to provide opportunity for concealment—sphagnum-moss peat, or even just plain turf are all equally good in this respect. Provision should also be made for a permanent and dry retreat and a tin-lid or a shallow-tray containing dry saw-dust, sand, or even pine-needles is an obvious way of supplying this need. Cover the tray with something flat and reasonably heavy—a piece of stone, slab of slate or slice of bark, leaving only a small aperture available to give ingress. Place any newly-acquired specimens inside this hide-out and allow them to find their own way out of it and in so doing to orientate themselves with the lay-out of the vivarium. It will also be necessary to cover the tank with glass or perforated zinc, not on account of the climbing propensities of the permanent inmates, but simply because it will be desirable to limit the wanderings of any unconsumed slugs, snails etc. which may be introduced into the tank from time to time as food for the residents.

Sexing of slow-worms is a fairly simple matter once you have accustomed your eye to the colour differences which occur over a range of individuals.

Newly-born slow-worms are all exactly alike—that is to say they all resemble one another, and differ most remarkably from their parents. They are around two-and-a-half inches in length, anything between six and sixteen in number, and they are all a light creamy-golden colour on the back, with a dark chocolate line (sometimes two) running from a spot above the occiput down the back-bone to the tail; the sides are also dark chocolate, and the ventral surface is a metallic blue-black, unrelieved at this stage by any spots. There is usually present also a small dark spot on the front of the head between the eyes.

Both sexes are identical for the first year or so and as they become sexually mature about the third year of life the sexual differentiation begins to show in the colour pattern and males assume a regular dark shiny-bronze hue and silvery spots begin to appear on the belly. The females, however, always retain the linear markings; the central dorsal stripe

splits up and migrates to the sides; in some cases this occurs more than once and the final effect is, in her case, that she has at least three and often five longitudinal stripes running down the sides.

Some very old males develop a fascinating peppering of dark-blue spots which are never seen in the females.

So outstanding is the appearance of some of these old males that more than one of the earlier zoologists fell into the trap and described them as a separate species. The first victim of this rather natural misconception, nominated the proposed new species 'Colchica'.

The favourite food of our native anguid is a common grey slug called *Limax agrestis*. In its turn it provides a tasty delicacy for many insectivores, and at least two other reptiles, and as far as this country is concerned its numbers are controlled by predation from moles, shrews, hedgehogs, and vipers, and at least in Dorset and some adjacent counties, by the Smooth snake (*Coronella austriaca*)—but always, and everywhere, alas, the most persistent destroyer is *Homo ignominus Horribilis*!

## Spatterdocks

by B. Fry

THE SPATTERDOCKS, or nuphars, are water plants (closely allied to the true water lilies, or nymphaeas) that range across the northern hemisphere from North America, through Europe and Asia, to Japan. The majority of species are indigenous to the U.S.A. Essentially they are plants of slow-moving or still waters. The large, heart-shaped leaves, often mistaken for lily pads, that add attraction to our canals, even in industrial areas, are those of *N. luteum*, which is widespread in the British Isles and throughout Europe. This nuphar has yellow flowers, popularly known as brandy bottles on account of their alcoholic smell. Sometimes it is called the yellow pond-lily. *N. luteum* is too overwhelming a plant to cultivate in the home aquarium,

though occasionally a seedling will stay small, with submerged leaves, for quite a long time. Seedling plants are quite accommodating as regards temperature.

*N. pumilum* is much smaller in all its parts than *N. luteum* and is therefore well-suited to aquarium culture. Although some of the more recently published reference books written for aquarists tell us, or suggest, that this species is widespread in Europe but is absent from the British Isles, the erudite Robert Gathorne-Hardy, in his *Wild Flowers of Britain* (Batsford, 1938), records that it may be found in high-lying tarns in the north. *N. pumilum* has the most charming submerged foliage: translucent, wavy-edged, and of a delicate grass green. Its basic needs are a good light and a compost richer than washed sand alone. It is the plant commonly sold by the dealers under the all-embracing name of spatterdock.

*N. japonicum*, as its specific epithet indicates, is native to Japan. It has the same tissue-thin foliage as *N. pumilum*, but the leaves are broadly

arrow-shaped. There is said to be a variety of this nuphar with red-brown leaves. A hybrid *N. japonicum* × *N. pumilum* has just appeared on the market. This plant adds greatly to the charm of a decorative tank and is quite happy if it is given comfortable room temperature (or a tropical temperature) and a reasonable light.

*N. sagittifolium* from the eastern half of the U.S.A. is popularly known as the Cape Fear spatterdock. Unlike the nuphars mentioned above, it will not flourish in the coldwater aquarium. It calls for tropical conditions. It also demands a strong light. The wavy-edged leaves are lanceolate and are held upright on strong stems. The leaves of a well-developed plant measure about 7 in. long by some 2 in. across.

Propagation of nuphars is by seed or division of the rhizomatous root. A root cutting is best weighted with a lead band and merely laid direct onto the compost. If the cut end shows signs of rapidly spreading decay, the rotting portion should be sliced off with a razor blade.



# The Pygmy Barb

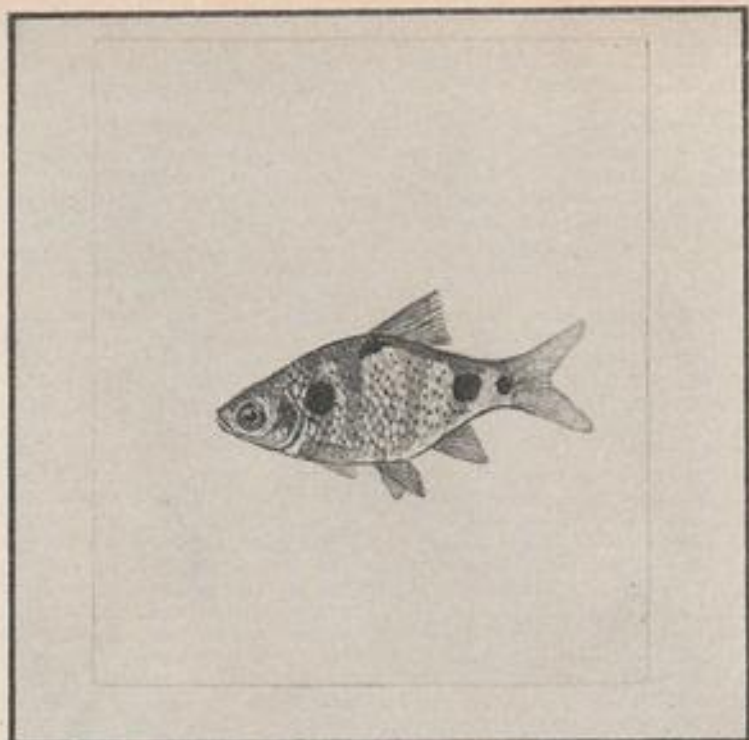
by Jack Hems

A CHARMING LITTLE fish worth looking out for is the dwarf or pygmy barb. Apart from its attractive coloration and peaceful ways, its hardiness, constant activity, and lack of interest in the plants as a much-relished item of diet (a failing with a number of barbs) makes it well suited to a decorative tropical aquarium. It is native to eastern India and Burma and has a history as an aquarium fish dating back to the early 1900s.

The general colour is greenish grey, whitish on the underparts. The large scales are shining silver to gold. There is a black spot behind the head and a similar marking near and at the tail base. The sides are adorned with some blue-black vertical bars, that sometimes disappear and are sometimes very pronounced. The head and flanks reflect metallic violet, green and blue lights. The anal fin is pale red, the ventral fins a shade darker, and the caudal and dorsal fins a greenish yellow. The pectoral fins are clear. The sexes are not readily told apart, except by the slightly heavier body of the female and the brighter garb of an amorous male. A temperature range of from about 70°F (21°C) to 75°F (24°C) is quite satisfactory, but a temperature above 76°F (24°C) is recommended for breeding.

The breeding procedure is typically barb-like. The brilliantly tinted male drives the swollen-sided female all over the aquarium until the excitement engendered by the chase culminates in the expulsion of milt and ova. Spawning often takes place if conditions are right (temperature, planting and lighting) in a community tank, but naturally the eggs will be eaten as they are released by all and sundry of the tank's inmates.

To raise fry, then, a likely looking pair of fish should be placed in a well-lighted, snail-free tank generously



Pygmy Barb *Barbus phutunio* (Above life size)

furnished with weighted bunches of fine-leaved plants to catch the eggs, and, after spawning is over, removed to another aquarium. At a temperature in the upper seventies or low eighties (°F), the eggs should incubate inside two days. About two days later, the fry will be on the move and snapping up tiny live or dried food.

For a planned spawning, separation of the sexes for a week or two is advised. If the fish are introduced into the prepared tank (which need not be larger than the regular 18 in. by 12 in. by 12 in. size) last thing at night in all probability egg-laying

will take place on the following morning, if the light is good.

At the present writing, and owing to the never-ending changes in nomenclature, the pygmy barb is known under two formal names: *Barbus phutunio* and *Puntius phutunio*. The latter appellation is favoured in the U.S.A. But to return to more mundane but equally important things. The pygmy barb will accept dried food readily, tends to play behind the plants until it becomes accustomed to its surroundings, and ordinarily has a life-span, given good conditions, of some three to four years.

## What is it?

From page 583

*Answer:* Egg case of dogfish in which outline of young can be discerned. A shrimp is seen at rest at the base of egg case.

## Solution to Find the Fish

From page 590

*Answer, BARBUS TERIO*

# Champion of Champions Contestants



Final entry list for  
Premier event  
at the B.A.F.



ENTRIES HAVE CLOSED for the "Champion of Champions" contest at this year's British Aquarist Festival, with a total even larger than that of 1967—clearly demonstrating the tremendous interest that has been aroused in this national contest for "best fish of the year."

Entrants have qualified by winning a "Best Fish in Show" award at Open Shows throughout the country during the competition year, and to each of these winners a gold-plated pin has been awarded by *The Aquarist and Pondkeeper*. Distance and other factors have prevented all of them from entering for the national contest, but the very substantial entry listed below promises a keenly-fought contest and a big attraction for the thousands of visitors to the B.A.F., to be held at Belle Vue, Manchester, on 26th and 27th October.

Here are the entries (to which, of course, is to be added the winner of "Best Fish in the Show" at this year's B.A.F.)

## THE PRIZES

**1st** Cash Prize of TWENTY GUINEAS, a Commemorative Plaque, and a hall-marked 9 ct. gold Lapel Pin.

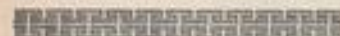
**2nd** Cash Prize of THIRTEEN GUINEAS and a Commemorative Plaque.

**3rd** Cash Prize of SEVEN GUINEAS and a Commemorative Plaque.

Name	Species of Fish	Club
P. Barritt	<i>Cichlasoma severum</i>	Aireborough A.S.
K. Binns	Blue Acara	Nottingham & District A.S.
R. V. Brothwood	Guppy	Gorton & Openshaw A.S. and Liverpool Section F.G.A.
F. Brown	Tiger Catfish	Bristol Tropical Fish Club
V. Collins	Golden Rudd	Yeovil & District A.S.
M. Davies	<i>Pelmatochromis fasciatus</i>	—
B. Davison	<i>Barbus tetrazona</i>	Mid. Herts. A.S.
J. & H. Dernie	Orange Chromide	Workop A. & Z.S.
D. Emery	Cichlid Red Devil	Haden A.S.
A. G. Esteves	<i>Corydoras</i>	Top Ten A.S.
F. Everett	<i>Synodontis robbianus</i>	Society of Aquarists for South Staffs.
G. Greenhalf	<i>Plecostomus racheoi</i>	Kingston & District A.S.
Mr. & Mrs. C. Grimshaw	Arrowana	Sunnybrow A.S.
J. Hartlebury	Black Swordtail	Thurrock A.S.
B. Harvey	Combtail	North Kent A.S.
K. J. Harvey	Piranha	Stone A.S.
C. Hunter	<i>Nannacara anomala</i>	North Kent A.S.
L. Kaye	Seven o'Clock Cat.	Top Ten A.S.
L. Kaye	<i>Nannacara anomala</i>	Top Ten A.S.
J. Langan	<i>Serrasalminus brandti</i>	Scottish A.S.
R. B. Moorcroft	Golden Severum	Merseyside A.S.
P. O'Bryan	Black Swordtail	Thurrock A.S.
K. Parkes	Tinfoil Barb	Merseyside A.S.
Mrs. E. M. Pennell	Cardinal Tetra	Stroud & District A.S.
A. Phillipson	Oranda	East Lancashire A.S.
P. Player	<i>Labeo bicolor</i>	Barry A.S.
Mrs. R. Robinson	<i>Pelmatochromis kiribensis</i>	Aireborough A.S.
B. C. Roberts	Neon Tetra	—
K. Scothorn	Jack Dempsey	Barnsley A.S.
Mr. & Mrs. D. Sides	Albino <i>Clarius</i>	Chapelton & District A.S.
J. Stillwell	<i>Lepomis gibbosus</i>	Portsmouth A.S.
N. Turner	Blind Cave Tetra	Mixenden T.F.S.
S. Walsh	Fantail Goldfish	Accrington A.S.
A. B. Wilkie	<i>Lepomis friderici</i>	Stretford A.S.
R. K. Willey	<i>Cichlasoma severum</i>	Salisbury & District A.S.
J. Wilson	Velifera Mollie	Catford A.S.



# OUR READERS WRITE

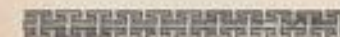


## Freeze-dried Foods

In your August, 1968, issue you were kind enough to publish an unsigned review of my book *Breeding Aquarium Fishes*, for which I thank you. The review was a fair one. But I think the remark made by the reviewer as regards the use of freeze-dried foods recommended in the book bears further discussion. As you know my company owns Gulf Fish Farms in Palmetto, Florida. We raise more than 5,000,000 fishes per year which, I believe, makes us the largest fish farm in the world. Our major problem in Florida is our inability to get live foods. Tubifex are impossible to obtain in Florida. Flying them in from the north is too expensive and too risky. It wasn't until we invented and produced freeze-dried Tubifex and other products that we were able to bring our breeders into proper condition for breeding. Then came the problem of raising the youngsters. Again our only source of success came from using newly hatched brine shrimp nauplii or the messy, delicate supply of good infusorians. By grinding up freeze-dried tubifex, brine shrimp and certain other ingredients were we then successful in raising newly hatched fishes in commercial quantities. The breeding book was a dedication to these foods. It will help millions of hobbyists breed fishes and raise the young without ruining their efforts with a faulty hatch of brine shrimp eggs, or by carrying disease to their breeders through the use of live tubifex or live daphnia.

I am deeply appreciative of the value of freeze-dried fish foods and what it has done for the fish hobby in America. It has brought the prices of fish down to almost half.

DR. HERBERT R. AXELROD.



## Classification

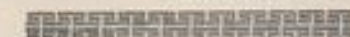
It is a great pity that Mr. M. J. Parry should have marred his otherwise excellent article on tropical aquarium carps by using the obsolete *Barbus* as the generic name of the Barb family. Dr. L. P. Schultz, a famous American systematic ichthyologist classified the barbs into the following categories: no barbels, *Puntius*, two barbels *Capoeta* and four barbels, *Barbodes*. Therefore we have *Barbodes everetti*, *fasciatus*, *hexazona*, *lateristriga*, *pentazona* and *schwanenfeldii*, *capoeta*, *arulius*, *nulstaerti*, *melanampyx*, *oligolepis*, *partipentazona*, *semifasciatus*, *tetrazona* and *titeya*. *Puntius conchonus*, *filamentosa*, *gelius*, *nigrofasciatus* and *sachsi* (golden barb) to name a few! I hope this will clear up any doubts and stop any arguments.

If male barbs are kept together or singly or in a group with very few females it will be found that when the males assume adult coloration (breeding coloration) they will keep this coloration continuously and will not lose it although they are not breeding. Such males often perform a fin stretched "dance" where their coloration is even brighter than when breeding. Such notable species that show this coloration are *C. melanampyx*, *C. oligolepis*, *C. titeya*, *P. conchonus* and *P. nigrofasciatus*. If you like your barbs in full colour all the time, then buy males. I have never come across sexually frustrated males who turn "nasty" from being kept without a female, but no doubt they do "turn up" from time to time. So to prevent any problems one could buy two males to one female or more in approximately the same ratio.

Although both generic names of the neon tetra are correct it is more correct to use *Paracheirodon*.

Yours faithfully,

H. R. COLIS, age 16.



## Paradise Fish

Two tropical queries in the September issue concerning paradise fish prompt me to write this letter to tell of my experience with this fish which might be of interest to others.

About three years ago, wishing to progress from breeding livebearers, I decided to invest in a pair of paradise fish which, my reading told me, were easy to breed but pugnaciously

inclined. Having obtained my stock they were placed in a 24 in. x 12 in. x 12 in. tank along with some unwanted guppy fry, about four weeks old, which I expected would soon be cleared. However, a couple of weeks later I had to remove the untouched fry with a net. During this time only dry food had been fed.

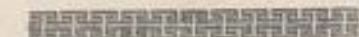
In due course I had a spawning. The fry were fed on Liquify for a week and then powdered Staple TetraMin until they were big enough to take tubifex and chopped earthworm. Second and third generations were fed TetraMin fry food and TetraMin growth food instead of the powdered Staple food. My third generation are as big as, if not bigger than, my original fish. On the debit side I could only raise between six and a dozen per spawning, but this was more than enough for my requirements.

My paradise fish have lived in a community tank along with such fish as neon tetras, a cherry barb and half-inch guppies and swordtails. The only sign of aggression I have ever seen was against inch-long specimens of their own kind, which were promptly set upon and killed.

One spawning was made in a 16 in. x 8 in. x 8 in. tank and the fry removed later to a larger tank. The small tank was emptied, except for depressions in the gravel, and placed in an outhouse for two or three weeks. It was later filled with cold water and left for a further two or three weeks before any heat was put on. A small paradise fish was then observed to be swimming about.

Yours faithfully,

DONALD M. BOND.



## Fluorescent Lighting

In reply to Mr. S. C. Barrell's letter about my article on fluorescent lighting, I would like to point out one or two things in respect of his power calculations.

I assumed (rightly or wrongly) that he measured the power dissipated in his circuit by measuring the current consumed and multiplying this figure by the mains voltage to give the answer in watts. (Watts = Volts x Amps). This will not give a true figure because there is a phase difference between current and voltage when any reactive components are

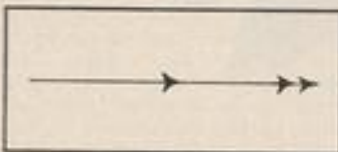
used in a circuit, i.e., a choke or a capacitor in this case, and it is only the "in phase" components of current and voltage multiplied together which will give the true power figure.

However, allowing for this fact, I measured the current consumption of my lighting, and ignoring the phase difference factor I got a reading of 0.14 amps which gives a wattage of 33.6 ( $0.14 \times 240$ ), and as I quoted that one 21 in. tube was roughly equivalent to two 40 watt lamps, I still reckon on saving a fair number of watts.

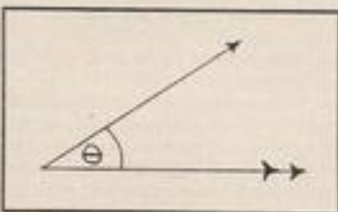
What the power factor capacitor does is to correct the phase difference between current and voltage, and the diagrams may clarify.

Single-headed arrows indicate current (Amps).

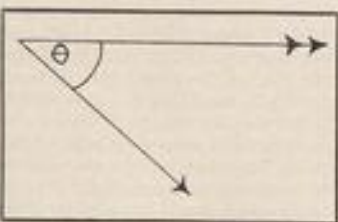
Double-headed arrows indicate voltage (Volts).



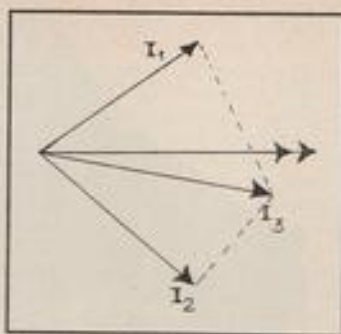
(i) Ordinary resistive circuit, current and voltage in phase.



(ii) Inductive circuit (choke), current lags behind voltage by phase angle  $\theta$



(iii) Capacitive circuit, current leads voltage by phase angle  $\theta$



(iv) Power factor corrected circuit,  $I_3$  is the corrected current flow.

At this point things seem to be getting very technical with vector diagrams and the like, indeed some readers may be wondering where all the little fishes have got to! However, while we are on electrical theory it would be interesting to know how Mr. Barrell made his measurements; after all it all seems a bit of a waste of time if a 15 watt tube is actually going to consume as much electricity as he says. I was always led to believe that after the initial setting up costs, fluorescent lighting was cheaper to run for comparable brightness to ordinary light bulbs.

There are different sorts of control gear available and it may be that Mr. Barrell has a type with a resistive ballast or even a lamp ballast in which case the figure of 100 watts becomes more reasonable.

R. C. MILLS.

#### Tank for Spastics Society

I would appreciate your help in providing a tropical fish tank for our Family Assessment Unit at 16 Fitzroy Square. The Society caters for the needs of spastics generally and the Unit at Fitzroy Square contains a section where parents who have had the misfortune to have spastic babies are brought in order that the child might be assessed as to the degree of its handicap and future potential. This necessitates them seeing consultants, psychiatrists and various other professional people and often there is a great deal of stress in this situation.

It was suggested by one of the psychiatrists that a tropical fish tank

in the waiting room of this section would have a therapeutic effect. As I, in the past, have been a keen tropical fish breeder, I was given the task of organizing this and it struck me that your readers might be able to help.

I feel that, as we are the custodians of public money, it would be wrong to spend this money when many aquarists up and down the country might be pleased to contribute surplus plants, equipment or fish. As the setting for this tank is fairly large, I had envisaged something like a 5 ft. tank. We should be perfectly happy to put a small plaque on any tank given to us by a manufacturer to the effect that it has been donated. The collection of any equipment, fish or plants can be organized as the Society has a small van and offices in most parts of the country.

I would be most grateful for your co-operation in this matter.

Yours sincerely,

R. D. CARTWRIGHT,  
Senior Placement Officer,  
The Spastics Society,  
Family Services and  
Assessment Centre,  
16 Fitzroy Square,  
London, W.1

*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



# Breeding goldfish

## Establishing a Strain

by A. Boarder



THE TERM ESTABLISHING a strain may not convey very much to the aquarist who is not a dedicated breeder or exhibitor. To be successful as an exhibitor it is necessary for the aquarist to have a good strain from which to breed his winners. I know that many fish are imported which may be shown but the difficulty with this is that there are no standards in the countries where these fish are bred and so it is very rarely that a good show specimen comes in from abroad. It cannot be easy for the foreigners to breed to a particular standard as these have been rather chaotic in this country for some years now and even the dedicated breeder is sometimes befogged by the changing standards.

I do not know many breeders who have a good established strain of any variety of fancy goldfish. One or two have some good shubunkins but apart from this variety I see very little evidence that any really good strain exists. For any aquarist to get together a good exhibition strain may take many years. One of the first points I consider necessary is that the breeder must specialise in one special variety. I do not hold with the breeder who has several varieties and is perhaps inclined to make cross

breedings.

Once the kind of fish has been decided upon it is necessary for the breeder to seek out and obtain the best fish he can possibly get of the particular types required. If he can find a good strain already established of the kind he needs he will be more than halfway towards his goal. Even having found the type he wants it may not be easy to get really show specimens as the breeder may wish to keep these himself either for exhibition work or breeding.

Even if the best fish cannot be obtained it is almost certain that any reasonably well shaped fish from a good strain is likely to breed at least a few very good fish and even if they do not quite come up to show standard, they are capable of breeding some better fish if care is taken with the fish kept to establish the strain. The time taken to get such a stock will be many years unless one is able to buy in exceptionally good fish for a start. It is possible that these may cost quite a large sum. The reason for a high price is that even from a very good strain of fancy goldfish it is probable that only about twenty per cent of the youngsters will be good enough for show purposes. This

percentage can vary not only in comparing one strain with another, but even within the same stock at different spawnings. At one time of the year a spawning may produce many finely-shaped fish whereas from the same pair of breeders a later spawning may produce a very low percentage of good fish.

I think that the variation in the quality of a fancy strain will be found much more marked in any variety with a double tail. Even fish from a long established strain can still produce many single-tailed fish. Added to that, there will be several with what is termed a tri-tail, that is one with the top part of the caudal fin single and the lower double. Then there will be many with web-tails; these have a double tail which is joined down the top centre, not showing two distinct tails. Even when the fish has the correct type of caudal fin this is not the end as the anal fin must also be double. Some fish have one and some none at all. Many more may have a double anal fin but one may be much larger than the other which would down-point it at a show.

The difficulty in establishing a good strain may be emphasised by the



relation of my own experiences with one particular type. This is the red-scaled fantail. The term scaled is used to denote that the fish have hard brassy scales and are not like shubunkins which appear to have had their scales ripped off. I started with my strain in 1937, and obtained a few fantails from a large mixed bunch. I decided to breed a strain of fantails which would be hardy enough to stand the winter out of doors in a garden pond. I then wanted to get fish which could change colour from the original bronze to the desired red. Thirdly I required a fish which was good enough to exhibit.

Each year I carefully selected the fish to be used for breeding and never used any fish which had not changed colour within a year. The fantails were left in my garden pond all the year round and appeared to be a very healthy strain. The outbreak of war in 1939 meant that I was not able to exhibit any of my fish as no shows were held. However, after the war the first show I found to be held was one by the National Aquarists Society held at Westminster Hall on 18th December, 1946. There was a class for Fancy Goldfish and my fantail had to compete with veiltails, moors etc. I was awarded a second prize in a class of 13, and was told that my fish would have been first if it had not had some silver on its body.

From then on I concentrated on breeding from fish which were completely red and it was not long before I won many first and special prizes for best fish in show. Now I come to the strange part of the story. During the past thirty-one years I have never had a single-tailed fish among my breeders nor any fish which was not of an excellent quality and colour. Yet today I still get many single tailed fish amongst the fry as well as many other unwanted types. One would think that after such a long time with only the best fish used for breeding, the percentage of good ones would be very high and that not one single-tailed fish would be produced. It would be very difficult to say with any certainty what the percentage of good fish is now as I find that they vary so much from one spawning to another.

One batch might have sixty per cent good ones in it whilst another from the same breeders may have only

forty per cent. These double-tailed fish appear to throw back to the natural shape repeatedly and I begin to wonder if I shall ever get a spawning with a large percentage of very good fish. There is another very strange feature about this strain I am describing. During the past thirty-one years I have never introduced any other fish into my breeding stock. On more than one occasion I have tried to do this but have never found any fantails of my type which came up to the standard I required. On several occasions I ascertained that the fish I had found had come directly from my stock. On one occasion I bought in some fish only to find, before they were put in the pond, that they had tails like veiltails and were obviously from a mixed crossing. On one other time I bought what looked like fairly good young fantails only to find that after a time they developed the hood of orandas. Fortunately, I had not put any of these fishes in with my breeders. The very strange fact about my strain is that I must have been inbreeding very closely for many years but yet the quality or health of the fish does not appear to have deteriorated one little bit. Some of the fish I bred last year were as good show specimens as I have ever bred.

When I used to breed Norwich canaries forty-seven years ago it was considered that inbreeding was a very bad thing to do but, with my fantails it does not appear to have made any difference. The fantails I bred last September spawned in May this year and one female produced about two thousand fry among which are many fine quality fish. How long one could go on with the same strain I do not know but from the many years I have been breeding with the same strain it appears that there is no likelihood of there being any disadvantage from the system. Of course I would never think of using any fish which was not one hundred per cent in good health but even if my youngsters do not all come up to a show standard they are very healthy and I rarely lose a youngster except by a silly mistake. One such happened the other day. I had a number of three month old fantails in a concrete tank. Wishing to use this tank for some younger fry, I thought that I had netted up every fish before adding the fry. The next day I could

hardly see one youngster whilst I had put one hundred and fifty in. At night with a torch I found the culprit, one fantail about two inches long over-all and it had cleared out the fry almost completely.

When sorting out the young fish it is important to have some of the best in a tank where the fish are easily examined to make sure that no faults are showing. The caudal fin is easiest examined from above but the fish must then be watched from the side to see that the dorsal fin is well developed and held. The body of fantails, veiltails and orandas must also be deep, not so deep with the fantails, just egg-shaped. The other fins are usually correct, except the anal where double-tailed types are in question.

To get the young fish to grow fairly quickly, four points must be considered. They are:—warmth, food, space and oxygen. Without any one of these it is probable that the growth will be restricted. Even with warmth, plenty of food and aeration the fish will not grow at their maximum without space. I recently kept eighty young fish of an inch length together in a 24 x 12 x 9 inch tank. They had warmth, 68°F., plenty of food several times a day and medium strength aeration. They remained perfectly healthy but did not grow anywhere near at the rate they would have done had there been about six fish in the tank.

Once a sorting has been done this will enable the aquarist to concentrate on the best fish. Those brought up in warmth when young do not appear to suffer in any way when they are placed in cool water like an outdoor pond. The change should of course be gradual, in the warm tank the thermostat can be lowered so that about ten degrees lower is obtained in about a week. The fish I reared during last winter at about 70°F., have been in my garden pond since the spring and have done very well, having spawned on more than one occasion and produced hundreds of fry.

The dedicated breeder will want to exhibit his fish so that he can get the opinion of an experienced judge as to the quality of his fish. Only by this means will he know if he is on the right track. Much patience is needed but anything worth while is worth taking some trouble with.



# Streamlined jets of the deep

by D. England

A BRITISH SHIP DESIGNER, getting the idea from a tunny fish, fitted one of his cargo ships with a pair of horizontal fins, and these reduced its turning circle to little more than half that of its sister ships.

The designer noticed that a blue tunny can catch a horse mackerel, although research goes to show that both fish have the same maximum swimming speed. As he was interested, he put the tunny under observation and found that it differed from the mackerel in possessing a well-developed pair of horizontal fins near its tail-end.

This is an illustration of the way in which marine engineers these days are more and more taking heed of the advice of that eminent scientist, Lord Kelvin. This was that they should go to natural creatures for education in their work and increase the speed and easier handling of their shipping.

It is not often appreciated that, apart from birds, some species of fish are among the fastest moving creatures. Man can raise a speed of a little over 20 m.p.h. for a short burst; the Derby is won at approximately 35 m.p.h.; and the hunting leopards known as cheetahs can reach 45 m.p.h. in two seconds from a standing start, and over 100 yards they are the swiftest of all animals, getting up to 70 m.p.h.

In recent years the Marine Laboratory, Aberdeen, a Government research station run by the Scottish Home Office, has been carrying out experiments from the point of view of interest to the fishing industry, and others have been carried out by the Cambridge School of Zoology. Some of these relate to the speed of fish, and their thrusting power, which is remarkable.

During a 100 yards race a sprinter reaches top speed only during the second half, but small fish reach their maximum in less than one-

twentieth of a second. An equivalent human performance would be for a sprinter to spring from the starting blocks to top speed in just over one-quarter of a second.

Of course it is impossible to use tank experiments for assessing the speeds of large fish and oceanic mammals, but there are plenty of reliable observations which go a long way to indicate that certain species are just as swift as some of the fastest animals on land. Porpoises, for instance, will without any apparent effort make rings (literally) round a vessel travelling at 15 knots. They are probably capable of at least 20 knots.

Whales and dolphins reach very high speeds. Writing of a grampus, which is a blunt-headed dolphin-like cetacean, a traveller at sea recorded: "The speed of the vessel in which I made the passage was fully 18 knots, but the little whale seemed to maintain its position with the same absence of effort as does the albatross over the mast-head of a swift steamer—any movement of fin or tail was impossible to detect. Occasionally, with the same utter ease, it glided ahead for a ship's length, then dropped alongside again, until its visiting time having expired apparently, it sheered off at right angles and disappeared."

Perhaps the swordfish is the swiftest of all sea creatures, although its maximum speed has never been accurately ascertained. But, remembering the astonishing feats of penetration achieved with its tremendously strong snout, scientists have put its velocity at the moment of impact at anything between 80 and 100 m.p.h.

Whatever the true figure, which is undoubtedly high, it is due in great measure to the streamlined form of the fish—pointed head, fins fitting into grooves, and the lithic body sloping gradually to the tail.

There are several literally "striking" instances of the power behind a swordfish drive. The snout of one of these fish pierced the oaken hull of H.M.S. *Wasp*, and in doing so went through a sheathing of copper, a quarter of an inch of felt and 13½ inches of oak at one dig, but it had to break off its snout in order to get away. Another hungry swordfish mistook the copper-bottomed hull of an oak sailing ship for food of some kind, and stabbed its sword clean through it. A section of this hull

plus sword is preserved at Singapore.

Frank Buckland, the eminent zoologist of last century, wrote: "When H.M.S. *Leopard* was repairing in 1795, after her return from the coast of Guinea, a sword of one of these fishes was found to have gone through the sheathing one inch, next through the three-inch plank, and beyond that four and a half inches into the firm timber; and it was the opinion of the mechanics that it would require nine strokes of a 25 lb. hammer to drive a bolt of similar size and form to the same depth into the same bulk; yet this was accomplished by a single thrust of the fish."

When hunting, the swordfish hurls itself at its prey with like ferocity. A scientist, Professor Richard Owen, spoke of its rush in these terms: "It strikes with the accumulated force of 15 double-headed hammers. Its velocity is equal to that of a swivel-shot, and is as dangerous in its effect as a heavy artillery projectile." When the ship whose relic is at Singapore was examined, it was estimated that the fish must have been moving at 60 m.p.h. when it struck.

A British scientific expedition to the Antarctic took observations relating to the locomotion of whales and other marine mammals and fish. It appears to be substantially confirmed that a blue whale can attain a speed of 20 knots for a short burst of about ten minutes duration, and maintain a speed of 14½ knots for two hours and probably longer. This is an impressive performance for such a huge bulk, because a blue whale of normal proportions may be as much as 90 feet long (even bigger sizes than this are recorded) and weigh as much as 120 tons. A killer whale may achieve slightly higher speeds. Scientists are puzzled as to how whales avoid excessive rises of temperature when developing the enormous power needed to propel them.

The whale differs from other marine creatures in that the tail is horizontal and moves vertically. As touched upon earlier, the tunny is also fitted with horizontal fins. Its body is regarded as one of the most perfectly streamlined contours known to nature. The thickest part is in front of the middle and the width diminishes gradually to the tail. This is known to engineers to be the shape which produces least resistance. A tunny weighs anything up to 1000 lb.,

and one towed an angler in his fishing boat 120 miles before it could be gaffed.

One of the most remarkable species is the flying fish, and close study, aided by the cine camera, has cast much light on its movements. It

breaks surface at 15 to 20 m.p.h., and is almost horizontal at that moment. But it does not begin to glide at once; instead it "taxies" along the surface. It thrashes the top of the water with its tail fins, plainly visible in photographs, and

this gives additional speed.

The air speed has been estimated at anything between 35 and 55 m.p.h. Then follows the glide, which may last up to four seconds carrying the fish 50 yards or so, and perhaps even further with a following wind.

## Saltwater cleaners continued from page 582

fins have been modified to form a sucker attachment which enables the neon goby to hang onto its clients. This is one of the more easily spawned of the gobies and could almost be called the guppy of the marine aquarium. The parents guard the new laid eggs jealously and will allow nothing large or small near their developing offspring. The spawn will hatch in about a fortnight when the fry will feed on natural plankton in the wild.

The wrasse belonging to the family Labroidae are common to the reefs of the Pacific and are all very similar to one another. The body is a dull silver in colour and has a large black band, very similar to the blue band of the neon goby. Juveniles differ only from the adults in that they are very much slimmer. The most commonly imported, and therefore the one you are most likely to see, is *Labroides (Pisilabrus) dimidiatus*. When adult it rarely exceeds four inches in length and makes a very good pet, feeding readily from the hand, and is one of the least expensive of the cleaner wrasses. Another *Labroides* which is very pretty is *L. rubrolabiatus* which is endowed with a pink face and cheeks. One member of this family has received, for services rendered, the title of "house-ester". One of the lesser known cleaners is *Rumulus (Rumula) rhinorhynchus*. This is rarely kept, as like many of the other blennies it is very aggressive towards members

of the same genus in particular, and to every other fish in general. The way in which it swims always reminds one of a little snake weaving through the water. The *Rumulus* is closely related to the Cleaner-mimic blenny (*Aspidontus taeniatus*). The latter has teeth that belong on a shark, so savage looking are they. It can be kept with members of the same species but should not be kept with other fish, as fins will soon take on the appearance of lace curtains. It is a very greedy fish, gorging itself almost incessantly on small pieces of fish and chopped earthworms. The colouring, finnage and size are identical to the previously mentioned *Labroides dimidiatus*.

As mentioned previously, several fishes perform the cleaning tasks when they are young. Most of these are small and brightly coloured like the blennies and gobies. The royal gramma (*Gramma leucichrysa* or *G. loreto*) is a small fish, seldom attaining three inches. What it lacks in size however, it more than makes up for in colour. The anterior half of the body is a glorious technicolour blue and the rear quarters are lemon yellow. There is an eye stripe which is dark brown or black and the dorsal spot is the same. On the anal and dorsal fins one can find three spines which appear to have no function other than a decorative one. This is a solitary fish and so only one should be kept per tank. The price of this is rather high, anything up to twenty

pounds for an adult in good condition. There is a comforting thought about this fish though. The gramma has a reputation for being a hardy fish and so the expense could be spread over twenty or more years. It will perform the cleaning tasks for the first few years, and then as it ages, it drops the habit and behaves like any other fish. After "retirement" has commenced, the gramma may even have to solicit the attentions of a younger gramma in order that any parasites or fungal growths may be removed.

There are many other cleaner fishes but most of these are rarely imported and even then are large and expensive. However, for the keen aquarist, fishes he can look out for are: the poekfish (*Anisotremus virginicus*), the blue-head wrasse (*Thalassoma bifasciatum*), and the one most commonly kept, but which only cleans in the first two years of its life, the banner pennant and wimple fish (*Hemiochus acuminatus* and related species). The latter is a tough fish and is the best butterfly fish for the aquarium. All the gobies and small wrasse mentioned are very inexpensive and make admirable inmates for the first marine tank, and most of the other fish mentioned are seen quite often in the well stocked marine supply shops.

My black clown appears to be scratching himself. Perhaps he has an irritating "bug" under his skin. This just might be a good excuse to introduce a neon goby.



Full list of entries for the  
"Champion of Champions"  
SEE PAGE 604



THE Hendon and District A.S. are once again pleased to announce that the Annual Congress will be held on Saturday evening the 7th December at 6 p.m. at Edgware School, Green Lane, off Spur Road, Edgware, Middx. This is very close to the Watford By-pass and the M.1. This year the speaker will be Mr. T. Horoman of Tadobrook Tropicals. He is one of the leading authorities in Europe on Aquatic Plants and has recently explored the waters of the Amazon. He has, as a record of his expedition, many illustrations of his finds. All members of all societies, are welcome but it should be mentioned that this Congress is not projected "just for the expert or specialist" but for all those who keep fish, whether they are "one-tank" Aquarists or not. The welcome also extends to any reader whether a "Clubman" or not. Early application for tickets is advisable and these are obtainable from K. Parbrick, 3 Holme Way, Stanmore.

A WELCOME return visit was made to the **Blood & District Aquarist & Pondkeepers' Society** recently, by Mr. W. Corby, who never fails to stimulate interest in the breeding of tropical fish. On this occasion Mr. Corby talked on the subject of breeding the anabantid, with particular reference to the Siamese Fighter and the Leeri Gourami and all those who attended gained a new appreciation of these fishes and a lot of useful information on their breeding requirements.

The Society had one of its periodical sales of fish and plants at the September meeting. An interesting programme has been drawn up for future meetings as follows:—Monday, 11th November: Lecture by Mr. R. List. Monday, 9th December: Programme on Fish Houses and Fish Shows by Mr. J. Morris. Monday, 13th January: Prize awards for 1968 and slide Show. Anyone interested in fish-keeping will be welcome to attend these meetings and further information about the Society may be obtained from the Secretary, Mr. R. Ruth, 103 Heath Road, Chadwell Heath, Romford.

THE Show results of the **Dewsbury and District A.S.** were as follows:

Livebearers: 1 and 3, Mr. and Mrs. Dermie (Worksop); 2, H. Gardner (Aireborough). Barbs: 1 and 2, F. Buxton (Barnsley); 3, Mrs. Batty (Swillington). Fighters: 1, A. E. Whiteley (Tadcaster); 2, Mr. and Mrs. Dermie (Worksop); 3, I. Cohen (Pontefract). Toothcarps: 1, M. Faircliff (Tadcaster); 2, Mr. and Mrs. Dermie (Worksop); 3, L. Greenall (Tadcaster). Cichlids: 1, M. Faircliff (Tadcaster); 2 and 3, P. Barrett (Aireborough). Breeders (Egglayers): 1, Mr. and Mrs. Dermie (Worksop); 2, P. Buxton (Barnsley); 3, M. Faircliff (Tadcaster). Breeders (Livebearers): 1, Mr. and Mrs. Dermie (Worksop); 3, H. Gardner (Aireborough). Characins: 1, P. Reynolds (Swillington); 2, J. A. Whiteley (Aireborough); 3, J. Wright (Aireton). Anabantids: 1, M. Cole (Swillington); 2, Mr. and Mrs. Dermie (Worksop). Catfish and Loaches: 1, W. Parkin (Huddersfield); 2 and 3, A. G. Esteves (Top Ten). Carps and Minnows: P. Barrett (Aireborough); 2, R. Walker (Sheffield); 3, W. Naylor (Aireborough). A.O.V. Tropical: 1, Mr. Naylor (Halifax); 2, P. Moonhouse (Bradford); 3, P. Reynolds

(Swillington). Pairs (Egglayers): 1, J. A. Whiteley (Aireborough); 2, W. Parkin (Huddersfield); 3, P. Buxton (Barnsley). Pairs (Livebearers): 1, Mr. and Mrs. Dermie (Worksop); 2, Mrs. Eaden (Sheffield); 3, G. Nash (Swillington). Furnished Jars: 1 and 2, Mr. Shields (Halifax); 3, Mrs. J. Cassidy (Dewsbury).

AT the September meeting of the **Pontefract and District A.S.** R. Winterburn of Bradford entertained members with a very interesting Slide Show on Garden Ponds and Aquatic Plants. The results of the monthly Table-Show were: Coldwater: 1, J. Thompson; 2, D. and B. Cohen; 3, G. Newbould. Sharks and Flying Foxes: 1, P. Gates; 2 and 3, D. and B. Cohen. Plants: 1 and 3, D. and B. Cohen. 2, J. Thompson.

THE Rochdale and District A.S. show results were as follows:

Guppies: 1, 2 and 3, Mr. Brothwood (Gorton); Mollies: 1, Mr. Harrop (Osram); 2, Mr. Wombell (Rotherham); 3, Mr. Ledger (Top Ten). Platies: 1, Mr. Brown (Mixenden); 2, Mr. Henshaw (Belle Vue); 3, Mr. and Mrs. Bone (Huddersfield). Swordtails: 1, P. and H. (Gorton); 2, Mr. and Mrs. Grimshaw (Sunnybrow); 3, Mr. Turner (Mixenden). Small Barbs: 1 and 2, Mr. Gregory (Osram); 3, Mr. Kershaw (Heywood). Large Barbs: 1, Master S. Kaye (Top Ten); 2, Mr. and Mrs. Grimshaw (Sunnybrow); 3, Mr. Moorcroft (Merseyside). Loaches: 1, Mr. Parkin (Huddersfield); 2, Mr. and Mrs. Webb (Salford); 3, Mr. Kershaw (Heywood). Small Catfish: 1, and 3, Mr. Esteves (Top Ten); 2, Mr. Kershaw (Heywood). Large Catfish: 1, Mr. Phillips (Ashton); 2 and 3, Mr. L. Kaye (Top Ten). Anabantids: 1, Mr. Whyte (Halifax); 2, Mr. and Mrs. Bone (Huddersfield); 3, Mr. Ledger (Top Ten). Fighters: 1, 2 and 3, Mr. Taylor (Aireborough). Dwarf Cichlids: 1, Mr. Moorcroft (Merseyside); 2, Mr. Taylor (Aireborough). Large Cichlids: 1, Mr. Moorcroft (Merseyside); 2, Mr. Hunt (Mixenden); 3, Mr. Williams (Oldham). Angels: 3, Mrs. McLean (Sunnybrow); 2, Mr. Gray (Sunnybrow); 1, Mr. Bone (Huddersfield). Small bross: 1, Mr. Bone (Huddersfield). Small Characins: 1, Mr. Bilton (Valley); 2, Mr. Gregory (Osram); 3, Miss Robinson (Huddersfield). Medium Characins: 1, Mr. Turner (Mixenden); 2 and 3, Mr. Whyte (Halifax). Large Characins: 1, Mr. Moorcroft (Merseyside). Toothcarps: 1 and 3, Mr. Bessley (Osram); 2, Mr. and Mrs. Grimshaw (Sunnybrow). Rastbors: 1, P. and H. (Gorton); 2, Mr. Gregory (Osram); 3, Mr. Moorcroft (Merseyside). Danios: 1, Mr. Boardman (Leigh); 2, Mr. Tonge (Oldham); 3, Miss Robinson (Huddersfield). Breeders (Livebearers): 1, Mr. Bilton (Valley); 2, Mr. Wood (Bury); 3, Mr. and Mrs. Bone (Huddersfield). Breeders (Egglayers): 1, Mr. Bessley (Osram); 2, Mr. Wood (Bury); 3, Mr. Gregory (Osram). Pairs (Livebearers): 1, Mr. Brothwood (Gorton); 2, Mr. Kershaw (Heywood); 3, Mr. and Mrs. Bone (Huddersfield). Pairs (Egglayers): 1, Mr. Parkin (Huddersfield); 2, Mr. Bessley (Osram); 3, P. and H. (Gorton). A.O.V. Tropical: 1, M. and W. (Sunnybrow); 2, P. and H. (Gorton); 3, Mr. Brown (Mixenden). Fancy Goldfish: 1, Mr. Walsh (Accrington); 2 and 3, Mr. Eaden (Sheffield). Common Goldfish: 1, Mrs. Davis (Heywood); 2 and 3, Mr. Eaden (Sheffield). A.O.V. Coldwater: 1 and 2, Mr. Eaden (Sheffield). Juniors: A.V. Tropical: 1, Master Wakefield (Osram); 2, Master Brown (Mixenden); 3, Miss B. Kaye (Huddersfield). A.V. Coldwater: 1, Miss Bone (Huddersfield); 2 and 3, Master Kaye (Huddersfield). Best Fish in Show: Fanciful Goldfish: Mr. Walsh (Accrington). Cup for best Angel: Mrs. McLean (Sunnybrow). Cup for Top Society (Osram).

The Warsop District A.S. welcome new members and also visitors to their weekly meetings on Monday nights at 8 p.m. Meetings are held at the Hare and Hounds, Warsop.

MEMBERS who attended the September meeting of **Tonbridge and D.A.S.** were entertained by two slide shows. The first, with a taped commentary, was of the British Aquarist Festival, 1966. This was followed by a set of very good slides of prizewinning exhibits which had been taken at Brighton A.S. Open Show 1968, and were shown by Mr. A. Riley of Brighton A.S. who jocularly admitted that he knew more about photography than fish. A report of the last P.B.A.S. assembly was given by the club's delegates.

Winners in the table shows were:—Fighters: 1, A. J. Bellingham; 2, R. Cattmore; 3, J. Mathison. A.O.V. Labyrinth: 1, M. H. London (Guest Gourami); 2, J. Williams (Pink Kissing Gourami); 3, J. Amos (Moonlight Gourami).

THE 4th Annual Open Show of the **Salisbury and District A.S.** was extremely well attended, both by exhibitors and the public. A record number of entries was received, namely 350, and a good standard of fish was attained. Complete results were as follows:

Guppy (Male): 1, C. Beets; 2, Mr. Carter; 3, Mr. Wright. Guppy (Female): 1, C. Beets; 2 and 3, Mr. Brown. Platy: 1, S. Cooke; 2, T. Garcia; 3, T. Coombs. Mollies: 1, R. Brown; 2, Mrs. S. Sainsbury; 3, D. Jones. Swordtail: 1, T. Garcia; 2, R. Harvey; 3, R. Brown. A.O.V. Livebearer: 1, R. Brown; 2, J. West; 3, A. Blake. Barb: 1, Mr. Permani; 2, R. Brown; 3, I. Goddard. Cichlid: 1, K. Willey; 2, Mr. Eason; 3, Mr. Permani. Dwarf Cichlid: 1, F. Gibbs; 2, D. Bridger; 3, F. Brown. Hyphosbrycon and Nemigramus: 1, Mrs. S. Sainsbury; 3, Mr. R. Brown. A.O.V. Characin: 1, Mr. Jeffery; 2, I. Goddard; 3, Mr. Hanks. Corydoras Cats: 1, Mr. Wright; 2, Mr. Pinkney; 3, J. West. A.O.V. Cats and Loaches: 1 and 2, F. Brown; 3, Mr. Carter. Rastbors: Mr. Minnow; 1, R. Cook; 2, Mr. Harding; 3, Mr. Coombs. Fighters: 1, 2, and 3, Mrs. King. A.O.V. Labyrinth: 1, D. Jones; 2, S. Cooke; 3, T. Blacard. Egglaying Toothcarps: 1, F. Brown; 2, D. V. Jones; 3, Mr. Carter (Jnr.). A.O.V. Egglayers: 1, R. Brown; 2, T. Garcia; 3, Mr. Hicks. Breeders (Egglayers): 1, Mr. Cox; 2 and 3, Mr. D. V. Jones. Breeders (Livebearers): 1, Mr. Beets; 2, R. Brown; 3, Mr. Carter. Goldfish (Coldwater): 1 and 3, Mr. Jeffery; 2, Mr. Voysey. Shubunkins (Coldwater): 1, 2 and 3, Mr. Coombs. Fancy Goldfish: 1, V. Voysey; 2 and 3, Mr. Coombs. A.O.V. Pond and River Fish: 1 and 3, V. Voysey; 2, V. Hunt. Best Fish in the Show: F. Brown of Bristol with a Mystus Cat. Highest Total No. of Points obtained by an Individual: R. Brown of Downton. Best Characin of the Show: Mr. Jeffery. Best Breeder Egglayer of the Show: Mr. Cox.

THOSE present at the September meeting of the **Leek and District A.S.** heard a really excellent lecture entitled Killifish. The Script, which dealt with natural habitats, general description and breeding of most species in this family was ably read by the secretary, C. K. Morris to whom credit is due for his perseverance with the lengthy Latin names by which most of the species are known. The highlight of the evening was, however, the accompanying colour slides which really did justice to these gems of the aquatic world. Killifish are not widely kept, but quite some interest was aroused in various members after having seen the slides.

The last show in the current season, for any varieties of fish, was well supported, with 28 entries. Results were:—1, J. Thompson (Kuhl loach); 2, S. Ormerod (Dwarf Gourami); 3, R. Billing (Perma-black Mollie); 4, W. Ash (Kissing Gourami).

The trophies for Aquarist of the Year and Junior Aquarist of the Year went to R. Billing with 21 show points and Gary Thompson, 12 show points, respectively. W. Ash was runner up with 20½ show points—a close contest.

**THE SAFE CURE FOR WHITE SPOT IS**  **Hillside Aquatics London N12**



AN attendance of over thirty members at the annual meeting of the **Bournemouth Aquarist Club**. Heard the Chairman, Mr. B. Coombes, give the results of the Home Furnished Aquaria competition held recently as follows:—1, Mr. Pink; 2, J. V. Jeffery; 3, F. McFarlane; 4, H. Earl. The Table Show of the Month was judged by Mr. L. James, with the following results:—Barbs: 1, B. Watkins; 2, F. McFarlane; 3, B. Coombes. Guppies: Only one entry. The award went to Mr. B. Coombes.

TWO meetings of the **New Forest A.S.** were held during September. The first was a joint meeting with Southampton when a quiz was held between the two clubs. In the table show which was judged by Mr. Jones of Southampton and Mr. Knapp of New Forest. Southampton took the first four places.

The monthly club meeting was held at the Lynton Community Centre, but unfortunately the attendance was rather poor. The meeting was devoted to a lively discussion of methods of attracting more members and improving attendance. Many useful suggestions were made. The table show results were as follows:—

Common Goldfish: 1, D. Harding; 2 and 3, L. Menhennett; 4, A. Williamson. Coldwater Plants: 1, R. Travers; 2, A. Williamson; 3 and 4, D. Harding.

THE **Rochdale and District A.S.** report that the Secretary, R. J. Lord, 61 Bridgefield St., Rochdale has been re-elected along with Mr. P. Dunster, Show Secretary, (new address, 63, Redcross St.) at the first annual general meeting.

THE open show held by the **Oldham and District A.S.** was a great success and these are the results.

Class A: 1 and 2, Mr. Duffy (Nottingham); 3, D. Coop (Ostram). Class B: 1, Mr. and Mrs. Standen (Loyne); 2, Mr. Brown (Mixenden); 3, K. Harrop (Ostram). Class C: 1, B. Thompson (Glossop); 2, Mr. and Mrs. Standen (Loyne); 3, B. Wombwell (Ostram). Class D: 1, Mr. and Mrs. Standen (Loyne); 2, F. Ledger (Top Ten); 3, M. Cob (T.A.B.).

Section 2 (Class A): 1 and 3, F. Gregory (Ostram); 2, B. Kaye (Huddersfield). Class B: 1, K. Parkes (Merseyside); 2, Mrs. Grimshaw (Sunnybrow); 3, K. Taylor (Aireborough).

Section 3 (Class A): 1, P. Barritt (Aireborough); 2, A. G. White (Halifax); 3, B. Tonge (Oldham).

Section 4 (Class A): 1, Mr. and Mrs. Webb (Salford); 2, W. Parkin (Huddersfield); 3, M. and W. (Sunnybrow). Class B: 1 and 2, A. G. Esteves (Top Ten); 3, B. Thompson (Glossop). Class C: 1, Mr. Phillips (Ashton); 2, Mr. and Mrs. Standen (Loyne); 3, F. Mulla (Merseyside).

Section 5 (Class A): 1 and 3, R. Taylor (Aireborough); 2, K. Wilbraham (Ostram). Class B: 1 and 2, R. Taylor (Aireborough); 3, Mr. and Mrs. Bone (Huddersfield).

Section 6 (Class A): 1, P. Barritt (Aireborough); 2, B. Wombwell (Ostram); 3, B. Tonge (Oldham). Class B: 1, P. Barritt (Aireborough); 2, K. Parkes (Merseyside); 3, S. Hirst (Mixenden). Class C: 1, J. Brankin (Oldham); 2, Mr. and Mrs. Standen (Loyne); 3, W. Gray (Sunnybrow).

Section 7 (Class A): 1, Mr. Shields (Halifax); 2, F. Gregory (Ostram); 3, M. and W. (Sunnybrow). Class B: 1, Mrs. V. Parkes (Merseyside); 2, N. Turner (Mixenden); 3, Mr. and Mrs. Bone (Huddersfield).

Section 8 (Class A): 1, P. and H. Gorton; 2, J. Roberts (Nelson); 3, D. Jackson (Ostram). Class B: 1, P. and H. Gorton; 2, M. Cob (T.A.B.); 3, S. Harrop (Ostram).

Section 9 (Class A): 1, 2 and 3, Mr. Duffy (Nottingham). Class B: 1, Mr. and Mrs. Standen (Loyne); 2, K. Wilbraham (Ostram); 3, M. Tonge (Oldham).

Section 10 (Class A): 1, Mr. Duffy (Nottingham); 2, Mrs. Grimshaw (Sunnybrow); 3, M. Jones (Valley). Class B: 1, F. Gregory (Ostram); 2, W. Parkin (Huddersfield); 3, F. Mulla (Merseyside).

Section 11 (Class A): 1, P. and A. Devine (Ashton); 2, Mr. Brown (Mixenden); 3, Mr. Webb (Salford).

Section 12 (Class A): 1, Mr. Walsh (Accrington); 2, Mr. Isherwood (Accrington); 3, Mr. Whitty (Accrington). Class B: 1 and 2, Mrs. Davies (Heywood); 3, A. Poinson (Oldham). Class C: 1, W.P.S.C. (Oldham); 2, A. Poinson (Oldham); 3, Mr. Walsh (Accrington).

Section 13 (Juniors): 1, A. Kaye (Huddersfield); 2, S. Kaye (Top Ten); 3, G. Brown (Mixenden). The number of entries was 299 and P. Barritt gained "best fish in show".

THE second open show held by the **Harlow A.S.** more than 400 entries and the results were as follows:

Guppies: 1, P. Murdoch (Harlow); 2 and 3, D. Gurry (F.G.A. Edmonston); 4, H. Vinal (Harlow). A.V. Fighters: 1, Miss L. Durrant (Thurrock); 2, Miss P. Durrant; 3, D. Durrant; 4, Miss C. Durrant. Mollie: 1, M. Smith (Walthamstow); 2, L. Davison (Mid Herts); 3, R. Pimm (Chingford); 4, F. Daley (Harlow). Swordtail: 1 and 2, B. Mather (Walthamstow); 3, Miss J. Read (Walthamstow); 4, A. Day (Harlow).

Platy: 1, K. Appleyard (Thurrock); 2, P. O'Bryan (Thurrock); 3, J. Duncan (Harlow); 4, S. Morgan (Harlow). A.O.V. Livebearer: 1, D. Durrant (Thurrock); 2, G. Greenhalf (Kingston); 3, B. Gee (Blackwater); 4, P. Wenzel (Harlow). Labyrinth: 1, S. Mooney (Tottenham); 2, J. Harris (Harlow); 3, C. Hooper (Brent); 4, E. Gee (Blackwater).

Barbs: 1, G. Larwill (Harlow); 2 and 3, T. Walker (Guildford); 4, F. Pimm (Chingford). Catfish and Loach: 1, A. Millhouse (B.G.A.S.); 2 and 3, J. Soanes (Harlow); 4, B. Pearson (Freelance). Characin: 1, A. Millhouse (B.G.A.S.); 2, F. Kendrick (Freelance); 3, R. Kerridge (Harlow); 4, T. Walker (Guildford).

Barbora Danio W.C.M.M.: 1, S. Mooney (Tottenham); 2, T. Walker (Guildford); 3, Mrs. J. Salisbury (Harlow); 4, B. Pearson (Freelance). E.L.T.: 1, B. Macintyre (Tottenham); 2, J. Soanes (Harlow); 3, T. Walker (Guildford); 4, S. Morgan (Harlow).

Dwarf Cichlid: 1, D. Kempen (Blackwater); 2, J. Maystone (Harlow); 3, B. Pearson (Freelance); 4, H. Sumner (Chingford). A.O.V. Cichlid: 1 and 4, D. Day (Harlow); 2, J. Maystone (Harlow); 3, R. Savage (Mid Herts).

A.O.V. Tropical: 1, S. Mooney (Tottenham); 2, F. Kendrick (Freelance); 3, A. Withers (Mid Herts); 4, G. Larwill (Harlow). Breeders (Egglayers): 1, T. Walker (Guildford); 2, J. Soanes (Harlow); 3, S. Mooney (Tottenham); 4, D. Durrant (Thurrock). Breeders (Livebearers): 1, B. Mather (Walthamstow); 2, M. Smith (Walthamstow); 3, G. Greenhalf (Kingston); 4, D. Durrant (Thurrock).

Club Furnished Aquaria: 1, Harlow; 2, Blackwater; 3, B.G.A.S.; 4, Chingford. Male Guppy: 1, D. Curry (F.G.A. Edmonston). Best Fish in Show and Aquarist Pin: A. Millhouse (B.G.A.S.). Piranha. Rose Bowl for Club gaining most points: 1, Harlow, 57; 2, Walthamstow 27; 3, Thurrock 25; 4, Tottenham 20.

THE **Southend, Leigh and District A.S.** called a Special General Meeting recently to discuss the holding of an open show in 1969. The date for the show was fixed tentatively for May or June. A show committee was elected as follows:—Show Secretary: R. Passmore, 39 Grafton Road, Canvey Island, Essex; R. O. Orford (Advertising); S. Norris and E. Nicoll (Electric); R. Blonham and E. Blonham (General members).

Highlights of recent ordinary meetings have been a talk on unusual fishes by Ed Nicoll of the Thurrock Society; a judging competition resulting as follows: 1, T. Clark; 2, Mr. Prockler; 3, N. Sellers; 4, M. Goodall, and a cichlid table show, judged by E. Nicoll of Thurrock, the result of the latter being: 1, P. Haron (Oscar); 2, R. Passmore (Discus); 3, R. Parker (Jack Dempsey); 4, R. Parker (Angel). In addition a home furnished aquaria competition was staged the placings being: 1, D. Finch; 2, R. Blonham; 3, T. Bobbin; 4, Miss E. Russell.

AT the September meeting of the **Aireborough and District A.S.** fifty members and guests were present. Three new members were warmly welcomed by the president who also officiated as the auctioneer.

During the evening some of the members' achievements in the **Breeders Award Scheme** were recognised with the awarding of the appropriate medal. The members are having continued success at 'Open Shows', and, in fact a third member has achieved 'Best in Show' on at least two occasions. This is Mr. P. Barritt with his 'Severum Cichlid.' Results of the September table show were as follows:—

Catfish and Loach (Excluding Corydoras Catfish): Advanced: 1 and 3, Mrs. R. Robinson; 2, B. Megson. Novice: 1 and 3, J. Kay; 2, J. Robinson. Junior: 1, Master A. Plesher. Platies: Advanced: 1 and 3 H. Gardner; 2, W. Naylor. Novice: 1 and 3, J. Robinson; 2, C. Thompson. Junior: 1 and 2, Master A. Sretton; 3, Master M. Robson. Fish of the month: H. Gardner's 'Platy Variatus.'

THE Annual invitation inter-club show of the **Crawley College A.S.** was held early in September. Results were as follows:

A.V. Barbs: 1, W. D. Harper (Kingston); 2, M. A. Whittington (Brighton); 3, P. Tee (Brighton); 4, A. Phillips (Crawley). A.V. Corydoras Cat: 1, B. Pearson (Freelance); 2, S. Perham (Redhill); 3, Mrs. M. Young (Redhill). A.O.V. Catfish or Loach: 1, G. Greenhalf (Kingston); 2, P. Tee (Brighton); 3, J. E. Wright (Redhill). A.V. Characin: 1, Mrs. J. H. Partridge (Crawley); 2, Mrs. Young (Redhill); 3, Mr. Pollard (Kingston); 4, I. J. Stemp (Redhill). A.V. Dwarf Cichlid: 1 and 2, B. Pearson (Freelance); 3, M. A. Whittington (Brighton); 4, R. E. A. Partridge (Crawley).

A.O.V. Cichlid: 1, G. Greenhalf (Kingston); 2, L. Answorth (Brighton); 3, I. J. Stemp (Redhill). A.V. Labyrinth: 1, P. E. Young (Redhill); 2, G. Harris (Redhill); 3, G. Greenhalf (Kingston); 4, Q. J. Taylor (Redhill).

A.O.V. Tropical Egglayer: 1, G. Greenhalf (Kingston); 2, Mr. Pollard (Kingston). A.V. Danio Rasbora and W.C.M.M.: 1 and 2, W. D. Harper (Kingston); 3, D. J. Soper (Mid Sussex). A.V. Platy: 1 and 2, D. Evans (Crawley); 2, P. Young (Redhill). A.V. Swordtail: 1, D. Evans (Crawley); 2, G. Harris (Redhill); 3, P. Tee (Brighton). A.V. Mollie: 1, L. Answorth (Brighton); 2, M. Clarke (Kingston); 3, D. Evans (Crawley). A.V. Tropical Livebearer: 1, D. J. Soper (Mid Sussex); 2, Mr. Pollard (Kingston); 3, G. Greenhalf (Kingston). A.V. Egg-laying Tooth Carp: 1, 2 and 4, B. J. Pasley (Kingston); 3, C. T. Eisner (Crawley). A.V. Tropical Pairs: 1, P. Tee (Brighton); 2, B. Pearson (Freelance); 3, C. Greenhalf (Kingston). A.V. Tropical Breeders (Livebearers): 1, D. Evans (Crawley); 2 and 3, G. Greenhalf (Kingston). A.V. Tropical Breeders (Egglayers): 1 and 3, D. J. Soper (Mid Sussex); 2, P. B. Young (Redhill); 4, Mrs. J. H. Partridge (Crawley).

THE show results of the **Nottingham and District A.S.** were as follows:

Common Goldfish: 1, C. Hill; 2, B. Forman; 3, Mr. and Mrs. J. Wright. London Shubunkin: 1, B. W. Forman; 2, C. Hill; 3, Mrs. C. M. Beard. Breist: 1 and 3, G. Fern; 2, C. Hill. Carassius Auratus: 1, 2 and 3, G. Fern (Best Goldwater, Brentnall Cup). Black Moor: 1, O. Pearson. Oranda: 1, 2 and 3, C. Hill. Orfe: 1, 2 and 3, B. W. Forman. Rudd: 1 and 2, B. W. Forman. Tench: 1, Master D. Beard; 2, B. W. Forman; 3, Mr. and Mrs. J. Wright. A.O.V. Coldwater: 1, B. Forman; 2, C. Hill; 3, J. J. Wood. Fighters (Male): 1, Mr. and Mrs. J. H. Derric; 2, P. Underwood; 3, P. Reynolds. Fighters (Female): 1, Mr. and Mrs. J. H. Derric. Thick Lipped Gourami: 1, P. and H. Hodgkinson; 2, Mrs. C. M. Beard; 3, Paul Hodgkinson. Dwarf Gourami: 1, J. and H. Derric; 2, Miss C. Sibson; 3, Mr. and Mrs. J. Wright. Lace-

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Gourami: 1, J. and H. Derric; 2, Stephen Chamberlain. Blue Gourami: 1, G. Hallam; 2, D. A. Page; 3, Miss A. Hill. Gourami (any other species): 1, P. and H. Hodgkinson; 2 and 3, J. and H. Derric. Anabantid (any other species): 1, F. J. Beard; 2, David Hallam; 3, Mr. and Mrs. E. N. Gee. Rosy Barb: 1, Trevor Poizer; 2, R. Cox; 3, D. Chamberlain. Gunning Barb: 1 and 2, A. Saxton. Nigger Barb: 1, Miss A. Hill. Checker Barb: 1, Mr. and Mrs. J. H. Derric; 2, Mr. and Mrs. J. Wright. Tiger Barb: 1 and 2, J. and H. Derric; 3, A. Wheatley. Cherry Barb: 1, D. Holland; 2, Mr. and Mrs. J. Wright; 3, P. Reynolds. Barbous (over 3 in.): 1, J. and H. Derric; 2 and 3, S. Hill. Labcor (sharks): 1, A. Garratt; 2, J. and H. Derric; 3, G. H. Colton. Platies and Glow-lights: 1, Mrs. A. Hill; 2, P. Reynolds. Neons and Cardinals: 1 and 2, D. Wragg; 3, J. J. Wood. Rosaceous and Robbostigma: 1, D. Wragg; 2, J. and H. Derric; 3, D. Holland. Black Line and N-Ray: 1, H. Nutt; 2, R. Cox; 3, C. Hill. Sepee Terra: 1, G. Hallam; 2, C. Hill; 3, J. and H. Derric. Hemigrammus (species): 1, Miss A. Hill; 2, P. Reynolds. Black Widows: 1, K. Birns; 2, M. Brown; 3, J. and H. Derric. Penguin: 1, J. and H. Derric; 2, J. Poizer; 3, C. Hill. Golden Pencil (Dwarf): 1, R. Cox; 2 and 3, A. Saxton. Characin (any other species): 1, P. Reynolds; 2, H. Nutt; 3, Miss C. Sibson. Male Swordtails: 1 and 2, J. and H. Derric; 3, B. Smith. Female Swordtails: 1 and 2, J. and H. Derric; 3, B. Smith. Var. Male Platy: 1, D. Holland; 2, J. and H. Derric; 3, Miss D. Scrimshaw. Var. Female Platy: 1, B. Smith; 2, Mr. and Mrs. E. N. Gee; 3, G. C. Chamberlain. Male Mollies: 1, A. Mawson; 2, J. and H. Derric; 3, Mrs. M. Hallam. Female Mollies: 1, David Hallam (15 yrs). Best entry by Junior for Junior Shield; 2, J. and H. Derric. Male Guppy: 1, 2 and 3, Mr. Duffy. Female Guppy: 1, A. Mawson; 2, R. Simpson; 3, Miss D. Scrimshaw. Livebearer (any other species): 1, Mr. and Mrs. E. N. Gee; 2 and 3, P. Reynolds. Danios: 1, J. and H. Derric. Giant Danio: 1, S. Hill; 2, Mr. and Mrs. J. Wright; 3, Mr. Allison. White Clouds: 1 and 2, P. Reynolds; 3, J. and H. Derric. Harlequin: 1, D. Holland; 2, Mr. and Mrs. J. Wright; 3, Mrs. P. Scrimshaw. Scissortail: 1, P. and H. Hodgkinson; 2, R. Cox; 3, Miss D. Scrimshaw. Any other species: 1, David Hallam; 2, Mr. and Mrs. E. N. Gee; 3, J. and H. Derric. Rameriz: 1 and 2, J. and H. Derric; 3, Mr. and Mrs. J. Wright. Severum: 1, K. Birns; 2, T. Miller; 3, D. Wragg. Acara: 1, K. Birns; 2, Mr. and Mrs. J. Wright; 3, D. A. Page. Angelfish: 1, P. Bousier; 2, Miss D. Scrimshaw; 3, Mr. Duffy. Jewel Fish: 1, Mr. T. Power; 2, Mr. and Mrs. J. Wright. Cichlids (under 3 in.): 1, J. and H. Derric. Best in Show, Syson Cup, Best Tropical, Airnow Cup: 2, E. G. Sibson; 3, Mrs. M. Hallam. Cichlids (over 3 in.): 1, Mr. Sibson; 2, J. and H. Derric; 3, P. Underwood. Lyre-tails: 1, Mrs. G. Squire; 2, Paul Hodgkinson; 3, R. Tunford. Panchak: 1, Mrs. I. Bulleyment; 2 and 3, J. and H. Derric. Rivulus: 1, Mrs. S. Hill. Top Minnows (any other species): 1 and 2, Mr. P. Reynolds. Bronze Cats, etc.: 1, Mrs. I. Bulleyment; 2, A. Reid; 3, P. Underwood. Catfish (any other species): 1, J. and H. Derric; 2, P. Reynolds; 3, A. Garratt. Kuhl Loach: 1 and 2, P. and H. Hodgkinson; 3, P. Haigh. Loaches: 1, Mrs. I. Bulleyment; 2, Master D. Beard. Rainbows: 1, A. Mawson; 2 and 3, J. and H. Derric. Any Other Tropicals: 1 and 2, P. G. Sibson; 3, Mr. and Mrs. Moorhouse. Pair Gouramis: 1, 2 and 3, J. and H. Derric. Barbs (Pairs): 1, J. and H. Derric; 2, D. Wheatley; 3, M. Brown. Characin (Pairs): 1, T. Power; 2, P. Underwood. Cichlids (Pairs): 1, Mr. and Mrs. J. Wright; 2, J. and H. Derric.

Livebearers (Pairs): 1 and 2, J. and H. Derric; 3, Mr. Duffy. Tropical Marine: 1, A. M. Deakin. Best Marine exhibit, C. and M. Hill Trophy. Tropical Furnished, Poultry-Supplies-Cup; Best Tropical Furnished: 1, B. W. Forman. Best Coldwater Furnished, Brown and Taylor Cup. Breeders (egg-layers): 1, J. and H. Derric; 2, S. Hill; 3, P. Underwood. Breeders (livebearers): 1, J. and H. Derric; 2 and 3, Mr. Duffy.

RECENTLY the Independent A.S. travelled to Hendon for the fifth round of the North-West London Inter-Club Points Competition. After the fish had been judged the pointings were: Independent 89, Hendon 80, Riverside 70, Hampstead 35, Willesden 32.

Anybody wishing to join the Club is welcome to call at Monism School, Hornsey Road, N.8, Mondays at 7.30 p.m.

AT the annual general meeting of the Wednesday A.S., the following officers were elected for 1968-69: President, B. Skidmore; chairman, B. Hyde; vice-chairman, A. Wood; secretary, G. Wadley; treasurer, A. Wood; show secretary, D. Highfield; assistant show secretary, T. Shipton. Committee members: Messrs. K. Rowley, A. Mowby, W. Tyson; Mrs. D. Highfield and Mrs. A. Wood.

The results at the monthly table show for 1967/68 were as follows: Novice class: 1, T. January; 2, B. Bennett; 3, T. Jones and W. Tyson. A class: 1, D. Highfield; 2, T. Shipton; 3, B. Caley. Breeders class: Livebearers, J. Reeves; Egg-layers, T. January.

Meetings are held the first Monday in each month at the Woodman Inn, Wood Green Road, Wednesday. Visitors are very welcome.

THE sixth annual open show of the Newport A.S. proved to be an outstanding success.

Special awards: Highest aggregate points in show: P. Brown (Beistol); Best fish in show: Red-Tailed Black Shark, P. Player (Barry); Best Breeders' team: J. Smithson (Bridgend); Best Coldwater Fish: B. Harding (Barry); Best Tropical Marine: D. Bevan (I.M.S.S.); Best Native Marine: Master M. Bromham (Newport); Best Furnished Aquarium: Mrs. M. Payne (Newport); Best A.O.V. Egg-layer: P. Player (Barry); Best Barb: D. Warneant (Cardiff); Best Guppy: R. S. Wigg (Llanwit Major); Best Corydoras Catfish: D. Warneant (Cardiff).

Other results: Siamese Fighting Fish: 1 and 2, P. Brown; 3, J. Parsons. Anabantids: 1, B. Harding; 2, M. J. Parry; 3, W. Chapman. A.O.V. Characin: 1, J. Parsons; 4, B. Harding; 1 and 2, J. Parsons; A.O.V. Cichlid: 1, J. Parsons; 2, B. Harding; 3, J. Smithson; 4, A. J. Payne. Corydoras: 1, D. Warneant; 2, T. G. Wall; 3 and 4, B. Harding; 5, J. Smithson. A.O.V. Catfish: 1 and 2, P. Brown; 3, J. Smithson; 4, A. Berry; 5, D. Warneant. Danios, Rasboras and White Cloud Minnows: 1 and 2, D. Warneant; 3 and 4, J. Parsons. A.O.V. Egg-layer: 1, P. Player; 2, P. Brown; 3, I. Phillips; 4, R. Chard. Swordtails: 1 and 2, W. Chapman; 3, R. Short; 4, I. Smithson. Platies: 1, B. Harding; 2, R. S. Wigg; 3, D. C. Bishop; 4, J. Smithson. Mollies: 1 and 2, B. Harding; 3, J. Parsons; 4 and 5, F. Barry. Guppies (Male): 1, 2 and 3, R. S. Wigg; 4, P. Brown. Guppies (Female): 1, F. Brown; 2, 3 and 4, Mrs. P. Player. Breeders (Livebearers): 1, F. Brown; 2, R. S. Wigg; 3, D. C. Bishop; 4, J. Smithson. Breeders (Egg-layers): 1 and 5, J. Smithson; 3, P. Brown; 4, R. Hoare. Any Variety Goldfish: 1, 3 and 4, B. Harding; 2, C. Jones. A.O.V. Coldwater Fish: 1, B. Harding; 2, C. Jones. Native Marines: 1, M. Bromham; 2, I. Bromham. Tropical Marines: 1, 2 and 3, D. Bevan. Junior Egg-layers: 1, Miss P. Player; 2, E. Boul; 3, 4 and 5, N. Rowlands; 6, J. Walker. Junior Livebearers: 1, G. Rowlands; 2 and 4, B.

Roberts; 3, D. Player; 5, J. Walker. Furnished Aquarium: 1, Mrs. M. Payne; 2, F. G. James; 3, J. Lowndes; 4, J. Parsons.

THE following is a list of winners at the second Open Show held by the Mid-Herts A.S. and was International as there were entries from Canada and the U.S.A. The total number of entries came to 547 and the results were as follows: Trophies: Club obtaining most points, Mid-Herts; Club making most entries, F.G.A. Radlett; Best British Guppy, T. Croucher (F.G.A.); Best Foreign Guppy, Cliff Wakeford (Ontario, Canada); Best Male Guppy, L. Weller (Mid-Herts & F.G.A.); Best Female Guppy, D. Phillimore (Walthamstow & F.G.A.); Best Breeders Guppy, T. Croucher (F.G.A.); Best Fish in Show, Aquarist Pin, P. Bird (Mid-Herts), Egg-laying Toothcarp, Furnished Aquarium: 24 in. x 15 in. x 12 in.: 1, J. Duncan (Harlow); 2, C. Withers (Mid-Herts); 3, R. Savage (Mid-Herts); 4, T. Timms (Mid-Herts). Furnished Aquarium: 18 in. x 10 in. x 10 in.: 1, D. V. Larder (Mid-Herts); 2, B. Funnell (Uxbridge); 3, A. E. Welsh (Un-attached); 4, R. Welsh (Un-attached).

Platys: 1, R. S. C. Wingrove (Wycombe); 2, B. Funnell (Uxbridge); 3, R. G. Cox (Wycombe); 4, R. Kerridge (Harlow). Mollies: 1, D. Phillimore (Walthamstow); 2, B. Clark (Uxbridge); 3 and 4, B. Funnell (Uxbridge). Swordtails: 1, D. Phillimore (Walthamstow); 2 and 4, Mr. and Mrs. P. Abbott (F.G.A.); Radlett; 3, R. Savage (Mid-Herts). Characins: 1, R. S. C. Wingrove (Wycombe); 2, Mrs. A. Withers (Mid-Herts); 3, P. Barnard (Mid-Herts); 4, R. Maynard (Hendon). Barb: 1 and 4, T. Summers (Mid-Herts); 2, P. Barnard (Mid-Herts); 3, P. Ginger (Uxbridge). Dwarf Cichlids: 1, B. Pearson (Free Lance); 2, J. H. Soames (Harlow); 3 and 4, Anthony Withers (Mid-Herts). A.O.V. Cichlids: 1, T. Stagg (Beitchley); 2, R. Savage (Mid-Herts); 3, B. Davison (Mid-Herts); 4, D. Marshall, Hendon. Egg-laying Toothcarps: 1, P. Bird (Mid-Herts); 2 and 4, P. Teak and R. Thacher (B.K.A.); 3, T. Walker (Guildford). Danios, Rasboras and W.C.M.M.: 1, J. Salisbury (Harlow); 2, S. Mooney (Tottenham); 3, P. Ginger (Uxbridge); 4, G. Greenhalf (Kingston). Siamese Fighters: 1, A. E. Welsh (Hendon); 2, H. S. Wood (Croydon); 3, S. Mooney (Tottenham); 4, J. Wintin (Brooklyn A.S. U.S.A.). Labyrinth: 1, T. J. Summers (Uxbridge); 2, D. Marshall (Hendon); 3, Mrs. G. Carter (Becknell); 4, I. Willis (Mid-Herts). Corydoras: 1, R. S. C. Wingrove (Wycombe); 2, W. Evans (Uxbridge); 3 and 4, T. J. Summers (Uxbridge). Guppy and Loaches: 1, R. D. Toomes (Dunstable); 2, B. Davison (Mid-Herts); 3, M. A. Carter (Becknell); 4, P. Ginger (Uxbridge). A.O.V. Tropicals: 1 and 2, P. Barnard (Mid-Herts); 3, Mrs. G. Parker (Mid-Herts); 4, W. Evans (Uxbridge). Breeders Pairs (Egg-layers): 1, P. Ginger (Uxbridge); 2, M. A. Carter (Becknell); 3, C. Withers (Mid-Herts); 4, B. Pearson (Free Lance). Breeders Pairs (Livebearers): 1 and 4, G. Greenhalf (Kingston); 2, W. Evans (Uxbridge); 3, L. Weller (Mid-Herts). Breeders (Egg-layers): 1, P. Bird (Mid-Herts); 2, R. G. Cox (Wycombe); 3, S. Mooney (Tottenham); 4, H. S. Wood (Croydon). Breeders (Livebearers): 1 and 2, B. Mather (Walthamstow); 3, H. S. Wood (Croydon); 4, R. G. Cox (Wycombe). Guppy Section run by F.G.A.: Males—S.D. Veil: 1, Mrs. J. Salisbury; 2, B. Bradshaw; 3, C. Parker, L.D. Veil: 1, L. Weller; 2, R. Clarke; 3, L. Kerridge. O. Veil: 1, R. Clarke. Delta: 1 and 2, G. Licence. Pantail: 1, L. Weller. Swords: 1, W. Holmes; 2, M. Bradford; 3, M. Richardson. Cofor: 1, R. Clarke. Scarf: 1, J. Soames. Roundtail: 1, W. Holmes. Breeders Males: 1, L. Weller; 2, B. Bradshaw; 3, M. Richardson. Experimental Males: 1, W. Holmes. Females—Superba: 1, D. Phillimore; 2, W. Holmes; 3, M. Richardson. Wedge: 1, D. Phillimore; 2, R. Clarke; 3, M. Bradford. Scallops: 1, V. Dower; 2, W. Holmes; 3, R. Clarke. Metropolitan: 1, W. Holmes; 2, T. Walker; 3, T. Timms. Roundtail: 1 and 3, M. Richardson; 2, W. Holmes. Colour: 1, R. Clarke. Breeders Female: 1, T. Croucher; 2, W. Holmes; 3, R. Clarke. Guppy Section run by F.G.A.

**BE SAFE  
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Hillside Aquatics London N12



(non-members): Males—S/D. Veil: 1, C. Wakeford; L/D. Veil: 1, C. Wakeford. Delta: 1 and 2, C. Wakeford. Experimental Males: 1, J. Menzies. Females—Superba: 1 and 2, C. Wakeford. Wedge: 1 and 2, C. Wakeford. Mr. Wakeford and Mr. Menzies sent entries from Toronto, Ontario, Canada.

THE results of the first open show of the **Warrington A.S.** were: Guppies: 1, 2 and 3, R. Brothwood (Gorton and Openhaw); Mollies: 1, P. M. Hughes (Mold); 2 and 3, Mr. and Mrs. Standen (Loyne). Swordtails: 1, J. Dugman (Sunnybrow); 2, R. Antonio (Northwich); 3, Mr. and Mrs. Standen (Loyne). Platys: 1, A. Hinzhar (Belle Vue); 2, Master A. Kye (Huddersfield); 3, B. Bewick (Warrington). A.O.V. Livebearers: 1, J. Alcock (Warrington); 2, R. Tench (Warrington); 3, M. and W. (Sunnybrow). Characins (up to 2 in.): 1, M. and W. (Sunnybrow); 2, W. Booth (T.A.B.); 3, F. E. Gregory (Otram). Characins (over 2 in.): 1, Mrs. V. Parkes (Merseyside); 2, P. Mulla (Merseyside); 3, Mr. and Mrs. Standen (Loyne). Barbs up to 3½ in., including Royal Barbs: 1 and 2, R. E. Gregory (Otram); 3, Miss B. Kaye (Huddersfield). Barbs (over 3½ in.): 1, Mr. and Mrs. Grimshaw (Sunnybrow); 2, Mr. Adamson (Birkenhead); 3, Mr. K. Parkes (Merseyside). Angels: 1, D. Bond, jr. (Leigh); 2, W. Gray (Sunnybrow); 3, Mrs. McClean (Sunnybrow). Dwarf Cichlids: 1, P. Barrett (Aireborough); 2, R. Moorcroft (Merseyside); 3, Mr. Smith (Merseyside). Large Cichlids: 1, P. Barrett (Aireborough) best fish; 2, R. Moorcroft (Merseyside); 3, Mr. Stetton (Wigan). Fighters: 1 and 2, R. Taylor (Aireborough); 3, A. Addison (Warrington). A.O.V. Anabantid: 1, R. Taylor (Aireborough); 2, Master A. Kaye (Huddersfield); 3, Mr. and Mrs. Bone (Huddersfield). Catfish: 1, R. Tench (Warrington); 2, Mr. and Mrs. Standen (Loyne); 3, Mr. White (Leigh). Loaches: 1, F. Mulla (Merseyside); 2, M. and W. (Sunnybrow); 3, W. Booth (T.A.B.). Labras, Sharks and Flying Foxes: 1, P. Barrett (Aireborough); 2, F. Mulla (Merseyside); 3, Mr. Thompson (Belle Vue). Toothcarps: 1 and 3, J. Roberts (Nelson); 2, Mr. and Mrs. Grimshaw (Sunnybrow). Minnows and Danios: 1, R. Antonio (Northwich); 2, B. Bewick (Warrington); 3, Master D. Holden (Blackburn). A.O.V. Tropical: 1, W. Booth (T.A.B.); 2, R. Moorcroft (Merseyside); 3, M. and W. (Sunnybrow). Breeders (Egglayers): 1, Mr. and Mrs. Standen (Loyne); 2, P. Mulla (Merseyside). Breeders (Livebearers): 1, Mr. and Mrs. Bone (Huddersfield); 2, B. Bewick (Warrington); 3, R. Tench (Warrington). Pairs (Egglayers): 1, B. Bewick (Warrington); 2, P. E. Gregory (Otram); 3, F. Mulla (Merseyside). Pairs (Livebearers): 1, Mr. and Mrs. Grimshaw (Sunnybrow); 2, Master A. Kaye (Huddersfield); 3, M. and W. (Sunnybrow). Common Goldfish: 1 and 2, E. W. Eason (Sheffield). Fancy Goldfish: 1 and 2, Mr. Walsh (Accrington); 3, Mr. Whitchy (Accrington). A.O.V. Goldwater: 1 and 2, E. W. Eason (Sheffield); 3, Mr. Walsh (Accrington). Special Junior: 1, 2 and 3, D. Bond (Leigh).

The judges were Mr. B. Pengilly and Mr. H. Loder. This was the society's first open show and due to the efficient organisation by Mr. J. Higham (the show secretary), it ran very smoothly. Mr. P. Bervill Severum won the best fish in show award and the president's wife, Mrs. M. Higham, presented the prizes.

Fish of the month results were: Danios and Minnows: 1, B. Worrall; 2, B. Bewick; 3, A. Addison. Tooth Carps: 1, 2 and 3, P. Norris. Rainbow: 1 and 2, B. Bewick; 3, A. Addison. Please note all correspondence should be sent to A. E. Addison, Esq., 5 Hewitt Street, Letchford, Warrington. To avoid delays in replies, as some are still being sent to the old secretary.

MEMBERS of Harlow, Enfield, Bethnal Green, Tottenham and Chingford, enjoyed an interesting meeting when the **Walthamstow and District A.S.** acted as hosts at an area group meeting recently. An inter-club table show took place in which Walthamstow gained the highest number of points. The feature of the evening was a slide lecture given by Mr.

D. Smalley entitled "Keeping and Breeding the Goldfish." Even ardent tropical enthusiasts showed keen interest and several aquaria were displayed with various varieties of Goldfish for the benefit of members. A further attraction was the illustration board prepared by Mr. Smalley showing step by step the method of breeding goldfish and the benefits of membership of the G.S.G.B.

AT the last meeting of **Burton and District A.S.** a table show was held for fish which members have bred themselves over the past six months. The results were as follows: Livebearers: 1, J. Hunt (Lyretail Mollies); 2, G. Mead (Guppies); 3, J. Quinn (Albino Swords); 4, B. Panton (Platys). Egglayers: 1, B. Panton (Thick-lip Gouramis); 2, B. Panton (Black Widows); 3, G. Mead (Copper Tetras); 4, J. Hunt (Chaperi Panchax).

ATTENDANCE has been extremely good at the two meetings held by the **Brighton and Southern A.S.** in September, and it has been very encouraging to see a gradual increase in membership. The first meeting consisted of a slide-tape lecture on loan from the F.G.A., entitled "Chester Zoo". This included some very good colour photography of the animals with special emphasis on the flower arrangements and plants on show. Mr. Jim Kelly provided an amusing and informative lecture with particular reference to the aquarium at Chester.

At this meeting there were twenty-two entries in the table show for Egglayer seed pairs. The following awards were made: 1, D. Shoulters; 2, D. J. Soper; 3, J. Kall; 4, C. West.

At the second meeting of the month, forty-three members attended to hear a lecture on Siamese Fighters by Mr. Williams of Brighton. This gentleman had lived for some years in the West Indies and he explained that his greatest breeding successes were at a temperature of 72°F. using rainwater. He stated that he had always suspended the female in a small jar in the centre of the tank and had provided a lily leaf under which the male would build his nest. He continued by explaining his methods of feeding and rearing the young and it was interesting to note that some of his fish he said had lived for four years.

Any person interested in joining the society should contact the secretary, Mr. B. Shelton, 45 Coventry Street, Brighton.

AT the 15th Annual meeting of the **Llantwit Major A.S.** the following officers were elected: Chairman, D. Songhurst; Vice-Chairman, A. Lewis; Secretary and Treasurer, R. S. Wigg; Show Secretary, J. Sanders; Librarian, Mrs. A. Lewis; Auditor, K. Farrant.

On the secretary's report, he stated that the society had a successful year, both financially and with their fish on the show bench. The society's judges had covered many miles, to assist with judging shows both in S. Wales and further afield. At the August meeting, Mr. Churchill of Cardiff was the guest speaker for the evening. He gave a very interesting talk illustrating over a hundred colour transparencies.

Alan Rogers was awarded the Best Fish for a very good "Cardinal" and will receive the Stampton Cup at the annual dinner. Results: A.V. Egglayers: 1, A. Rogers; 2 and 4, A. Ibbertson; 3, D. Songhurst; Joint 5, K. Farrant and J. Helson. A.V. Livebearers: 1, A. Rogers; 2, Mr. and Mrs. A. Lewis; 3, D. Songhurst; 4, A. Ibbertson. Breeders (Egglayers): 1, S. Helson; 2, A. Ibbertson. Breeders (Livebearers): 1 and 2, R. Wigg.

At the open show in Cardiff Alan Rogers took First with his Platys Varietas and second with his Cardinal.

A MESSAGE from **Middlesbrough and District A.S.** states that Trophies won at the Annual Show held in April 1967, should have been returned by March 1968. Would all Societies please note and inform any winners to return Trophies immediately as only two have been returned and the non-return has led to the Annual Show not being held this year. Remem-

ber, this could happen to your Society and the cost is crippling. Please return trophies only to address below:—M.D.A.S. Trophies, c/o, 65, Heythrop Drive, Acklam, Middlesbrough, Teesside. Secretaries also note! Please do not send schedules to J. R. Allan, 79 Southwell Road, Linthorpe, Middlesbrough. New address will be circulated in due course.

FOR the first meeting in September of the **Rugby and District A.S.** members enjoyed a very interesting slide lecture given by Mr. Fenton of Fensday Aquaria on a trip to the near and far east, visiting his suppliers of tropical fish and plants. The table show for the evening attracted thirty-four entries, in the Coldwater Class. Results: 1, Master B. Malin (Golden Rudd); 2, Mrs. J. Smith (Shubunkin); 3, Master B. Malin (Goldfish). Placings in the Catfish and Loaches Class were: B. Leggett first (Electric Catfish); second (Bronze Corydora); and third (Mystus Tengan). The Juniors Class for this evening was for Livebearers, the results being: 1, Master Q. Wells (Swordtail); 2, Master B. Malin (Swordtail); 3, Master D. Boulc (Platy Varietas).

The speaker at the second meeting was Mr. J. Peden who gave a talk on Reptiles and Amphibians. The table show was for Cichlids the result being: 1, E. Leggett (Pike Cichlid); 2, Master C. Locke (Oscar); 3, Mrs. J. Smith (Blue Acara). In the Juniors Class, for Barbs, its placings were: 1, Master D. Boulc; 2 and 3, Master Q. Wells. Breeders Class: 1, H. Harris (Comband); 2, P. Underwood (Three Spot Gourami); 3, P. Underwood (Jewel Cichlid).

TABLE SHOW results of the **Wellingborough and District A.S.** were as follows: Cichlids: 1, Mrs. P. Flint (Angeli); 2, E. Rowthorn (Kribensis); 3, C. Wigg (Green Acara). Coldwater: 1, R. Bentley (Common Goldfish); 2, D. Atkins (Fantail); 3, R. Bentley (Orfe).

RECENTLY the **Horsforth A.S.** invited the Top Ten Society of Huddersfield to be guests to join the monthly meetings, and also to bring their fish along to enter the monthly table show. During the evening there was an interesting slide show by the chairman, Mr. R. Harrison. The winners of the Table Show were as follows: A.O.V. Adults: 1, L. Kaye (Top Ten); 2 and 3, Mrs. J. Dickinson (Horsforth). A.O.V. (Juniors): 1 and 2, S. Kaye (Top Ten); 3, D. Shaw (Horsforth). Best in Show: S. Kaye (Top Ten). Winners of the Furnished Aquarium competition were 1, K. Shaw; 2, C. Tate; 3, M. Pollard.

AT the last meeting of the **Hull A.S.** Mr. Boyce of Wardells of Driffield, the well-known breeder, importer and exporter of fancy coldwater fish, gave a lecture to seventy-five members on his experiences of keeping and breeding fancy coldwater fish and displayed eighteen different species. This was a very unusual and extremely interesting evening. The Society conveyed their great appreciation to Mr. Boyce. The "Fish of the Night" competition was "Barbs," 1st prize won by A. Harrison, 2nd prize won by C. Harrows and 3rd prize won by T. Collingwood. Future activities are 6 November, Lecture and show by Mr. Pengilly of Bursley; 20 November, Friendly match with Thorne A.S. at Hull.

The one hundred membership has been achieved and this Society offers a warm welcome to visitors, new members and other society members to come along any first or third Wednesday of the month, Railways Club House, Anlaby Road, Hull, 8 p.m.

#### SECRETARY CHANGES

**South Park Aquatic (Study Society):** R. G. Pickard, 150, Lavender Avenue, Mitcham, Surrey.

**Wednesbury A.S.:** G. Wardle, 60, Morris Avenue, Bentley, Walsall, Staff.

**Priory A.S.:** D. Johnson, 41, Beresford Road, Tynemouth, Northumberland.