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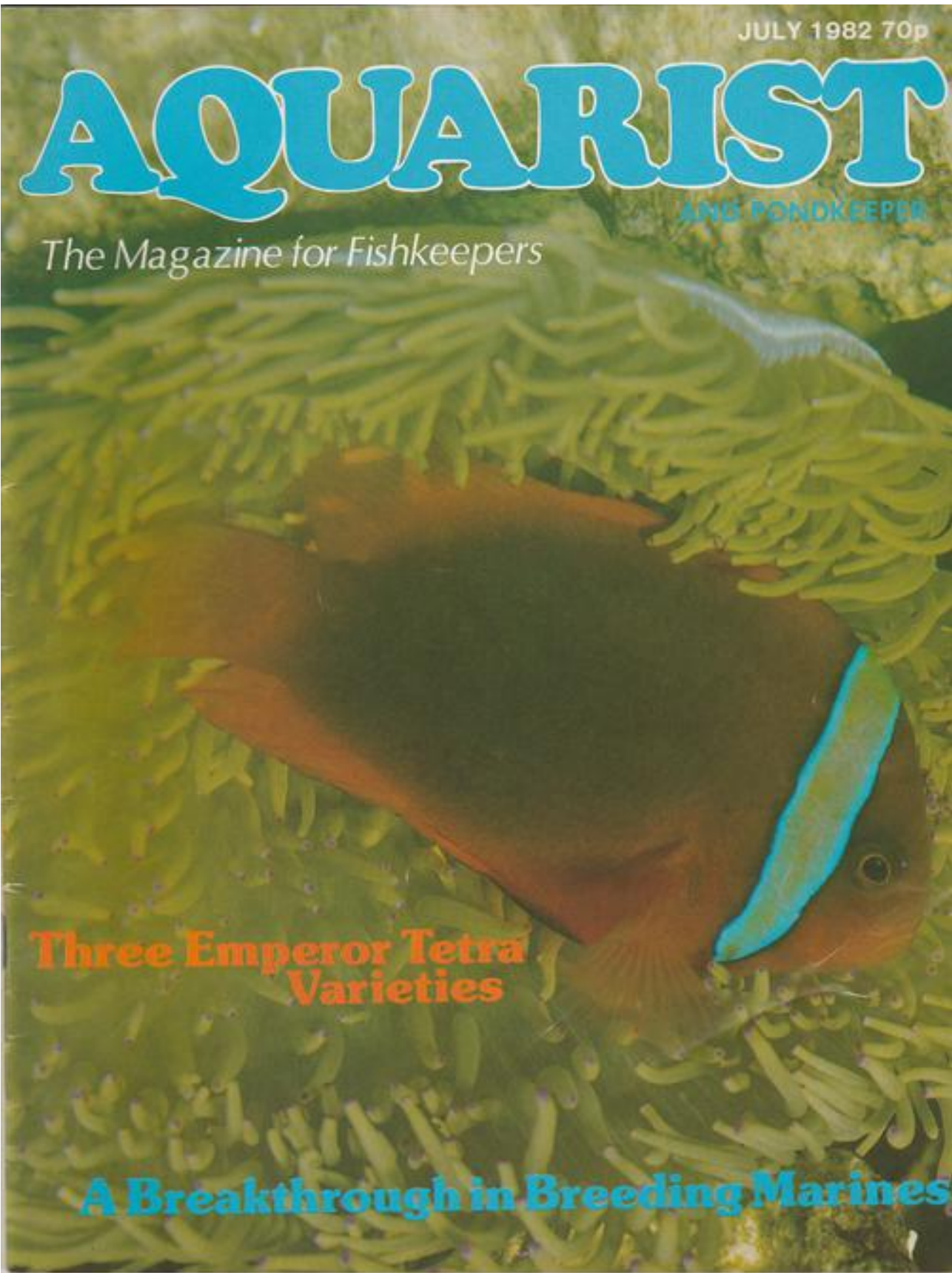
# AQUARIST

AND PONDKEEPER

*The Magazine for Fishkeepers*

**Three Emperor Tetra  
Varieties**

**A Breakthrough in Breeding Marines**



# THE AQUARIST AND PONDKEEPER

Britain's Leading Magazine for Fishkeeping

Published Monthly 70p

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# KNIFEFISHES

of the new World

by B. Black



*Rhamphichthys rostratus*. Head study

SOUTH AMERICA is perhaps the richest supply source of new species to the aquarist and ichthyologist alike. There are still many inaccessible regions in central Brazil, Peru and Bolivia which no doubt harbour many new species and genera. Several recent additions to the aquaristic world were first discovered by the great ichthyologists of the 18th and 19th centuries, such as Linne 1707-1778 and C. H. Eigenmann 1863-1927, but only now are these being imported and commercially bred. The group of fishes that I am particularly interested in is the Gymnotiformes, the knife-fishes of the new world. The varying species have only been available in limited quantities over the past decade and will continue to be so until commercial breeding becomes a reality.

The knife-fishes have a wide distribution ranging from Lake Nicaragua in Central America (*Gymnotus cylindricus*) to the La Plata region in the

south (*Gymnotus carapo*). They inhabit the freshwater streams and lakes in both fast and slow moving waters, preferring to hide under logs and in dense plant growth during the day, venturing out only at night to seek food. They have few enemies, perhaps only the Tiger fish (*Hoplias malabaricus*), Piranhas and large catfish being able to catch and devour them efficiently. The South American Indians do not threaten their existence as they believe the souls of dead people possess the knife-fishes bodies (*Apteronotus* sp.) and so will not eat their flesh.

#### AQUARIUM CARE

The aquarium for your specimens should be on the large size, 1 metre (25 gallons) being adequate for a 30 cm. knife-fish and a few other companions. It is advisable to keep larger knife-fish away from other species of their family as they can be very territorial and resulting quarrels can be fatal. However, other types of fish eg. Cichlids,

Barbs and large Characins are beneficial and should be kept with your knife-fish as this will make it less nervous and more willing to stay out in the open. Decorations for the tank should consist of bogwood, forming caves, plenty of plants and a few rocks. Non-toxic plastic drainpipe covered in gravel makes ideal hiding places for them and can look inconspicuous if disguised properly. The knife-fish will be able to retreat into these if it is harassed by the other fish. Water quality is important for these fish; p.H should be between 6-4-7-0, D.H. not above 10, and the temperature not below 25°C. Knife-fish are susceptible to chills and can contract various parasitic infections quite easily, which can prove difficult to cure as they are sensitive to chemicals in their environment. Partial water changes should be done slowly at 10% per week rather than drastic changes every month.

Feeding can present problems if you have difficulty in obtaining live-foods although frozen livefoods are

the next best thing. Larger specimens can take such a variety of foods like earthworms, maggots, small fish and pieces of meat or fish. Dried foods are not usually eaten and so to maintain their intake of vitamins some of the foods above should be soaked prior to feeding in a vitamin supplement. Needless to say, feeding should be done just before the lights are turned off.

#### UNKNOWN BREEDING BEHAVIOUR

To my knowledge the many species have not been bred in captivity and nothing is known of their breeding behaviour. Morphologically there are no sex differences but according to Hopkins (1972) the seldom imported species *Sternopygus macrurus* can be sexed by means of determining the electrical discharge rate, as only the males of the species can produce rises and interruptions in its discharge rate. This may also apply to species in the other families. The electrical powers of the knifefishes have been known for a long time but they are only recently being understood. They are used mainly as a source of navigation but also as a means of defence. All fishes have a very complicated system of determining external stimuli by means of the lateral line and olfactory senses and so quickly react to the presence of an electric field produced by the knifefish. In some instances it can lead to the death of the affected victim through prolonged exposure. The pulses of the knifefishes can vary between 60-400 discharges per second and each species has its own frequency. The discharge rate rises at night due to the increase in activity when searching for food or when stimulated by the presence of another species. Knifefishes have developed this navigation system because eyesight is useless in the dark murky waters and so their eyes have become degenerate. Perhaps in a few thousand years time their eyes will have disappeared altogether. This method of navigation is just like radar. When a pulse is emitted it is received by the lateral line and numerous sensory pits on the head, so when this pulse is altered by striking an object in the water the disrupted

signal is detected by the fish. As several hundred of these pulses are emitted by the fish every second, it is able to build up a picture of the object as if it could see it. They have also developed a keen sense of smell which is apparent when food is put into the water.

#### ANAL FIN ONLY

Another curious adaptation is the absence of the caudal (in most families), dorsal and ventral fins, and the development of a very strong and powerful anal fin. This runs almost the entire length of the body from the anal opening underneath the head to almost the end of the body. This arrangement of fins enables it to swim very fast by undulating its anal fin. By simply reversing the undulations it can swim backwards equally as well which is advantageous when escaping from predators or the aquarist trying to catch it. Therefore, two nets are essential for catching these fish. The laterally compressed body allows knifefishes to squeeze into very small crevices in rocks or wood so protecting themselves during the daytime.

There are about six commonly imported species which I will now briefly describe as the care and maintenance has already been discussed.

#### *Eigomannia virescens*. (Valenciennes 1849)

This is probably the most readily available species as it is the most placid of all knifefishes and so commercially important. Usually called the Green or Glass knifefish it can be purchased at a very small size making it a novelty addition to the community tank. When buying these fish make sure they have full stomachs, as hollow-bellied specimens soon die, and try to buy several as they are a shoaling species enjoying the company of their own kind. Do not keep them with very small fish as they will eat them. Aquarium specimens seldom exceed 25 cm; whereas in the wild they will attain 45 cm. The coloration of both juvenile and adult is a pale grey-green becoming darker with age. Very small glass knifefish are translucent hence their common name. This species is one of many

in its family and has a range from Surinam down to the La Plata.

#### *Hypopomus artedi* Kaup 1856

Commonly called the spotted knifefish, this is one of the more sombre coloured species being tan colour with dark brown spots over its whole body. This colouring would enable it to hide among the leaf litter at the bottom of the streams and escape predators. It is usually imported when young and is a tempting purchase but this knifefish grows to about 60 cms. and so can only be kept with larger fishes. *Hypopomus artedi* is toothless, unlike *Eigomannia virescens* which has a single row of teeth on each jaw.

#### *Gymnotus carapo* Linnaeus 1758

This was the first knifefish to be described right at the beginning of the system of nomenclature by Linnaeus in 1758. The banded knifefish is the most aggressive of all the knifefishes and probably because of this has the widest distribution from central America to La Plata. It can attain 1 metre in length and so should be kept in only large tanks with large fish. Its body shape is slightly different from the other species in that it is more cylindrical and has an obliquely supra-terminal mouth. That is to say, the lower jaw protrudes further forward than the upper jaw. The body is light brown with irregular dark brown bands diagonally across it running into the anal fin. This is probably the most primitive of the knifefishes.

#### *Apteronotus albifrons* (Linnaeus 1758)

The Black Ghost Knifefish is perhaps the most spectacular of all being a rich velvety black with two white bands on the caudal peduncle and a thin white stripe along the back. This species is unusual as it possesses a caudal fin whereas all the others do not (except *Sternarchus* and *Sternarchella* spp). Although it too becomes quite large it does seem to be more peaceful than most other knifefishes and can become quite tame. This species has a larger mouth than all the others, excluding *Gymnotus*, and so can be fed earthworms, maggots and pieces of meat quite easily. There are several other species in this genera, *Apteronotus leptorhynchus* being the



other most often imported species. It is brown with a cream stripe down the back and near the tail. This family has been cited as having a filamentous dorsal fin but this has never been seen in any live or dead specimens.

*Steatogenys elegans* (Steindachner 1890)

This fish has recently become in great demand but has never been imported in large quantities as it is a much rarer fish in the wild than other knifefishes. It is a small species rarely growing larger than 20 cm and would make an ideal community fish. The anal fin does not extend as far as normal and so it has a pointed body, hence the common name of whiptail knifefish. It has a very pleasant marbled pattern on its body and fins similar to *Hypopomus artedi* but can be distinguished by its greater body depth and rounded head. *Steatogenys elegans* possesses an organ on either side of its head called a mental barbel which passes under its cheeks. This is the only knifefish to have this and as yet it is not known what it is used for.

Small livefoods should be offered to these fish because of their small mouths and a slightly higher temperature maintained as they inhabit shallow creeks where the water is warmer.

*Rhamphichthys rostratus* (Linnaeus 1758)

Several families in the order Gymnotiformes have developed long proboscis like snouts to enable them to forage in the sand and humus at the bottom of rivers and lakes. *Gymnorhamphichthys* and *Rhamphichthys* are two such families, the former being a translucent sand dwelling species and the latter being a marbled brown leaf litter dweller. Both grow to about 60 cm. and have snouts similar in shape to the pipefishes. *Rhamphichthys rostratus* is the only species imported and has so far proved difficult to keep. Ideally the tank should be large and deep with a bottom covering of sand about 3 in. deep. The Horse Faced Knifefish is dependant on worms and crustaceans which it sieves out of the sand with its

*Hypopomus artedi*

long nose, so owners of this fish should have a good supply of *Tubifex* and *Daphnia* for it.

This is the most elongated of the knifefishes and because of its very long anal fin it can become a target for fin-nipping fish. As it is extremely peaceful, only small fish such as tetras should be kept with them. The horse-faced knifefish is one of the most demanding and rewarding of this group and presents a challenge to any aquarist.

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- Hopkins C. D.—Sex differences in electric signalling in an electric fish. *Science* 1972, 176, 1035-1037.
- Gunther—*The Freshwater Fishes of the World*. T.F.H. Publications, 1973.
- Astorqui I.—*Peces de la cuenca de los grandes lagos de Nicaragua*. Vol. 19, 7-57, 1971.

IN VERY simple terms it can be said that the rays in the fins of the single-tail types of goldfish are composed of small, twinned bones which are fused along their length. To all intents and purposes the rays appear and act as single units of very flexible and strong fine bones which support the membranes of the fins. In those varieties which have two caudal fins and two anal fins these flexible rays are divided along their length. From this it should become obvious that a partly divided caudal, or one which is completely joined along its upper margin, is entirely due to the degree that the ray splits into two. In order to differentiate between those varieties with a single caudal fin and those which had two, the Goldfish Society named the two types as singletail and twintail varieties, respectively.

In general, the term twintail covers all varieties which have two caudal fins and twin anal fins; however, the group is divided to cover those forms which possess a dorsal fin and those which do not, and more often than not is applied to the former. Those varieties which lack a dorsal fin are, in the main, referred to as dorsal-finless. For the purpose of this series this article will deal with those varieties which do possess dorsal fins, and are twintailed.

The fantail goldfish is a most attractive and hardy variety which has the ability to withstand the rigours of the outdoor pool in all but the most severe of winters; it is also well suited to life in the aquarium and for these reasons, if no other, is very popular with many coldwater fishkeepers.



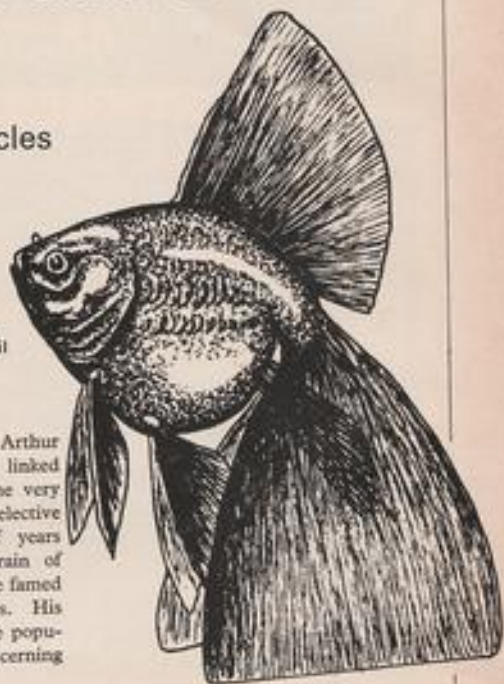
Fantail

July, 1982

# goldfish varieties

## Part 3

A series of six articles  
by Frank Orme



Veiltail

Fellow contributor, Mr. Arthur Boarder, has his name firmly linked to the fantail, for he took some very ordinary types and, by careful selective breeding, after a number of years established an outstanding strain of metallic scaled fantails that were famed for their show-winning qualities. His fish did much to encourage the popularity of the variety amongst discerning aquarists.

Modern show standards describe the ideal fish as egg-shaped, with a body depth approximately three-quarters that of the length. The dorsal fin should be equal to half the depth of the body, in height, with a slight concave upper margin. The anal fin to be fully divided into two separate, matching fins. The caudal moderately forked on the trailing edges, with rounded lobes. It should be well spread and carried stiffly in the vertical plane. It may belong to either the metallic or nacreous groups. Unfortunately, some exhibitors occasionally attempt to pass off short-tailed throwouts from veiltail parents as fantails. However, they seldom manage to beat a true fantail on the show bench for an experienced judge of goldfish cannot be fooled so easily.

A somewhat similar fish can sometimes be seen in dealers' tanks; this

is the ryukin—a Japanese variety. The body is short, deepish and often, has a pronounced hump where the body joins the head. Although not recognised by British show standards, it is nevertheless very popular in Japan where large numbers are raised commercially.

The veiltail is probably the most popular of the twintail varieties; good specimens are hard to find and very expensive to buy. Ideally it should share an aquarium with its own kind, where its sedate manner of swimming and its well-developed finnage can be seen to advantage. Although it can spend the warmer months in the garden pool, it is unwise to leave it outdoors throughout the year—a life to which it is not suited.

It is generally believed that the variety originated in the U.S.A., being

developed from the ryukin. However, the late Wm. T. Innes, a publisher in Philadelphia, a great name in the world of fishkeeping, has recorded that in 1893 the Japanese sent a collection of fish to the World's Fair which was held in Chicago. Only a few survived, in a diseased condition, and these were given to a Mr. William P. Seal. He, in turn, sold one to a Mr. Barrett. This fish became known as the "World's Fair Fish" and, due to the excellent qualities which it later developed, was regarded as such a perfect specimen that it could not be improved upon. A drawing of the fish was used as the emblem of the Aquarium Society of Philadelphia. It might therefore be reasonable to think that this fish played a part in establishing the variety in America.



Oranda

British standards require that the body should be round and 'sphere-like' with a short deep head. The height of the convex dorsal fin to be equal to the body depth. The anal fin to be well developed, and fully divided. The fully separated caudal fin must be long and broad, with a straight lower edge, and fall gracefully below the level of the pelvic fins. The pectoral and pelvic fins should be long, well developed and pointed. It is recognised in both its metallic and nacreous form.

There are telescope-eyed forms of both the fantail and veiltail; however, in general, only the moor is recognised as a show variety by British standards.

The moor is an all-black metallic form of the veiltail, with protruding telescope eyes. Apart from the colour and eyes, it is identical to the normal-eyed veiltail. Standards state that the

colour should be a deep velvet-black, extending fully into the fins. The eyes to be protuberant and either globular or truncated in shape, but matching each other in size and form. This is a reasonably hardy variety, and can spend time in the outdoor pool but, due to its colour, little of its attractions will be visible.

Another fish, having the same body and finnage requirements as the veiltail, is the oranda—the nacreous form of which is known to the Japanese as the azumunushiki. The outstanding feature of this variety is the head growth, otherwise known as the hood. The growth that forms, after some time, upon the head results in small soft protuberances which cover the head and gill-plates. When fully formed the head growth appears similar to a large raspberry, in which only the eyes and mouth are exposed. The standards state that the nodules should be small, and similar in size, giving an even texture to the globular-shaped hood. This is an attractive variety which has many admirers. It has the disturbing habit of forming a light mucous covering, which is whitish in colour, during the cooler months of the year, but this need cause no alarm for it will normally clear up as the temperature rises.

A fish which seems to be gaining in popularity is the redcap oranda. In body shape and finnage this is another fish which resembles the veiltail; however, it differs in that it has a growth similar to the oranda, but it

is confined to the top of the head. It also differs in its colour. So far as is known only the Association of Midland Goldfish Keepers recognise this variety, and their standards describe a similar fish to the veiltail but add that 'the cranial region of the head is crowned with a symmetrical, bright reddish-orange raspberry-like growth which must not extend below the level of the eyes.' The body is described as being devoid of colour, being a silvery-white. The fins must also be clear of any colour. It is a metallic scaled variety and can quite often be found in the tanks of the larger pet-fish dealers.

The pearl-scale has an 'egg-shaped' body, but has a flattish dorsal contour. From a head-on view, the body is quite thick and round—which makes the fish almost look as though it is suffering from dropsy. The scales are domed and pearl-like, and arranged in neat rows along the body of the fish. British standards for this variety require that the dorsal fin should be equal, in height, to two-thirds of the body depth and have a straight upper margin. The pectoral and pelvic fins to be of medium length and slightly pointed, whilst the anal fins must be fully divided into two matching fins. The caudal fin is not so well developed as that of the fantail, being somewhat shorter. It must, however, be full and broad with a slightly concave trailing edge and be fully separated into two matching fins which are carried stiffly, and well spread, in



Ryukin

the vertical plane. The standards recognise both the metallic and nacreous forms of this variety. The pearlscale is a hardy fish with an unusual appearance, which does not seem to be quite as popular as some of the other varieties. Specimens can often be obtained from dealers who advertise fancy goldfish in the columns of this magazine.

Although not an infallible rule, it is reasonable to assume that the further a variety departs from its original forebears the greater the care it will require. On this basis it is logical to conclude that the shorter the length of the fins, the harder the fish will be. For instance, the fantail is less likely to suffer from congestion of the caudal fins than those of the longer finned veiltail types. In general it can also be taken for granted that the nacreous scaled group of goldfish will not be quite as hardy as those which are adorned with a body cover of metallic-type scales. If these facts are borne in mind the fish can be treated accordingly. In other words, whilst temperature and other conditions may allow a fantail goldfish to spend the entire twelve months outdoors, those same conditions may only allow a veiltail to spend part of the year in the garden pool with safety.



Moor

Before concluding this article it should be mentioned that there are two types of fantail sometimes seen in retailers' tanks which have the protuberant eyes of the telescope-eyed moor. One has the black metallic scaling of the moor, the other is nacreous. Upon occasion a metallic form is seen which has the same coloration as the common goldfish. However, these fish will seldom be kept by the goldfish enthusiast, in fact they will not be found in any of the British show standards. Although they are

considered to be somewhat inferior to other varieties they can be quite attractive, indeed many find a home in the decorative aquarium of the less

discriminating goldfish keeper—who may well prefer them to the more exotic types that are favoured by the enthusiast—and why not?

## Press Release



### New range of undergravel filters from Armitage

ARMITAGE have introduced a new range of undergravel filters. These are in the three most popular sizes, suitable for the majority of tanks sold in the

UK—9 in. x 17 in., 11 in. x 17 in. and 11 in. x 23 in.

The special features of these new filters are the adjustable airlift and the hooded water outlet. These features make the unit easier to install and reduce the noise level from the water flow. Normal retail prices are £2.75, £3.05 and £3.29 respectively for the three sizes.

### New telephone number for Tetra information service

Please note that as from July 1st 1982 the telephone number of a 24 hour answering service at the Tetra information Centre will be Leeds (0532) 555980.

All urgent enquiries regarding the use of Tetra products should be made via this telephone number. Written enquiries should still be made to—Tetra Information Service, 15 Hewlay Lane Place, Leeds LS13 2BB.

Messages left on the answering service will be dealt with as soon as possible and it would be helpful if hobbyists left a home as well as work telephone number when calling.



## Press Release

### Hozelock

Hozelock has done it again! New modifications in Hozelock's garden and pool lighting means further savings for consumers.

Up to now, Hozelock's lighting equipment, like similar equipment in the UK, has incorporated sealed beam units. These are costly and replacements can usually only be obtained from stockists of the original equipment. Now Hozelock has adapted the "Moon-glow" and "Aqua Glow" lighting systems to take standard car bulbs. Not only are these bulbs considerably cheaper than the sealed units, they are also widely available from garages and car accessory shops. Replacement is quick and easy too—the old bulb is simply twisted out and the new one fitted into its place.

Hozelock's new "Nightglow" patio lights are already fitted with standard car bulbs. Restyled "Moonglow" and "Aqua Glow" lights they are in the shops. For people who already have the garden or pool lighting systems, Hozelock is producing conversion kits which will adapt this equipment for use with car bulbs. The kits are easy to fit and cost £4.95 + VAT—the same price as a sealed beam unit. Thereafter bulbs can be replaced quickly, easily and cheaply, greatly reducing maintenance costs on all Hozelock's lighting systems.

### Phillips relieve holiday fears

PHILLIPS YEAST PRODUCTS announce the addition of a new product to their large range of Fish Foods, PHILLIPS HOLIDAY BLOCK. This food ensures that your fish will receive a nutritious diet while you are away. Lasts up to 2 weeks. Price 36p.

### Automatic Heat Loss Alarm

M.C.A. of Waterlooville are now producing a Heat Loss Alarm, which automatically gives an audible warning if a pre-determined temperature is not maintained.

Operated by two HP11 batteries with a life of approximately 1 year it is completely independent of mains supply or failure.

Sensors of up to 100 metres can be supplied on request, enabling the Alarm itself to be sited conveniently. The relatively low price makes it ideal for aquariums or garden, greenhouse, frost warning, incubators, etc. when loss of heat can be costly or detrimental.

Further details on request from the manufacturer: M.C.A. Electronic Controls Limited, Arnside Road, Waterlooville, Hants PO7 7UP. Phone: (07014) 50611. Telex: 86700.

### Jaynor moves to Chessington

Mr Michael Ray-Hills wishes it to be known that all activities of Jaynor International Ltd. are now being conducted at the following address: Aqua House, Unit 4, Barwell Trading Estate, Leatherhead Road, Chessington, Surrey, KT9 2NY. Mr Graham Sanson is no longer with the Company.

### The stapeley 1982 Catalogue

BIGGER and brighter than ever, it contains everything the reader needs to know about **Water Gardening** including details on Fountains, Plants, Waterfalls, Fish, etc., and how to make a pool for £15 in hours.

A most useful addition for your "Garden Reference" files.

This publication is sent on receipt of 25p p. & p., etc., on application to: Stapeley Water Gardens, Dept. AP, London Road, Stapeley, Lantwich, Cheshire (Catalogue FREE to Mail Order customers only).



### King British win prizes too

Mr. Tommy Stansfield and Family of Ossett, Nr. Leeds, had a very successful 1981 Season. Winning a whole

board of prizes with his Cichlasoma Synspilum, including the British Aquarist Festival Champion of Champions Show.

This fish was bred and reared on King British Tropical Flake throughout.



## Coldwater Jottings by Frank W. Orme

We are fast approaching that time of the year when the coldwater fishkeeper can look forward to visiting one or other of the specialist open shows, in fact, South Park Aquatic (Study) Society staged their show for coldwater fish during last month. This reminded me that Mr. H. C. B. Thomas, a senior member of the Bristol Aquarist's Society, wrote to me last March to inform me that there would be an innovation at their open show—to be held on the 11th of September. In his letter he wrote, "We are going to divide the show into six sections, these will be for singletails, twintails, pairs, babies, teams of four and pond and river fish. The best fish in each section will be decided by the judges working on that section. Each winner will receive a Section Plaque in addition to the awards gained as class winner. This means to say that, in future, it will only be necessary to review six exhibits to decide which one receives the sole award for the Best Exhibit." He continued, "I hope that this system will make clear to everyone just how the award came to be made."

Certainly this method will ease the burden, and time spent, in deciding

which particular exhibit should be awarded the supreme accolade of being the best in the show. It is no easy task to have to consider each winner of around 34 different classes, and reducing the number down to six will greatly simplify the task.

### N. G. P. S. Show

The 7th of August is the date of that first-class open show of fancy goldfish, organised by the Northern Goldfish and Pondkeepers Society, which is held in Bolton, Lancashire. This society has, possibly, the most spacious venue of any present-day goldfish show, and is easily reached from the motorway system. Although this will only be the sixth open show to be arranged by the N.G.P.S., their shows have proved to be events that should not be missed—either as an exhibitor or a spectator—and have claimed a place in the calendar of the goldfish enthusiast.

Details of these, and other shows, can be found in this magazine under the heading 'Dates for the diary'. Visitors to any of the specialist shows will, almost invariably, be able to see some of the best fish, of their kind, in

the country. This applies equally to both the koi and goldfish events.

There is, of course, another side to these affairs, for they are also looked upon as great social occasions. From casual meetings many strong friendships are formed and, as some live many miles apart, the shows provide an ideal opportunity for these friends to meet, renew their acquaintance, exchange experiences, and otherwise enjoy the pleasure of each other's company. Often these friendships involve groups of aquarists from one part of the country with groups from another who, perhaps, only meet each other during these annual 'get-togethers' but who all share a common interest. This is not to say that the beginner, or newcomer, is made to feel unwelcome. In fact, most of the experienced exhibitors are only too willing to answer questions, or discuss some particular aspect of fish keeping or, perhaps, explain the good and bad points of some of the exhibits. It is only by visiting these shows, and talking to others, that the many pleasures can be discovered—for it is not purely competitive, although each exhibitor hopes to gain an award, but is also a pleasant day-out.

### Inferior stock

Recently I was in conversation with a visitor who was complaining about the number of retailers who were offering inferior quality goldfish, of no specific variety, to the public. Although experienced fish keepers would recognise these fish for what they were, less knowledgeable people would think they were getting something special. He felt that it was wrong to offer types of goldfish, which would be considered rubbish by any sensible hobbyist, at rather high prices to an unsuspecting public—he found it even more difficult to understand why the dealers even considered stocking such fish. As he remarked, dealers if they understand their trade, must be aware that the rubbish is not improved by a fancy name tag and also, realise that they are not helping the hobby.

*Continued on page 27*

From a  
Naturalist's  
Notebook



The underwater environment of so much aquatic life is still too little known, hence the recent setting up of a new worldwide professional organisation in the U.S., the Society of Wetland Scientists. The U.S. alone has 5,000 professional researchers and managers of wetlands. Exchange and development of ideas is urgent. Drainage, for instance, threatens the rich fauna and flora of Holland's "De Worm" river.

Meanwhile, the National Environment Research Council has granted £18,084 for a 3-year study of the effects of grass-carp on the aquatic ecosystem where they are being introduced in the NW Water Authority area by a Liverpool University botanist, and £4,023 for a 3 years study of limpet competition, breeding and distribution by a Manchester University zoologist. Another £22,968 goes to an Aston University biologist, research in rainbow trout culture, as that has a commercial interest.

Can molluscs learn? A Bangor University zoologist with a £14,640 grant is looking into and filming the way dogwhelks select their prey. Normally they feed on barnacles and mussels, not the largest as was assumed but medium-sized, and drill in the thinnest area of mussel-shells but in thicker shells going for where the visceral mass lies. We may not think of shellfish learning much, but dogwhelks can learn to improve their prey-handling ability with experience, decreasing their inspection time prior to feeding. So some are being trained on a diet of mussels and others on barnacles in

by Eric Hardy

order to measure their speed of learning, and how soon they forget if the food isn't continued or is switched. Next to be studied will be the shore-crab, a more generalised feeder.

They aren't the only example of associative learning in molluscs. In the U.S., Sahley, Rudy and Gelperin at Princeton and Colorado universities recently showed its important part in food-selection by our common European great grey slug, *Limax maximus*. Rather like curing people of smoking by horribly-tasting cigarettes, they turned these slugs from the once attractive smell of carrots and potatoes by adding the bitter taste of quindine sulphate. They found remarkable similarities between this associative learning of slugs and that of higher vertebrates, and possible future insight into analogous cellular mechanisms which influence this.

#### Water Invasive weeds

The floating fern *Salvinia rotunda* has increased to become the most invasive of waterweeds, exceeding the damage of water-hawthorn and other troublesome aquatics abroad. Lake Moodarra in Queensland is choked with it and in the past 25 years it has become a major problem in India, Sri Lanka, Papua New Guinea, New Zealand, Africa and Australia. A native of southeast Brazil, it is controlled there by a black weevil *Cyrtobagus spingularis* which has now been introduced to check it in Australia. A previous attempt at such biological control from Trinidad failed because a different species of *Salvinia*, *auricularis*, was the food of those weevils, and nobody thought of teaching them taste of the other kind.

On the other hand, the world's rarest aquatics arouse the anxiety of Kew for their conservation. The 500-page international Plant Red Data Book (Royal Botanic Gardens, Kew, £10) notes the quillwort *Isaetes boryana* surviving in only 6 ponds and lakes in France and Spain, including the 2 lakes of the Sierra de Gredos, both threatened by eutrophication. The Louisiana quillwort, considered extinct, was rediscovered in 1978 in its only location, in Washington, Louisiana. Only about 100 plants of *Crisium mauritanicum* are known outside cultivation, all in shallow water at a single locality in Mauritius. Papyrus was believed extinct in Egypt until rediscovered in 1968. The Egyptian papyrus sub-species, *Cyperus papyrus*

## Naturalist's Notebook

*hadidii* grows only in a shrinking freshwater marsh around 3 small soda-lakes disappearing with water-extraction from the Nile. Even the famous Venus's flytrap is now endangered in the bogs of Carolina, with about 100 sites left. Less than a hectare of marsh in Cape Town's Fransch Hoek Mountains has the last of the South African heath *Erica chrysocodon*. The grass *Hubbardia heptanervosa* grew only in the spray of Gersoppa waterfalls on India's Sharavati river, until a hydro-electric scheme diverted the water. But it may linger unknown by nearby falls. Swamp woodland in Sri Lanka's Kalutara district has the last 1,000 of the Lenter palm, *Areca concinna*.

Thirteen of the 18 known colonies of Furbish's lousewort, in Canada and the U.S.A., are endangered by hydro-electric schemes.

### Microscopic water life

An ingenious idea for public interest in water-life is the Buxton Micrarium, open daily until October where specially adapted microscopes are available to view all sorts of things, from tiny copepods to midge larvae, at St Ann's Well in The Crescent. Because 97% of breeding adult toads return to the pond from which they emerged as tadpoles, and will travel over 2 kilometres to get there, British Herpetological Society plan next spring a safety scheme to get them across roads where they might otherwise be crushed. They suggest road-signs, closing

favoured roads between 6 p.m. and 6 a.m. (few motorists would accept that) or fitting roadsides with pitfall-traps to collect toads which can then be carried safely across. Populations may even be moved to new sites and new ponds.

Muckle Moss, a new Northumberland reserve, has many such pools which also harbour 17 species of *Sphagnum* moss, various dragonflies, and plants like bog-rosemary and cranberry. Bitterns sometimes wander in Norfolk's reed-fringed new Snipe Marsh reserve, beside the road at Cley's East Bank.

## Coldwater Jottings

Continued from page 25

In many respects I must agree with his sentiments, for no matter whether Chinese or Japanese a 'tri-tail' is still a poor quality fish, and can be found in most twintail spawnings; however, they are quickly weeded out. Sarasa goldfish are often priced higher than their pure one-colour counterparts, yet the only difference is that they are orange-red and silvery-white. Again, such specimens can be found amongst the young of metallic-scaled parents. 'Cambridge' blues may look nice, but they are not recognised varieties in our country. Therefore anyone who buys such fish is often acquiring fish of no value—at least, of no value to the hobbyist—but which may still give the purchaser some pleasure. Obviously,

if the person then becomes sufficiently interested in goldfish to learn more about the various varieties, the mistake will be discovered and, hopefully, not repeated.

The thing which I find surprising is that British dealers should import such fish when they could just as easily import more respectable specimens, albeit at somewhat higher cost. But, of course, like my visitor I speak as one with a knowledge of fancy goldfish—and their finer points—like the average person who is only interested in buying a few fish for 'the kids', and has no interest in whether or not a fish is of any particular variety. Whilst we may frown upon the 'rubbish-fish' we are not compelled to buy them, and perhaps the nearby tanks will contain specimens of goldfish which are acceptable.

### Difficult breeding

A question which is heard with monotonous regularity: which is the most difficult variety of goldfish to breed? The short answer is that, with one or two exceptions, none is any more difficult than another. The

difficulty is in the number of decent young that may be expected from any particular variety. Without doubt the common goldfish will produce a greater number of acceptable young than, say, the Bristol shubunkin. By the same token, the Bristol shubunkin will give a higher percentage of worthwhile progeny than will be obtained from a veiltail or moor spawning. The truth of the matter is that, the further the variety departs from the original 'wild' type the greater will be the number of worthless young that are produced.

If one has the space available it is quite possible to raise a fair number of decent singletail goldfish whereas, for instance, due to the many young that have to be culled from a spawning of lionheads, less space is required to raise the very few good young that can be expected from this variety. But to raise the 'perfect' goldfish of any variety—now that really is a difficult problem!

# SPOTLIGHT

## QUEEN TRIGGERFISH

by Martyn Haywood

Common name: Queen Triggerfish  
Specific name: *Balistes vetula*  
Range: Caribbean, Tropical  
Western Atlantic  
Size: 12 in. approx.

THE triggerfishes, family Balistidae, are found throughout the world's warm oceans where they are one of the most noticeable groups of fish on the reefs. The warm Gulf Stream current sweeps north and east from Florida and occasionally triggerfish are brought as far as our own coasts. The most attractive and the biggest variety of triggerfishes is found in the Indian and Pacific Oceans but the family is fairly well represented in the tropical Atlantic area. Of these the Queen Trigger, *Balistes vetula*, is by far the most colourful and popular with aquarists.

Like all triggerfishes the Queen Trigger is strong, inquisitive, in-

clined to be territorial and is equipped with razor sharp teeth. It has no hesitation in using the latter, be it against its natural food: shellfish, urchins, shrimps and crabs, or against inquisitive fingers or other fishes. The Queen Trigger is particularly notorious for its inclination to bite and its penchant for re-arranging tank decor. These characteristics must be borne in mind when establishing an aquarium for this species. There are many tales, no doubt some of which are apocryphal, of this fish biting through heater cables, airlines and filter tubing, but enough accounts are reliable to urge caution. As a general rule Queen Triggers can be relied upon to occasionally chew any stationary item in the tank so all vital wires and lines should, at the very least, be hidden behind rocks or corals. Mercury thermometers or those containing lead balls should never be used.

A spillage of mercury or lead into the aquarium would quickly make it lethal to all marine life.

Aquaria are often described as 'living pictures' but *B. vetula* can turn a tranquil scene into a Chaplinesque orgy of destruction and the unexpected. This is definitely not a fish for those who hold firm views on tank decor, with everything having its correct place. A two-inch specimen will easily pick up and carry a four or five inch diameter branch coral and transport it the length of a three foot tank. Anything that cannot be moved directly may well be undermined by persistent digging. A number of aquarists have awoken to find rocks having fallen against, and broken, their tank glass. Clearly all items of decor should be large and heavy and placed on the base of the tank rather than just resting on the coral sand.

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## SPOTLIGHT



As if this were not enough, the triggers are often considered aggressive and I find the Queen Trigger to be the worst offender. Individuals vary in temperament but on the whole I would advise keeping *B. vetula* strictly by itself or alternatively only with large, equally aggressive specimens.

Once, at SeAquariums, we received with very ill grace, a shipment from Barbados containing fifty three-inch long specimens of these little devils. Rather than space them one to a tank, as is normal practice and which would result in them eating other stock, they were housed twelve or thirteen to each of four large aquaria. Anyone who has shuddered at the horror stories surrounding Piranha would have been a nervous wreck after watching these triggers at work.

At feeding time they were given sizeable chunks of frozen irradiated fish. Within a split second the tank would be a maelstrom of thrashing bodies and invariably one of the triggers would lose one or both eyes, or large pieces of fin or body tissue. Within a few more seconds this poor specimen would have disappeared—it is all grist to the Queen Triggers' mill. Chopping the food into smaller pieces only increased the casualty rate in this internecine war. Suffice to say I have never deliberately imported Queen Triggerfish since then. I hate to think what they could do to someone's lovingly nurtured collection of more delicate species.

Having expounded on the cons

of this species it is only fair to say that there are several pros, not least of which is their near indestructibility. *B. vetula* is an extremely hardy species and might be considered an ideal candidate for someone seeking a specimen fish, with great character, to be housed alone. There is never any problem with feeding, as it takes almost anything edible and indeed, any problems are more likely to result from its insatiable appetite and the pollution this can cause.

As can be seen from the illustration the Queen Trigger is a very beautiful species when in peak condition. Unfortunately the youngsters most frequently offered for sale are often a dull buff-brown and the iridescent blue-green markings only a shadow of what they can be. Good management, feeding with shrimps and chopped whole fish, and the regular use of a good vitamin supplement will usually quickly improve the colouring which is at its best in specimens seven or eight inches long. Unless they are housed in very large aquaria they are unlikely to exceed this length.

Having described this fish's temperament, few aquarists are likely to be tempted to keep more than one so the question of breeding hardly arises. There have been, however, a number of observations made in the wild of breeding activity among Balistidae. When adult they make what appear to be permanent pairs, defending a large territory against other members of their family. The territory is often centred around a cave and will usually include an open sandy area. When ready to spawn the parents construct a miniature volcano, about three feet in diameter, the crater of which is filled with coral rubble. Whether eggs

are laid onto this rubble or covered with it after spawning is not clear. The parents guard the nest until hatching when the pelagic larvae form part of the zooplankton. They are at the mercy of water currents and this may well explain the very wide range enjoyed by many species.

Although dealing mainly with the Queen Trigger here, there are many other triggerfish which are regularly imported. To judge these on the basis of what has been said about *B. vetula* is a folly comparable to branding all the freshwater barbs (*Puntius*, etc.) as outright villains on the basis of the behaviour of some Tiger Barbs. At one extreme we have *Balistapus undulatus* which is just as ill-mannered as *B. vetula*, while at the other is *Rhineacanthus assasi*, the Red Sea Picasso Trigger which is among the most peaceful of all large marine fishes. Equally, individual members of the same species can be very different in temperament, none more so than the famous Clown Trigger. While some can be terrors, I know of one which lives in harmony with a boxfish less than an inch long. All triggers, however, have well developed personalities and quickly learn to take food from their owners' fingers.

At night, and when resting during the day, these fishes will wedge themselves between rocks or corals. By erecting the very strongly developed dorsal and anal spines they lock themselves in place and are virtually inextricable when locked into a small crevice. Unless done voluntarily by the fish, the dorsal spine can only be released by depressing the shorter spine immediately behind it. It is this triggered release mechanism from which the common name for this family is derived.

**£10  
PRIZE**

# YOU & US

**READER  
PARTICIPATION**



*Although this particular competition is now closed, please remember that we are always interested in original ideas and comments from our readers, so don't stop writing to us will you?*

*Congratulations to this month's winner of our £10 prize who is: J. C. Andrews of 14 Pannatt Hill, Millom, Cumbria.*

*Mr. Andrews will receive a cheque from us in the near future.*

*Once again, many thanks to all those readers who participated in the contest and provided us with so much to think about in the coming months!*

Dear Sir,

I am chairman of the local club the Birtley Aquarist Society. My favourite article is 'What is your Opinion?' because it gives the views of people like myself, ordinary Aquarists not experts. The information I would like to find in future issues are: (1) more information on how different Clubs are run and how interest is maintained for the members. (2) Pull-out Colour Supplements which build into an up-to-date looseleaf; some of the costs could be recovered by selling special binders. (3) For Sale and Wanted or Swap Column. (4) Junior section for fishkeepers of the future. G. W. Temperley, Co. Durham.

## **THIS MONTH'S WINNER**

Dear Sir,

In response to the loose leaf insert in the April issue of the *Aquarist*, I thought that I would drop you a line and present my thoughts on the question raised.

1. I have often seen photographs of truly magnificent aquaria—notable for their size and the formation of planting. An interview with such an aquarist who would give the system he uses to create this environment. His opinion as regards the many facets of fishkeeping would be of value, in particular the history and life expectancy of his created environment with, perhaps, photographs showing the set-up at 'birth' and in subsequent years and the changes made.

2. Plants are perhaps my main interest and I would value a series of articles showing plant growth in the 'wild' and underwater photographs please; of particular interest would be a description of the environment that gives rise to particularly fine stands of plants.

3. I have long admired the construction of public aquaria, in particular the use of what I presume to be fibre-glass rockwork. Is this feasible for the home aquarium? A description of how this would be made and the problems would be of interest. I would envisage a stage effect with side, 'flats,' (as I think they are called), increasing in size to the rear of the aquarium.

4. Cryptocoryne disease—is there such a thing? There seems to be some divergence of opinion on this subject yet I am sure that all aquarists have suffered the dying back of the leaves (and often the rootstock) after introducing strong-looking plants to their aquarium. Can one prevent it? Differing opinions on this subject would be very useful and help 'clear the air'.

I hope that you find these ideas of interest.

14 Pannatt Hill,  
Millom, Cumbria.

J. C. Andrews

## **ADVANCE NOTICE**

The Federation of Northern Aquarium Societies  
in collaboration with "The Aquarist and Pondkeeper"  
present

**THE BRITISH AQUARISTS FESTIVAL**  
Belle Vue, Manchester — November 6th, 7th, 1982



# Meet the Aquarist

No. 15

## John Pollard— Disabled Fishkeeper

*Written and illustrated  
by Eric Franklin*

JOHN POLLARD first started keeping fish some eighteen years ago. His interest was aroused by the sight of an aquarium of tropical fish in the lounge of a friend's house. Later he described what he had seen to another friend who then offered him an aquarium he no longer wanted. John quickly accepted the offer and wasted no time in furnishing it and stocking it with fish. At that stage he had firmly made up his mind to have only one tank!

Some weeks after John visited a Kingston District Aquarist Society open show where he became aware of a wide variety of tropical and cold-water fish. At the next Society meeting he became a member.

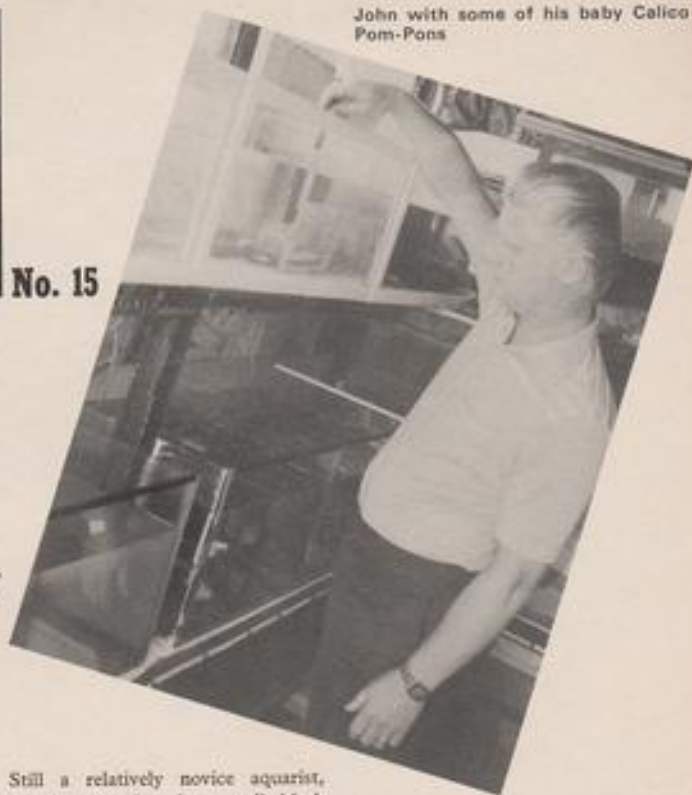
A pair of killifish was his next acquisition and for these he bought a second tank for which he cleared a shelf in the cupboard under the stairs. This was soon followed by a third tank for which another shelf was cleared. At length, all the under-stairs cupboard space was occupied with tanks which presented quite a problem to the gasman when he called to read the meter.

Still a relatively novice aquarist, John next purchased a small black fish around 2½ in. in length. It grew rapidly and was consequently moved from tank to larger tank until a 4 ft. tank was provided and placed on the sideboard beside the budgie cage. Continuing to grow, Sammy as he had been christened, attained a length of 25 in. and lived for seventeen years, finishing his days in a 6 ft. tank. You will have guessed that Sammy was a Black Shark (*Morulus chrysocephalus*).

John went on to win many first awards at shows as well as an *Aquarist* Gold Pin. He joined the K.D.A.S. committee as assistant show secretary and remained a committee member for twelve years. He was also assistant show secretary to the F.B.A.S. *Aquarist & Pondkeeper* and *Perfish* shows for three years.

John next made a small pond in his garden and, guided by two friends, selected some London Shubunkins to stock it with. A fortunate spawning

John with some of his baby Calico Pom-Poms



ensued, the egg-laden blanket weed transferred to a tank and another coldwater fishkeeper was born.

By this time tanks were proliferating and spreading throughout the house; even the doors to the under-stairs cupboard were removed to afford more tank space.

At about this time John met up with D. J. Mackay, known to his intimates as Mac, and between them they laid plans for building a fish house. Unfortunately, John's back began to give him trouble and a major operation became necessary confining him to hospital for seven months. Friends cared for his fish during this time and 'Get Well' cards from fellow hobbyists became so numerous that the nurses hung them from the ward ceiling.

John left hospital encased in plaster from neck to knees and thus attired he attended a K.D.A.S. dance albeit it was not a fancy dress affair.

*Continued on page 39*

THE AQUARIST



# A break-through in breeding marines

Consistent spawnings of *Centropyge* Angelfishes by Robert J Goldstein, PhD

THE age of Breeding Marine Fishes has arrived. In recent years, methods have been developed for spawning adults and rearing the fry. The successes have not been restricted to scientists, but have been shared by aquarists and those lucky people who fit into both categories simultaneously. Often little items are included in the reports that seem to have no great significance by themselves. But when seen time and again, and consistent with other success stories, those small, seemingly insignificant observations take on importance. Should the excitement, in the future, prove to be a false alarm, no harm has been done. In fact, you can have an awful lot of fun getting excited about something, even when it isn't really there! One such item which made me twitch was the inclusion, as almost an afterthought, of frozen fish eggs in the diet of spawning marine angelfishes of the genus *Centropyge*. It was right after I started using this food that my own clown fishes began spawning. Coincidence? Maybe so. But it won't hurt to get excited about it, and begin using this food as a potential breeding initiator.

The paper that riveted my attention was recently published in the *Bulletin of Marine Science* (volume 31, number 3, pp. 495-513, 1981). The authors are J. A. and S. E. Bauer, and the title is "Reproductive biology of pigmy angelfishes of the genus *Centropyge*." Now you and I know that anybody can get lucky and get a pair of marine fish to spawn. Those of us that are even luckier get those same fish to spawn regularly. But when results like the Bauers' are reported, there is no luck involved. They have hit upon the key, the system, the technique, and it's time for all of us to sit up and take notice.

First, however, let's review what we know (or think we know) about the genus *Centropyge*. The genus was first well-defined by that great British ichthyologist, Fraser-Brunner, at least in modern times. Typically, these are small angels, ovate in body outline (as opposed to circular or quadrangular), having large scales on the head and body, and five or fewer vertical rows of scales on the operculum. The eyes are close together, with the interorbital distance (the space between the eye sockets) no greater than the diameter of an orbit. There are about 48 pored scales in the lateral line, ending at the end of the soft dorsal fin. The fins are sometimes angular, but there are never produced filaments. The tail fin can be rounded or truncated. The young have the same markings as the adults. In some species there are subtle forms of sexual dichromatism or dimorphism. There is the possibility that these observations are in error, as will be explained later. The name *Centropyge* was first proposed by Kaup in 1860. After Fraser-Brunner's redefinition of the genus in 1933, there have been few important modifications. One important exception is a paper by Shih-Chieh Shen and Chen-Shiang Liu at National Taiwan University. In their paper, entitled "Clarification of the genera of the angelfishes, family Pomacanthidae," which I believe came out in 1977 or 1978 (the paper is undated),

the authors divided the angelfishes into two subfamilies. The technical details of the generic system are too complicated to report here. In addition, I have my doubts whether this system will be sustained, since some novel and perhaps unreliable characteristics were used. It is most important, however, not to discard as unimportant the work being done by this group. Indeed, they have produced a vast amount of solid materials on the marine fishes of the region, including several new species descriptions.

They did note that *Centropyge* typically have very long, coiled intestines, which generally signifies a vegetarian (or largely herbivorous) diet. That is consistent with the classic work of Hobson in *Fishery Bulletin*, volume 72, number 4, 1974, pp. 915-1031, "Feeding relationships of teleostean fishes on coral reefs in Kona, Hawaii." Hobson looked at only one *Centropyge*, *C. potteri*, and noted that the predominant dietary component was filamentous algae. There were also debris and foraminiferans, indicating that the algae had been scraped from some surface. There were some copepods and sponges, but they could have been ingested with the algae. Even so, they may be important dietary components for the nutrients they provide, even though their bulk was very slight. Hobson concluded that *Centropyge potteri* fed on bottom algae and probably on some organic detritus. This contrasted with the results on another angelfish, not in *Centropyge*, which was shown to feed mostly on sponges, and which also took in algae and hydroids only incidentally. Thus, all work pointed to *Centropyge* as being algae-eaters.

The species of *Centropyge* are not all known. For example, I have seen photographs of members of this genus which have not yet been described. In addition, on at least two occasions, new species have been discovered which were previously overlooked due to their remarkable mimicry of other, more common, fishes. *Centropyge*, it seems, has more mimics than any other group of angelfishes, and we can be just about certain that shallow mimics and deep water forms have yet to be discovered even in the most heavily studied areas.

One of the first known forms of mimicry was the similarity of *Centropyge flavissimus* to the tang, *Acanthurus pyroferus*. Both have yellow bodies, with a blue eye ring and a blue slash along the vertical line of the gill opening. Juveniles of this angelfish have a prominent ocellus on the middle of the side, which may be a similarity to another kind of fish, such as a pomacentrid. Indeed, an Atlantic pomacentrid has a similar pattern in its juvenile stage.

The first Atlantic *Centropyge* to be discovered was *C. argi*. This fish was not seen earlier due to its great similarity to pomacentrids. It is overall blue with a slight area of yellow flushing on its ventral surface. Looking at the angel and damsel side by side in an aquarium might have you doubt the similarity, but that is not the same as seeing them in nature. An even more dramatic similarity of a *Centropyge* and a damsel is provided by the



*Centropyge argi* of the Atlantic was overlooked for years due to its similarity to small pomacentrids, and occupation of a similar habitat.



*Centropyge acanthops* from the Indian Ocean, shown here, is just about identical to the Atlantic *C. aurantonotus*.

recently discovered *C. colini*. This fish has a shallow area of brilliant blue on its dorsum, with the remainder of the body bright yellow. It looks more like a damselfish than most damselfishes! There are other examples of mimicry, including tangs that resemble *C. eibli* and *C. potteri*. Which brings us to another unusual feature of this group.

Many kinds of *Centropyge* resemble each other so remarkably, that we would be absolutely certain of their identity were it not for where they were caught. Perhaps the best example, is the perfect match between the newly discovered Atlantic angelfish, *Centropyge aurantonotus* and the Indo-Pacific species, *C. acanthops*. For years I was convinced that *C. acanthops* was merely a variant of *C. fisheri*, but in the face of such similarity of fishes from two different oceans, who can be sure any more? If fishes that are so far apart can be so similar, then how do we know that fishes only slightly separated, and only slightly different in markings, are not in fact really different species?

Right now, the species of the genus that have been named seem to be: *acanthops*, *argi*, *aurantius*, *aurantonotus*, *bicolor*, *bispinosus*, *caudoxanthurus*, *colini*, *eibli*, *ferrugatus*, *fisheri*, *flavicauda*, *flavissimus*, *heraldi*, *hotumatua*, *interruptus*, *joculator*, *loriculus* (= *flammeus*), *multifasciatus*, *multispinus* (= *somervillei*), *nigriocellus*, *nox*, *potteri*, *tibicen* (= *leucopleura*) and *vralicki*. And I'm not so sure about *leucopleura*, having seen a photograph of a fish that gives me some doubts.



*Centropyge loriculus* is probably the same fish as *C. flammeus*. The Bauers had a tank of these that spawned regularly for seven years.



*Centropyge bicolor*, shown here, is almost identical to *C. joculator* and *C. hotumatua*



*Centropyge fisheri* from Japanese waters is a beauty  
Photo: DR. FUJIO YASUDA



*Centropyge heraklus* is similar to *C. flavissimus*, but lacks the blue colors

If you think you know *bicolor*, think again. It, *joculator* and *hotumatua* are almost identical. A description of the three and how they can be separated appeared in Proceedings of the Academy of Natural Sciences of Philadelphia (U.S.A.), volume 126, number 8, pp. 105-113 in 1974. Written by Smith-Vaniz and Randall, this is the paper that also described *colini* for the first time.

All of these dwarf angelfishes appear to feed largely on algae, and perhaps that is why they tend to mimic other algal-eaters. Several algal-eating fishes taste bad or are toxic, and that could account for a similarity to tangs. On the other hand, a similarity to pomacentrids is more difficult to explain, unless they just plain taste bad. They are not known to be toxic. Years ago I tried eating some large Florida pomacentrids and recall that they tasted somewhat like a cross between mud and old socks used to carry dead fish. Therein may lie the explanation, although clearly this is an area for hours of delightful armchair speculation.

All pigmy angelfishes whose diets have been studied have been found to be largely herbivores, feeding on algae. That seems to have played an important role in the success of the Bauers in getting several species to spawn consistently.

The Bauers kept six species of *Centropyge* in separate

aquariums of about 45 gallon capacity. They used synthetic sea water of normal salinity (27-30 parts per thousand). Their filtration system is important. It was described as "brisk, airlift filtration over a crushed oyster shell substrate." There was no mention of power filtration or outside filters. Oyster shell was used, rather than dolomite or crushed coral. The temperature was maintained at 20-24°C, and Gro-lux lights were kept on 14 to 16 hours a day. They used about 36 watts per tank. There was also natural daylight exposure, which un-

doubtedly helped in the algal mat growth. The authors changed 10% of the water monthly. Algae grew profusely under these conditions, with extensive growth of filamentous greens and *Caulerpa floridana* growing throughout the aquaria. Food was offered several times a day. It consisted of dry flake food supplemented with shredded scallop and shrimp, frozen adult brine shrimp, and frozen fish eggs. Fish eggs, of course, are not only very nutritious, but a wonderful source of hormones and vitamins.

Six species of fish were maintained in these tanks. They were *C. argi*, *C. acanthops*, *C. bimaculatus*, *C. flavissimus*, *C. loriculus* and *C. fisheri*. (The authors erred in considering *acanthops* an Atlantic species. It occurs on the east coast of Africa, in the Indian Ocean, rather than on the African west coast, which abuts the Atlantic). Each aquarium contained a group of *Centropyge*, rather than a pair. It had previously been shown by Moyer and Nakazono in 1978, writing in the Japanese Journal of Ichthyology, volume 25, pp. 25-39, that at least one kind of angelfish was a protogynous hermaphrodite. This is a fish that becomes a functional female first, and can later change into a functional male. It is nothing unusual in fishes. In waters of the Atlantic coast of the United States we have a fish called a black sea bass (*Centropristis striata*), quite popular with anglers, in which all the really large specimens are males. They are few and far between, with the bulk of the fishes being much smaller females or immature and functionally sexless. Moyer and Nakazono studied *Centropyge interruptus* in Japanese waters, but the implication was clear. If one member of a genus behaves this way, then perhaps others and even all of them do. Recall the situation in clown fishes of the pomacentrid genus *Amphiprion*, for example, where we have protandrous hermaphroditism.

Using this information as a guide, the Bauers set up harems of fish, consisting of three to ten individuals per aquarium. Sure enough, when spawning initiated, it was found that the one large fish was a dominant male, and the rest were females. But, unlike the situation in anemone fishes where there is only a single functional pair, plus a sexless reserve, in the pigmy angelfishes there was a harem-leader male and several functional females. Each female took over a small territory or position in the tank and the male would visit them in turn. Spawning occurred with all the females, and always within an hour of the lights going off (they were on a timer). In nature, they spawned after sundown. That the aquarium fish would adapt to a timer-operated light cycle is striking. There were other important observations. Spawning occurred every day, all year long. It had previously been reported that they spawn with a lunar cycle in nature. The Bauers found constant, daily spawning not only in their aquaria, but also when they observed several kinds of *Centropyge* in nature, including Atlantic and Pacific species. It seems that the previous report of a lunar cycle may have been merely species-specific, or (more likely) an assumption based on insufficient observations.

The Bauers did more than this. They collected eggs from the breeding fishes in their aquaria, and checked on their fertility. That is, they tried to get some feel for what percent of the eggs were good. Their results varied tremendously. It is noteworthy that the Bauers did not report either the egg yield or the percent fertility of the fish they called *C. bicolor*. On the other hand, they reported sexual differences in "bicolor" based on a subocular bar. The presence of a supraocular bar is known from *C. bicolor* and from juveniles of *C. jacobulator*, but it does not occur in *C. hotumatua*. These fishes also differ somewhat in the shape of the tail fin, and that "difference" has been reported by others to be a sexual difference in other kinds of pigmy angelfishes. These various observations, and omissions, suggest that what some people are calling sexual differences might in fact be indicators of species differences, and that would certainly lower fertility as compared with an expected high level of good eggs. It must also be pointed out that the varying fertility results that the Bauers found might indicate that the fish were spawning perhaps too often, putting out immature eggs. That is not unheard of, and occurs with many kinds of fishes.

Breeding was ritualized. The male would parade about the various areas, displaying to the females in turn. When ready, a female would join the male in the upper level of the aquarium, and one or the other sex would blanch, i.e., turn partly light coloured. There was an observable release of gametes during a brief spawning burst, and then the female would dart back down to her territorial locale. Each female spawned only one time each evening. But each spawned every evening, and all through the year.

For those interested in the details of the ritual, see the original paper in the Bulletin of Marine Science for 1981. From the point of view of breeding these fishes, it is clear that they require only a simple set-up with minimal costs in equipment. What are important are space, good algal growth, privacy, frequent feeding and a rich diet. The contribution of frozen fish eggs to the diet may be important. The use of a group of fish in a harem may also be important. That the fish took meals, in addition to grazing on extensive algal growth, must be of great significance. Indeed, it has long been thought that many herbivores get a lot of nutrition from the inadvertent ingestion of all kinds of creatures that live in the vegetation, and that an herbivorous mode of life is less indicative of what they use than of their inefficiency in gathering animal matter any other way.

The Bauers did not try to raise any fry. They placed the eggs (collected by filtering them out of the water) in still water in shallow dishes, where they developed normally. Thus, they did not need current to develop and that should be considered when attempting propagation.

We have come a long way in understanding breeding and development of the sexual stages of marine fishes. The pigmy angelfishes offer an excellent opportunity for marine aquarists as the next group to work with, after the clown fishes, other damselfishes and the gobies.

Continued from page 34

John's coldwater interest continued to grow and a coldwater fish house was added to the tropical one. He had success with both coldwater and tropical showing but ill health reduced these activities because of his dependence upon other people to carry and bench his fish.

The first all coldwater show which John attended was held by the South Park Aquatic Study Society and here he met many coldwater fishkeepers. Soon afterwards he was taken to the G.S.G.B. convention. This was around twelve years ago and he has attended every succeeding convention except when compelled to have his 'holidays' in hospital.

John is a founder member and now vice-chairman of the Characin Society.

In 1974 John was classified as disabled and he spent three and a half months at Egham Rehabilitation Centre. From there he went to the Queen Elizabeth Training College for the Disabled at Leatherhead for nine months and where he gained a diploma for bookkeeping. With the help of friends his fishkeeping continued throughout this time.

For a year after this John worked as a bookkeeper as well as running his home and bringing up his son.



John in fish house with prize winning Brambleheads

As a result of the obvious pressures he had a mental and physical breakdown.

Recovery came at length and he joined the South Park Aquatic Study Society, a coldwater specialist society, and this afforded him the chance of showing fish again, with the help of friends.

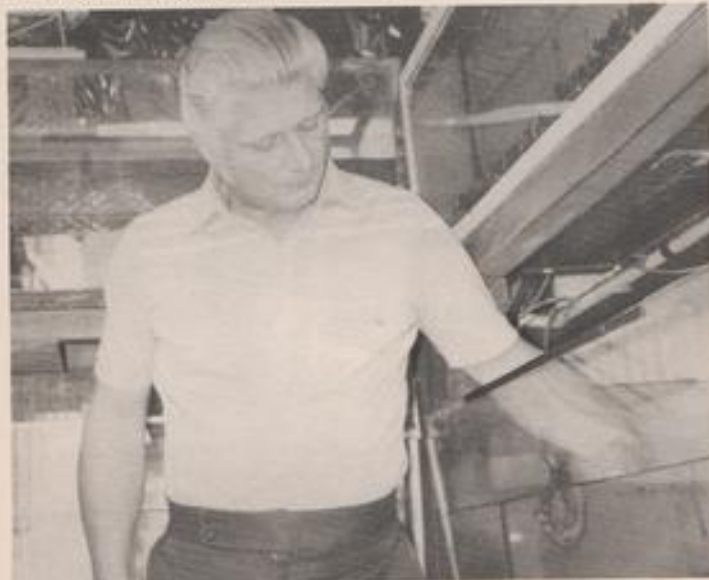
With his disability John finds coldwater fish easier to maintain than

tropical. Water changing, for example, is so much simpler for obvious reasons. He keeps Lionheads, Pom-pons, Bubble-eyes, Pearl-scales, Orandas, Bristol and London Shubunkins as well as Koi, Bitterling and Prussian carp. Most of the tropicals are Characins and Catfish, from a 14 in. Hyposomus to a 2 in. albino Corydoras.

John maintains that when he buys a fish it must be of a quality fit to show or to breed as it costs as much to keep a bad fish as it does to keep a good one. His choice of fish is governed to a degree by its ability to tolerate tap-water. Regarding breeding he believes coldwater fish offer more of a challenge than tropicals because 'man-made' goldfish do not breed true so the number of good fish from a spawning is never large.

In 1980 John became a life-member of S.P.A.S.S. and this was closely followed by his receiving life-membership of the K.D.A.S. He is also a member of the Bristol Aquatic Society. John also attends a Disabled Day Centre at New Malden where he is in charge of the raised fish pond.

John says that this hobby has kept him sane during his troubles along with the help and friendship he has received by belonging to fish societies. He recommends any disabled readers to contact the local aquarist society where they will be surprised at the warmth of welcome extended to them.



John holding Bubble-Eye

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# Probability and Pairs

by Martin Cain

MANY species of fish are difficult to sex and when attempting to choose a pair under these circumstances, we are forced to select a number of specimens. Intuitively, we know there is an optimum number, beyond which the probability of obtaining a pair improves only fractionally. Therefore, we want to know:

1. What is this optimum number?
2. How is it affected by the ratio of the sexes?

For simplicity, let's first examine the situation in which equal numbers of both sexes are present in an aquarium containing 100 fish.

## Two Draws

Let's assume we are only to draw 2 fish from the tank. The probability of obtaining a male or a female on the first draw is 50%, or expressed another way, 50/100. Similarly, on the second draw, the probability of choosing a male or a female is also 50%. However, the combined probabilities of any 2 consecutive draws are  $50/100 \times 50/100 = 2,500/10,000$ , or 25%. The following table summarises the 4 possible combinations and their probabilities:

In cases 3 and 4, a pair results and therefore, the probability of obtaining a pair is  $25\% + 25\% = 50\%$ .

## Three Draws

As more fish are drawn, the probability of a pair improves dramatically, and if 3 fish are selected consecutively, we have the following possibilities:

In cases 3 through 8, a pair results and therefore the probability has improved to  $6 \times 12.5\%$ , or 75%. Put another way, given a 50/50 ratio of males to females, and if we are to draw 3 fish consecutively, we shall select trios of either 2 males and 1 female or 2 females and 1 male, 75 times out of 100.

The above examples are simple but will help us understand the following table, and again we are assuming a sex ratio of 50:50.

## Multiple Draws

Table 3 indicates the aquarist stands an excellent chance of obtaining at least 1 pair of fish, if 5 or more specimens are drawn from the tank. Beyond 8 specimens, the probability of selecting 1 pair improves only marginally, and unless one is interested in obtaining 2 or more pairs, there is little real advantage in selecting more than 8 fish. Therefore, the "optimum number" lies in the range between 5 and 8, 6 being the usual number recommended.

## Complications

The foregoing dealt with a rather ideal situation in which equal numbers of both sexes were present. In reality, we quite often encounter a less than equal distribution of the sexes and the probability of obtaining a pair from a given number of fish drawn, is affected accordingly.

For example, in a rather extreme situation where our tank of 100 fish contains 10 fish of one sex and 90 of the other, the probability of selecting 1 of the 10 fish in the first draw is 10/100 or only 10%. In fact, we would have to draw 22 fish before achieving even a 90% probability of a pair! This compares to 5 fish in the 50:50 distribution case.

The following table summarises the probability of selecting a pair, assuming a number of different sex ratios, and will be useful as such data are available.

However, we usually do not know the sex ratio of a group of fish, unless we are dealing with a strain known to have such an imbalance. Most situations will yield good results if the standard 6 fish are drawn, because even with the 70:30 case above, there is an 88% probability of obtaining a pair in 6 consecutive draws.

| Case No. | Draw No. 1 | Draw No. 2 | Probability            |
|----------|------------|------------|------------------------|
| 1        | male       | male       | 50/100 × 50/100 or 25% |
| 2        | female     | female     | 50/100 × 50/100 or 25% |
| 3        | male       | female     | 50/100 × 50/100 or 25% |
| 4        | female     | male       | 50/100 × 50/100 or 25% |
|          |            |            | total probability 100% |

| Case No. | Draw No. 1 | Draw No. 2 | Draw No. 3 | Probability                          |
|----------|------------|------------|------------|--------------------------------------|
| 1        | male       | male       | male       | 50/100 × 50/100 × 50/100<br>or 12.5% |
| 2        | female     | female     | female     | 12.5%                                |
| 3        | male       | male       | female     | 12.5%                                |
| 4        | male       | female     | male       | 12.5%                                |
| 5        | female     | male       | male       | 12.5%                                |
| 6        | female     | female     | male       | 12.5%                                |
| 7        | female     | male       | female     | 12.5%                                |
| 8        | male       | female     | female     | 12.5%                                |
|          |            |            |            | total probability 100.0%             |

| No. of Fish Drawn | Probability (%) |         |         |         |
|-------------------|-----------------|---------|---------|---------|
|                   | 1 Pair          | 2 Pairs | 3 Pairs | 4 Pairs |
| 2                 | 50              | —       | —       | —       |
| 3                 | 75              | —       | —       | —       |
| 4                 | 88              | 38      | —       | —       |
| 5                 | 94              | 63      | —       | —       |
| 6                 | 97              | 78      | 31      | —       |
| 7                 | 98              | 88      | 55      | —       |
| 8                 | *99             | 93      | 71      | 27      |
| 9                 | 99              | 96      | 82      | 49      |
| 10                | 99              | 98      | 89      | 66      |
| 11                | 99              | 99      | 93      | 77      |
| 12                | 99              | 99      | 96      | 85      |

\* stands for "greater than"

| Sex Ratio | Number of Draws |    |    |    |    |    |    |    |    |    |    |  |
|-----------|-----------------|----|----|----|----|----|----|----|----|----|----|--|
|           | 2               | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 |  |
| 90:10     | 18              | 27 | 34 | 41 | 47 | 52 | 57 | 61 | 65 | 69 | 72 |  |
| 80:20     | 32              | 42 | 59 | 67 | 74 | 79 | 83 | 87 | 89 | 91 | 93 |  |
| 70:30     | 42              | 63 | 75 | 83 | 88 | 92 | 94 | 96 | 97 | 98 | 99 |  |
| 60:40     | 48              | 72 | 85 | 91 | 95 | 97 | 98 | 99 | 99 | 99 | 99 |  |
| 50:50     | 50              | 75 | 88 | 94 | 97 | 98 | 99 | 99 | 99 | 99 | 99 |  |



The Rainbow Tetra  
*N. lacertei*

# The three Emperor Tetra varieties



The Emperor Tetra  
*N. palmeri*



by  
**Anthony C  
Terceira, PhD**

TETRAS OR CHARACINS are generally not recommended as beginner's fish when one is trying to successfully raise egg-scatterers. Within the hobby there are currently available three kinds of Emperor tetras (*Nematobrycon*) which are relatively easy to breed and very beautiful. All three of these tetras grow to approximately 2 inches and live in ponds and slow moving streams at headways of rivers west of the Andes in Columbia, South America.

During the late '50s and early '60s two forms of *Nematobrycon* were exported to the United States from the Choco region of Columbia where the headwaters of the Rio San Juan and Rio Atrato lie adjacent to one another. The Emperor tetra was collected from this area. It is a beautiful blue and black banded fish with a trident tail. Dr. Carl Eigenmann had made this fish known to science in 1911.

The second *Nematobrycon*, *spp.* the rainbow Emperor tetra was found in the Rio Calima. There were later importations and these were apparently shipped as *Nematobrycon amphioxus* which were known in aquarium literature. Eigenmann and Wilson in 1914 had described *N. amphioxus* from the headwaters of the Rio Atrato, far North of the fish which had arrived from Rio Calima. This fish was found to be unknown to science and was described as a new species, *Nematobrycon lacortei*, by

S. Weitzman and W. L. Fink of the Smithsonian Institution in the August 1971 issue of "Beaufortia," a publication of the Institute of Taxonomy of the University of Amsterdam, Netherlands.

Shortly after this importations two breeders, namely Rosario La Corte, after whom Dr. Weitzman named the new *Nematobrycon*, and Walter Indell a fish breeder of some 60 years' experience, beginning behind the Iron Curtain, found a very black form of *Nematobrycon* among their respective spawnings of *N. palmeri*. Without each other's knowledge both men began isolating these fish, believing that they were colour mutants of the normal blue-black *N. palmeri*. Both men soon established a Black *Nematobrycon* that bred true. Both these men, without either's knowledge, distributed these fish in rather large quantities and these are now established within the aquarium trade. This accounts for the three forms of Emperor tetras available to hobbyists.

While Weitzman and Fink were investigating the identity of the Rio Calima species, they studied all of Eigenmann's original preserved specimens of both *N. palmeri* and the true *N. amphioxus*. They found that the two species were almost identical except for colour pattern and that the colour pattern of specimens of *N. amphioxus* was approximately the same as that of the black *Nematobrycon* that was established by Mr. La Corte and Mr. Indell. Further investigations led these men to the specimens sent for identification to the U.S. National Museum in 1960 and found that these were all *N. palmeri* except for one female which had the colour pattern of *N. amphioxus*. Re-checking specimens sent by Rosario La Corte in 1960 showed Dr. Weitzman that the identification of the specimens was partially incorrect because along with the

*N. palmeri* was found one female with the *N. amphioxus* colour pattern. Further studies lead Dr. Weitzman to conclude that *N. palmeri* are geographic colour variants not distinct enough to be regarded as separate species. Apparently both fish breeders had more or less reconstructed *N. amphioxus* in their selective breedings.

It seems that the three forms of Emperor tetras known to hobbyists are derived from wild stock of two separate species, one being *Nematobrycon lacortei*, the rainbow emperor, and the other *N. palmeri*, the emperor tetra. The blue-black form known in the hobby are probably of mixed parentage but fairly pure stocks of both are available. Dr. Weitzman and W. L. Fink made a great deal of this information available to aquarists through a previously published magazine. (*Aquarium Hobbyist* 2 (2)). Being somewhat of a tetra lover over the years, I have kept and bred all three forms using two different methods.

#### Temporary method

Using a temporary spawning arrangement is perhaps the easiest way to rear a great many young at once. The adults are fed heavily on any and all available live and frozen foods, including Brine-shrimp, *daphnia*, *tubifex* worms, and mosquito larvae. The exact diet is not as important as the diversity and frequency of feeding. At least twice daily should be considered a minimum. When the females begin to bulge with a swollen abdomen, they are ready to be placed into a previously set-up breeding tank containing water of the same quality as that in which they are maintained. The tank should be between 5½ and 10 gallons in capacity, and the water temperature should be approximately 78° F. An airstone or sponge filter should be placed in the tank

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## The three Emperor Tetra varieties

along with spawning media. Perhaps the most accessible spawning media for egg-scattering tetras is Acrylic yarn which may be made into "spawning mops" a la Killifish style or may be used simply in quantity. One end of the tank should contain enough yarn to fill one third of the tank, and cover the tank from the top of the water level to the bottom of the tank. Yarns should be boiled prior to use, and re-boiled after use to be sure to rid them of any unwanted and harmful bacteria. When the fish are ready to transfer to the breeding tank, the females are generally transferred first, and are added approximately four hours before the males—to allow them time to settle down. You may use pairs or trios (two females and one male). I have found better results with trios, but have been able to get sufficient young from a pair when that was all that was available. If the females are ripe, spawning will commence at dawn, and males will relentlessly drive the females into the spawning media where eggs will be scattered throughout the mops. Emperor tetras are quite capable of laying 300 eggs per female if they are properly conditioned. When the females appear depleted of eggs or after 24 hours if you are unsure, the fish should be removed from the breeding tank and the tank, hopefully containing eggs, should be shielded from direct light (a sheet of paper over the tank will do the trick). In 48 to 56 hours you should begin to look very carefully

into the tank and notice small tiny hairlike objects clinging to the side walls of the tank, or when the mop is disturbed you may see tiny specks seeming to dash about. Do not feed these newly-hatched young, they will live on their egg sacks for another two days. When a total of five days has elapsed since the parents were removed from the tank, small feedings of live baby brine shrimp, combined with micro-worms, may begin. Check the young approximately 10 minutes after feeding and you should be able to see their small stomachs bulging "red" with food. Frequent small feedings will get the young off to a good start and in a matter of five to six weeks, depending on feeding and temperature, the young will begin to look like miniature copies of their parents. It takes four to five months before sexing can be done for certain since all young develop the female characteristics first, and then slowly the longer finnage and brighter colours of the males becomes apparent. In order to maximize growth you will have to transfer the young to larger tanks as they continue to grow. I have found that 20 gal. long tanks are the best for rearing young of all tetra species. The surface area is much greater than a conventional 20 gal. tank, and the low height makes their arrangement in a fishroom much more efficient.

### Permanent method

If you do not wish to raise Emperor tetras in quantity, but would rather maintain the fish and assure yourself of a few additional pairs for barter with other hobbyists, they may be set-up in a tank with no other species, and there will always be a few fish at the varying stages of growth to assure you of not losing these fish. I maintain a small population, and have continued to for seven years, in a 10 gallon tank which contains a large

spawning mop, an inside filter, and a heavy covering of water sprite. I feed the adults twice a day on a varied diet, and once daily add live baby brine shrimp to the tanks. Both adults and young enjoy this food so there is no problem with uneaten or "wasted" food when feeding baby brine shrimp to any of the smaller tetras. As the environment of the tanks stabilises, males will begin chasing females into the spawning media, and if enough cover is provided, a few young will survive the hungry eyes of the adults, and grow to maturity. This is a very enjoyable arrangement and it does allow one to view these beautiful fish spawning at just about any time during the year. You will not be able to have a permanent arrangement unless the tank contains nothing but Emperor tetras, and is heavily covered with a thick bed of a dense top floating water plant.

The key to raising these fish is the same as with other tropical fish for the aquarium; proper maintenance, a varied diet, and frequent partial water changes. Given these basic, simple requirements, Emperor tetras, as well as all other aquarium inhabitants, will provide you with years of enjoyable activity.

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## STOP PRESS

### Fire at Phillips Yeast

Due to a serious fire at the Park Royal premises of Phillips Yeast Products Limited on the night of the 6th June, this has resulted in the loss of much stock and plant. This fire is being treated as a serious case of arson by the police.

Phillips Yeast will endeavour to resume normal trading as soon as possible but ask our customers to bear with us over unavoidable delays.



The care and  
breeding of  
**Axolotls**

by Chris Mattison

The Axolotl, *Ambystoma mexicanum*,  
white form

'AXOLOTL' is an Aztec word meaning 'water dragon', and it is the name given to a strange amphibian from Mexico. The Axolotl is really a tadpole, the larva of a salamander, *Ambystoma mexicanum*, which retains its external gills and its aquatic habits throughout its life, instead of metamorphosing in the normal way. It is possible to induce an Axolotl to metamorphose by injecting it with a thyroid preparation but, contrary to some reports, attempts to make it leave the water by gradually reducing the depth in which it lives usually end in failure. The terrestrial form is, in any case, a rather nondescript animal, and may be difficult to maintain in captivity, so the majority of people prefer to keep their Axolotls just as they are—Peter Pans of the amphibian kingdom.

Part of a batch of Axolotl eggs, attached to a twig and a stem of *Elodea*

They may attain 40cm but are usually about half of this length, and two colour forms exist—a white strain and a black strain. Both kinds are equally easy to keep and breed and are understandably popular with aquarists who have a spare aquarium and like to dabble with the occasional 'odd-ball'. They are not suitable tank-mates for fish or turtles as their fins, toes and feathery gills may be nibbled and are then prone to infection. In addition, they are rather greedy and are quite capable of snapping up fish of 3 to 4 centimetres. They need an aquarium measuring about 60 x 30 x 30 cm (for an adult pair or a group of young) with a layer of pebbles on the bottom. Larger, smooth surfaced rocks can be added for appearance and tough plants give a natural look as well as helping to keep the water in good condition. Delicate plants soon become uprooted and broken as a result of the animals' clumsy perambulations. Axolotls are remarkably tolerant regarding temperature,

surviving in water from freezing point up to 25°C or more. In warm water their gills grow larger and more feathery because the water retains less oxygen, but tropical temperatures are unnatural. At 12-20°C they grow steadily but live for a long time.

Their food consists of worms, pieces of lean meat, liver, etc. and this is required two or three times each week. Since they swallow their food whole, it should be offered in fairly small portions, and uneaten food must be removed shortly after each feed to prevent the water from becoming foul. Young animals, up to about 5 cm, will live quite well on *Tubifex* or small earthworms.

All Axolotls offered for sale are tank bred, and breeding should not present any difficulties to a competent aquarist. They reach maturity at about 15 cm (18-24 months of age), and then the sexes can be distinguished by the plumper appearance of the female, and the swollen cloacal margins of the male.





Spawning may take place spontaneously or it can be stimulated by lowering the temperature of the water, for instance, by replacing half of it with cooler water which has been stood overnight to dispel the chlorine. The male deposits a small cone of jelly with a sperm mass at its apex. This is known as a spermatophore. The female then positions her vent over the spermatophore and takes it up: the eggs are thus fertilised internally, unlike those of frogs and toads. A day or so later the female begins to lay and may continue to do so for up to 48 hours. The sticky eggs are laid singly and are attached to stones, twigs (which should be scrubbed and placed in the aquarium for this purpose), or the stems and leaves of aquatic plants. 200 eggs form an average batch, and the female may be ready to spawn again one month to six weeks later.

The eggs must be removed from the aquarium, either complete with the various objects to which they are attached, or by easing them into a beaker or tea-strainer. They are housed in shallow aquaria or dishes and should be inspected every day for signs of fungus. Infected eggs can be separated from the others with forceps or pointed scissors and then sucked up

into a bulb pipette. The eggs hatch after 10-20 days (depending on temperature) and the small larvae require live food in the form of newly hatched Brine-shrimp, small *Daphnia*, or protozoan 'soup' from the bottom of a well matured and not too 'clinical' aquarium. They grow quite rapidly with ample feeding and frequent water changes (remembering to use de-chlorinated water at the same temperature) and must be regularly sorted into groups of similarly-sized larvae in order to prevent cannibalism—arms and legs are frequently snapped off by hungry brothers and sisters, but these will grow again provided that the wounds do not become infected.

Although a pair of white Axolotls can

Day 9 (at 25°C): the young larvae are almost fully formed within their jelly capsules. Two arrowed eggs are infertile and have become infected with fungus.

only produce white offspring, if one or both of the parents is black, black and white young may be present (depending on the genetic make-up of the parents—as in Guppies, Swordtails, poodles, geraniums, etc.).

Successfully spawning and rearing a group of young Axolotls may be the first step towards keeping and breeding other, perhaps more difficult, amphibians, or it may simply be an interesting diversion for the serious aquarist.

### NEXT MONTH

Part 4 of **THE MAKING OF A WATER GARDEN** discusses Oxygenators and Water Lilies. This feature will be illustrated in full colour. Jack Hems concentrates our **SPOTLIGHT** on those popular **DISCUS** fish.

**THE SPLASHING TETRA.** The second part of this fascinating picture series by van den Nieuwenhuizen.  
**AN ATTRACTIVE NEWCOMER TO THE AQUARIUM PLANT COLLECTION.** Yet another well illustrated article from Karel Rataj.

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THE FISHKEEPER WHO REALLY CARES.**

## Your questions answered...

### Tropical anabantids . . .

I am a keen hobbyist especially interested in anabantids. Can you send me the addresses of any anabantid societies?

There is a newly formed Anabantid Association in the U.K. Contact A. Thompson, 4 Nelson Avenue, Nelson, Cramlington, Northumberland.

You might also like to write to the International Beta Congress, W. P. Hart, 142 East 7th Avenue, Ft. Pierre, S.D. 57532, U.S.A.

Do enclose a S.A.E.

### guppies . . .



I am a relative newcomer to the hobby. I thought guppies were easy to keep but mine will not breed and do not survive long in my tank. Where am I going wrong?

Whilst guppies are quite hardy fish, you must still adhere to a few simple rules of aquarium maintenance, and I have sent you a check list which may help. A partial water change of 25% of the tank volume every 2-3 weeks is very important and you must avoid overfeeding and overcrowding and ensure adequate filtration.

Very often guppies will not fare too well if the water is soft and/or too acid. Check this with a reliable test kit. You may find that the addition of little aquarium salt or limestone chips to the tank will help.

### TROPICAL



Dr. C. Andrews

### COLDWATER



Arthur Boarder

### not so tough! . . .

Can you send me some information on the care of piranha?

Piranhas can be kept in the home aquarium, although they are not as robust and hardy as their reputation might suggest.

They must be given the respect they deserve, as even quite small individuals can give a nasty bite—so **HANDLE WITH CARE**:

They are not a community tank fish. Piranha are best kept as a single fish in a 15-20 gallon tank, or as a small shoal of five or six individuals in a much larger aquarium. The water temperature should be a constant 25-28°C. When small they will feed on all manner of live food and scraped lean raw beef. As they grow older they can become accustomed to a diet of lean raw beef and occasionally, fresh or frozen raw fish. Dead goldfish, guppies, etc. may add variety to the diet, but beware of introducing disease in this manner.

The aquarium is best set-up along fairly spartan lines: a good external power filter, a minimum of strong living or plastic plants, and a layer of gravel (if desired). Rock caves may be provided—but beware of nervous piranha injuring themselves on sharp edges. Heater-thermostats have also been broken in this way. Piranha have been bred in the aquarium—but spacious quarters along with a good, varied diet seem important to bring the fish into spawning condition.

Piranhas tend to be rather messy feeders. All excess food should be removed once it has settled onto the tank floor. Every week about 25% of the water and all the accumulated debris should be siphoned out, and the tank topped up with fresh water

at the correct temperature. *AquaSafe* will safely condition new tap water, and its regular use has many advantages in the home aquarium.

Further information on piranha keeping may be found in:

"The Piranha Book" by G. S. Myers;

"Piranha" by H. Schultz;—both T.F.H.

"Aquarium Handbook" by G. Sterba (Pet Library).

C.A.

### Coldwater

#### *insect larva . . .*

I was looking through a magnifying glass at some goldfish eggs in a hatching tank. I noticed several tiny transparent grubs moving about on the weed. What are they and do they do any harm?

I think that the tiny grubs are the larva of midges. These may be seen on a hot summer's evening swarming over lakes and ponds. They will not harm the fishes but I am rather suspicious of their ability to eat into a goldfish egg. I may be wrong about this as I have not been able to prove it. You could swish the plants, with eggs, in a weak solution of T.C.P., just for a minute and then wash through the plants in fresh water. I do not think that the short immersion will harm the eggs.

#### *duck weed . . .*

Will goldfish eat duck weed and is it of any use in a garden pond?

Duck weed is ideal for helping to clear green Algae from a pond. A good covering on the surface will

## PLANTS



Vivian De Thabrew

## KOI



Hilda Allen

## MARINE



Richard Sankey

## DISCUS



Eberhard Schulze

Our experts are always pleased to receive your letters which should be addressed to: Readers Service, The Aquarist & Pondkeeper, The Butts, Brentford, Middlesex TW8 8BN. All queries must be accompanied by a S.A.E.

choke out much of the light and so the Algae will die. It is as well to empty out much of the water to remove a lot of the dead algae. Duck weed can take over if not controlled and the best way to clear it from a pond is to flush it across the pond with a hose and it can then be raked out. Hungry goldfish will eat duck weed.

### terrapians . . .

Can terrapins be kept in a garden pond with goldfish?

The short answer is yes, but they are not likely to survive a winter there and must be brought indoors out of the frost. As these creatures feed on fish it is not unusual for one of them to snap a piece out of a fish. So take your choice.

### breeding tench . . .

How old must green tench be before they will breed?

A lot depends on the rate of growth of the fish. In 1947 I bred some green tench in the garden pond and after feeding them well they grew and spawned themselves in two years. They spawned each year until they got rather too large for my pond and were transferred to the Aquarium at the London Zoo.

### failure to breed . . .

In my greenhouse I have a pond, 5½ ft × 2½ ft. and fifteen inches deep. In it I have a dozen goldfish and many water snails. In two years the fish have never bred.

### Can you give any reason for this?

The pond is very small and appears to be over stocked with fishes. It should not hold more than about 14 inches of fish (excluding the tail). If the fish are of breeding size it is certain that the pond is over crowded. Any eggs laid would almost certainly be eaten by the fishes or snails. Get the book "Coldwater Fishkeeping" as this gives all instructions for breeding goldfish.

A.B.

## Plants

### filtration . . .

I am a complete novice in the process of purchasing equipment to set up my first tropical aquarium. So far I have purchased an all-glass tank (36 in. × 12 in. × 15 in.) and a stand and am proposing to purchase plants for it. Will the proposed plants thrive over under-gravel filters? Is an "in-tank" power filter a better proposition, or would you recommend an externally-mounted power filter?

I would like to assure you that you can grow good aquarium plants with undergravel filters, provided the depth of the planting medium is at least 3 inches. I have grown prize specimens using this system. The secret of course is to choose the correct type of plants.

However, if you prefer a power filter, this should also be satisfactory. It does not really matter whether the power filter is based internally or externally. For that matter, plants do not require filtration. It is the inmates of the tank, the fish, which require it. Therefore I

suggest you choose the type of filtration you think will suit your fancy and pocket, and then try to maintain a well-balanced tank. By this I mean you should have a tank with water of a slightly acidic condition, at around 6.5-6.8 pH; the temperature should be maintained between 74°-76°F. The lighting should be adequate for your 36 in. × 12 in. × 15 in. tank—2 × 20 watt fluorescent tubes lit for approximately 10 hours per day will suffice. The planting medium should be fairly rich; a mixture of coarse sand with gravel and a thin layer of washed peat or clay (dried clay granules) below the main layer is ideal. These conditions will be satisfactory for most plants, except for the few which are not suitable for growing in acidic conditions, such as *Sagittaria natans* and *Elolea dena*.

V.T.

## Koi

### water starvation . . .

When my submersible water pump failed I decided to purchase a comparatively cheap domestic circulator pump for installation beside the pond. Although this pump uses only about half the electricity of my original unit and when working properly obviously pushes through a lot more water, it is difficult to prime and sometimes seems starved of water. I hope the enclosed sketch of the layout will help you to comment on my problem.

This is an interesting query which demonstrates some of the technical headaches associated with keeping such

potentially large fish as Koi and my reply will tend to contradict advice usually given.

On many occasions I have commented on the need of sufficiently large diameter pipework in order to avoid friction and pumping losses in the system but yours is one of those peculiar problems which may not be recognised by other Koi-keepers who have made a similar change of water pumps.

From your sketch it is impossible to fault the under gravel system and the use of 1½ inch diameter pipes all totally submerged. The problem is created by taking the suction pipe up and over the pond wall and down to the pump sited below the surface level of the water. I understand the difficulty with fully priming this pipe but once filled with water it should operate as a siphon to permanently flood the suction connection of the pump, and no trouble would be expected whenever this is stopped or re-started.



Showing the reduced pipework connected to the pump with PVC fittings

However, it is possible the pipe-bends over the wall are seldom free of an air-pocket when considering their size in relation to the flow of water not being sufficient to keep the suction pipe entirely free of air. In addition, air naturally in the water can be released to build up in the pipe and so interfere with the pump performance as you describe.

A classic example of what happens can occur in an outside box filter fitted to an aquarium where the siphon U-tubes over the side, although only about ½

inch diameter, are comparatively large for the flow of water so that a bubble of air can form to reduce or even stop the system from working.

I would suggest you reduce the diameters of your suction pipe to not more than 1¼ inch or not less than a true 1 inch internal diameter.

An earlier adaption for much the same reason as your own, but completely trouble-free is shown in the accompanying photographs using 1½ inch PVC waste couplings to suit the threaded connections of the central heating pump and reduced in this case to accept a thick wall 1 inch bore plastic hose.



In the far corner can be seen the suction pipe connected to an under-gravel filter, and in the foreground showing about 800 gallons/hour return from the pump

H.A.

## Marine

### loss of colour . . .

At the moment I am having problems with my anemones (*Radianthus*). When purchased they were a beautiful clean white with delicately pink spotted tips; now they are gradually losing their colour and becoming more and more dirty brown.

One of the anemones, when shrunk, goes a horrible green. I have rung a couple of shops but they don't seem to have much idea. Could you please help me?

I am fairly confident that the particular anemone that you mention in your letter is a *Radianthus mals* which is a species of anemone which

is commonly imported from the Indo-Pacific border. Generally speaking these, and most other species of sea anemones, are basically various shades of brown naturally in the ocean. This brown coloration is caused by rather special algae cells that live within the tissues of the sea anemone. These special algae are known as Zoanthilli and it is these very same algae that live within the tissue of many invertebrate animals, corals and certain molluscs, such as Clams. Not all these algae are brown in colour; in fact some of them are very vivid green, red or blue.

So when collected most anemones are predominately brown in colour, that includes even the ones that have a natural purple hue. Most importers of marine life have realised that by storing very freshly collected sea anemones in total darkness for a period of about a week, these algae die back and that the anemones gradually become almost pure white which, of course, makes them considerably more attractive in the home aquarium. What is actually happening in your aquarium is that gradually over a period of time these Zoanthilli algae are re-establishing themselves inside the tissue of your sea anemones. It is thought by some that these algae are crucial to the survival of the sea anemones. I personally believe that this is not always the case and that there are some species of sea anemone that can survive quite happily without them.

Indeed, there are some sea anemones and most definitely many corals that cannot survive without them. There is well documented scientific evidence to prove that many corals and other invertebrates require these populations of Zoanthilli within their tissue, either utilizing them as a food source or indeed as part of a complex procedure involved around skeletal growth.

Without any doubt, the particular red light source that you have on your aquarium will stimulate the growth of these algae, but does to me indicate a fundamentally healthy aquarium. My advice to you would be that you should not attempt to keep a white or light pink coloured anemone, but try and get one of the very brightly



coloured anemones that are naturally coloured by some of the more Zoanthid algae which I am sure will do very well in your aquarium.

R.S.

## Discus

### planting the tank . . .

I would like to keep Discus fish but only in a fully furnished and planted tank. Your advice would be most welcomed.

No problem; it has been done before. I suggest that you install a Eheim Reverse Flow Undergravel Filter system in your aquarium and then, apart from the first few weeks, should have no problem at all with either a build-up of nitrite or the growth of your plants. As decor I suggest that you use pieces of bogwood or roots rather than rocks or slate.

A great number of plants will take this high temperature but you must remember that the higher the temperature the more intense the light must be otherwise the growth will be poor. I would also advise the use of a CO<sub>2</sub> diffuser as well as an iron-based plant fertiliser.

As bunchplants choose from: *Cabomba aquatica*, *Rotala macrandra*, *Vallisneria spiralis*, *Crimson thalassum*, *Ceratopteris comuta*, *Rotala rotundifolia*, *Sagittaria subulata f. pusilla*.

As specimen plant use *Echinodorus bleheri* or *Aponogeton crispus*.

As a plant for the foreground: *Cryptocoryne affinis*, *willisii*, *walkeri*, *uteriana*.



Some beautiful Discus

### pair of reds ? . . .

I have been keeping 'ordinary' tropical fish for many years and

since I started to keep Discus fish I have had nothing but a lot of trouble. The first pair of Discus fish I got from my local dealer died within a very short time. He then offered to sell me a pair of Reds at a discount price because he thought that the Reds were much stronger than the Browns I had before. But these fish never even started to take any food and died within 2 weeks. When I went back to the shop I was told that my aquarium is not suitable and he couldn't do anything else for me. I have a 39 inch x 12 inch x 18 inch All Glass Aquarium with an undergravel filter in one corner. The temperature of the water is about 80° to 82°F, and I keep the lights on for about 7 hours a day. When I wanted to get some more Discus fish from another shop and told the man all my troubles I have had, he said that I should first write to you and ask you for your advice.

Although your letter gives some indication as to why you may have had problems with your Discus fish there are too many gaps to be really sure. To state that your aquarium is not suitable, I can not accept since Discus fish have been successfully kept in 'Milkbooties' as well as in 'Oceans of Water'; the size of your aquarium is about right, one could certainly argue about your filtration system. I am for one completely against U/G filters, and especially in Discus fish tanks, but, no Discus fish will die because of it within 2 weeks or so of purchase.

Although Discus fish are still classed as a 'specialist' type of fish, they often require less attention and care than many of the so-called ordinary tropicals:—as long as one understands fully their requirements, but it has become quite the 'thing' for many shops to have at least one or two tanks stocked with the 'Royalty' of the aquarium world simply to project an up-marked image; very often with disastrous consequences not only to themselves but also to their customers. And this is where I believe a lot of the Discus fish problem stems from.

Even if you do not understand the

various terms often used with fish-keeping like hardness, conductivity, pH, nitrite, there is still no obvious reason why it should have been your fault that these fish died. Discus fish will stand a lot more abuse than many of the so called 'easy' tropicals before they will show any signs of discomfort:—to put it in a nutshell: I would have said that the Discus fish you were sold by your local dealer were a bad lot, it does happen once in a while. It has also happened to me but with experience one will find that the only loser in the long run is going to be the supplier, and offering you a pair of REDS because they are stronger is a lot of bull . . . (What are Reds anyway? Will someone please tell me!)

Discus fish, when bought as babies, should be bought in numbers, 6 to 10, since they are a shoaling fish they will never do well when bought in pairs. If you remember only to get pairs when they are 'pairs' but otherwise as many as your pocket will allow then your discus fish keeping will be much less trouble. It is wrong to get a pair of Discus fish 'to see how they are doing' before you get any more because they will never really do well; be bold, get 6 or 10 or 20 babies at one time and see the difference, they will not hide behind a piece of wood or rock, they will make use of the whole aquarium, they will be much more adventurous and they will start to feed much sooner. They will be a happy fish and a happy fish will also be a healthy fish and will always be 'up front'.

One final point: the smaller the Discus fish the higher the temperature. Babies can easily be kept at around 88° to 90°F whereas fully grown specimens only need to be kept at around 84°F. Make sure there is sufficient oxygen in the water at this high temperature, and you will find that Discus fish keeping is not that difficult, after all.

E.S.

I USE A battery-operated quartz alarm clock to waken me up each morning. I find that its electronic buzzer gets me awake and alert more quickly than a clockwork alarm clock, complete with bell.

Early one March morning I was awakened by the alarm buzzer and, as usual, I reached out in a sleepy daze to flick the switch on top of the clock to silence the alarm buzzer. I flicked the switch—but the buzzer continued. Again I flicked the switch; and the buzzer continued. Still in a daze I began to flick the switch rapidly. As the buzzer continued to hum I used more force on the switch. I reached a stage of despair because I could not manage to turn off the buzzer. Finally I got angry with the alarm clock and decided to take the ultimate step to silence its buzzer: I removed the battery and lay back on my pillow to relax. The buzzer continued to hum away loudly. Panic overcame me and I imagined the men in the white coats arriving to deal with a buzzer that must obviously be inside my head.

I resisted the temptation to fling the battery-free clock against a wall to silence it; and whilst I did so my brain began to operate more effectively and I suddenly realised that the buzzing noise was not coming from the direction of the clock. After that realisation it did not take me long to discover that the buzz was coming from an Aqua-Alarm unit monitoring one of the tanks in the bedroom. The tank in question is situated below and beside a large window. The window was fitted with closed venetian blinds and drawn curtains. I glanced outside to see if it looked as cold as it felt inside. It was snowing. Obviously cold air from the inside of the window had flowed down past the blinds and curtains and had activated the Aqua-Alarm sensor/probe attached to the outside of the aquarium and set off the battery-operated buzzer—and tiny red light. I was glad that I had not demolished my alarm clock against a wall!

Recently, one afternoon, I was downstairs and heard the Aqua-Alarm buzzer buzzing. It was a warm, sunny day. I rushed upstairs to see what was amiss. The bright sun shining through the window was being reflected by a large



WHAT  
IS  
YOUR  
OPINION?

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

mirror onto the side of the tank on which the Aqua-Alarm sensor/probe is attached. The additional heat had set off the warning alarm buzzer and light.

These amusing examples show how sensitive the Aqua-Alarm sensor is. Fortunately, in neither case was the water in the aquarium at an unacceptable temperature. I'm prepared to accept the occasional false alarm in the knowledge that the alarm unit should not let me down if there is ever a real emergency when the tank over-heats or the heater fails and the tank temperature drops excessively.

In the February issue Mr. R. Newton, of 22 Howard Road, Arundel, West Sussex BN18 9EL, offered "Malayan sand-burrowing-snails" for sale. There was a little confusion about how he expressed the price. In a follow-up letter he says that he did not express his meaning too well. He says that he meant "5p for 30 snails, plus 20p postage and packing". He continues: "As a guide, it may interest you to know that 30 well-grown snails in a small, 35mm. film cannister are just inside the 15p first-class postage step; but I am fast running out of these containers. Anyone who wants snails should send me one of these containers—together with the appropriate amount of money." (It's encouraging to learn of a use to which empty 35mm. film cannisters can be

put—if one can get them open without breaking a fingernail. Those interested in obtaining snails should send container and payment direct to Mr. Newton, at his home. I hope he'll let us know how many readers send to him for snails. B.W.)

Mr. Dick Mills lives at 70 Lee Road, Greenford, Middlesex, UB6 7DB, and he is a man of many parts (Dick fixed it for me when I wanted to meet K9). As well as an author, Dick is also Editor of the *Bulletin* produced by the Federation of British Aquatic Societies; and he is a regular contributor to this feature. Writing about W.Y.O.? in his latest letter he says: "First of all, many congratulations on staying with it for 15 years! On behalf of all F.B.A.S. members may I thank you for your efforts to make the hobby's more mystical areas less opaque to the newcomers and to the old established hands who were afraid to ask; your open forum of personal experiences based on the adage 'a problem shared is a problem halved'—or a column written?—may be considered as more credible than the more often 'experts-write-back' type of thing where again the newcomer might fight shy of asking illustrious people for advice—although at the rate you're going you should almost be an expert yourself!" (My thanks to you and the F.B.A.S., Dick, for the kind comments and the congratulations. I've been keeping fish and plants for about 35 years, and I have been writing about them and photographing them for magazines for 18 years. I should imagine I have written between half and three-quarters of a million words about my favourite hobby. My dictionary states that an expert is 'a person who has special knowledge or training'. Perhaps I qualify—although I have the good sense to realise that I don't know all the answers, never mind all the questions. B.W.)

Mr. Mills continues his letter by saying: "I seem to remember that a little time ago you admitted to knowing hardly anything about koi—well, that's twice as much as me!—so I thought that you might

like a copy of our latest booklet on just that subject. You'll appreciate that we're quite proud of it as it is our first in colour; and it may help the fishkeeper to recognise some of the standard colour patterns.

"There's a new plant book just out—*The Complete Guide to Water Plants*—by Helmut Muhlberg, published by EP Publishing Ltd., Bradford Road, East Ardsley, Wakefield, West Yorkshire. If Mr. Perkins hasn't already farmed it out for review try and get it from him; I know you'll like it." (I haven't heard of the new book before. Perhaps I'll buy myself a copy—if it isn't too expensive.)

I am typing this on 26th April and I have just watched the first programme in the series *Fancy Fish*. It was called *Living Jewels* and dealt with various coldwater fish—including goldfish and koi. I found it quite interesting—although it annoyed me to see various people being interviewed without their names appearing at the bottom of the screen in caption form. One is used to seeing people's names on television during interviews. Some of the names credited at the end of the programme were Pamela and Roger Whittington, Dave Tisbury and Pauline and Ronald Seal. Frequently I've noticed Mr. Seal's name appearing in koi magazines. I was not surprised to note that the music accompanying the programme was the section 'Aquarium' from Saint-Saens 'Carnival of the Animals'; and that Peter Howell and friend Dick Mills provided the electronic version used. A gentleman, whose name I did not catch if it was mentioned, said that the three most popular hobbies, in order, are: golf; stamp collecting; and keeping fish. I gave up number one years ago because I seldom hit the ball; and I gave up number two very many years ago when my cub mistress took my stamp collection to see if it merited the award of a collector's badge and did not return my album. Perhaps it's worth a fortune now—wherever it is. I began to keep fish even longer ago and my interest still remains as fresh as ever.

Some of the coldwater fish shown

on the programme were rather revolting, e.g. the bubble-eyes; and I was surprised to see several people handle fish in their bare—if wet—hands. However, it is easy to be critical of anything. I enjoyed the programme and thought many of the koi shown were very beautiful. If I heard correctly, a top, award-winning, Japanese koi was said to be worth £27,000. A few of those would come in handy! I look forward to seeing the remaining programmes in the series *Fancy Fish* and congratulate those who managed to get our hobby some well-deserved time on television. I hope the series will be repeated on BBC1 at a later date to capture a larger audience.

The F.B.A.S. Booklet, *Nishiki Koi—National Show Fish Guides & Technical Information Booklet No. 13*, is an attractive publication consisting of 32 pages. It contains many coloured and black-and-white drawings and a lot of useful information—including an index of all those exotic names, e.g. Ki Utsuri means yellow on black, and Taisho Sanke red and black on white. F.B.A.S. *Bulletins*—winter 1982 (*sic*) and spring 1982—contain a variety of interesting information and articles. The book reviews are particularly useful; and I see that the previously-mentioned, new plant book costs £6.50. Mr. Mills is obviously a busy man. I do not know the price of the new koi booklet.

Those collecting information on bulb-life lengths in aquarium hoods may wish to add the following two figures for 40 watt pearl bulbs: Woolworth's—116 days; and Philips—40 days.

My thanks to the Coventry Pool & Aquarium Society for the latest issue of their *Newsletter*. This interesting, little publication is edited by Steve Brown and contains a dozen pages. I was interested to read an article about the advantages and disadvantages of small aquaria over larger aquaria. I should be pleased to hear what your opinion is on this topic. I must admit that I'm very fond of 18 in. × 10 in. × 10 in. decorative tanks.

I must thank Dr. Vivian De Thabrew for sending me a delightful selection of species of *Cryptocoryne*. I planted

the several dozens of plants in a couple of different tanks and will report on their progress in due course. I am amazed that none of the plants has lost its leaves after several weeks in my tanks. Please write to me if you have any views on the conditions that can cause *Cryptocoryne* plants to lose their leaves.

Mr. Bill Bradbury lives at 17 Stuart Avenue, Perth, Scotland. He says: "I have wanted to write to you for a number of years concerning our fascinating hobby but have felt rather ill equipped due to my lack of knowledge of the English language. Your being an English teacher makes it even more difficult. I am afraid that as a child I did not get a proper education as I was hardly ever at school. Many years later, however, I did try to atone for the lapse by attending evening classes at a college of technology. The subjects did not include English, though. They were: maths, chemistry and physics. May I be so bold then as to say that at least I am intelligent? Well, I hope so.

"Talking of knowledge, I remember as a junior member of a tropical fish club—or would you rather have aquarist society?—many years ago debating what it was necessary to know in order to keep tropical aquariums successfully. The comments went something like this: 'One needs to be an ichthyologist to keep abreast of new species and their requirements for breeding; also, fish diseases.' 'One needs to be a botanist and also have some knowledge of horticulture in order to grow aquatic plants successfully.' 'One needs to be a chemist in order to understand pH, hardness, the effects of metallic substances in water, etc. Water itself, being a chemical compound, requires knowledge of its unusual properties (*sic*).' 'One needs to be a biochemist to understand the implications of decaying organic matter in the aquarium and how to deal with it.' 'One needs to be a glazier, joiner, electrician and general handyman if one is to save money

by constructing one's own aquaria, hoods and so on.' 'One needs to be an entomologist in order to culture live foods.'

"I would wager that there is no other hobby in the world that requires so much knowledge and so many skills. Perhaps that is why I enjoy it. It's such a challenge! Don't you agree?"

"Still on the subject of knowledge, I remember in one of the rare periods when I attended school without a break my science master gave a lesson in which he described the axolotl and its peculiar life cycle. However, the most learned gentleman misnamed it as *Amphioxica*. My classmates and myself were indeed fortunate that I was reading my first aquarium book at the time and I lost no time in correcting the teacher.

"At about the same period of time the aforementioned science master gave an account of the liver fluke which, dare I say, was nearer to your description than a certain Mr. Belshaw's. Well, someone said in a previous issue of *The Aquarist* that it was a never-ending saga, so I might as well keep it going. Never let him forget it. . . .

"I think I had better conclude on that note; hope it isn't a sour one. Please feel free to correct my English as necessary. I am anxious to learn any knowledge—even English. I hope you will allow me to write to you again sometime in the future. P.S.—Although this letter isn't meant to be an advertisement for Tipp-Ex fluid, I find it very handy stuff. Hope you don't write too many (sic)!"

My pupils and I consume large quantities of Tipp-Ex, Mr. Bradbury. It's useful for typewriting, fountainpen ink and ballpoint ink—although not so good on red ballpoint ink when I try to correct my corrections of my pupil's errors. Your English is perfectly acceptable. Mine is quite acceptable too—and I am a former science master to boot. I met a former pupil recently and liked his term for a technical college. He called it the college of knowledge

which, if nothing else, is an example of assenance.

Some months ago I published the latest missive from Mr. L. Belshaw and included his comment about his opening a fish hospital—whatever that is. I asked for readers' comments. Mr. Jerzy B. Gawor, B.Sc., M.I.Biol., is one of the directors of AQUALITY Ltd., 137 Southwood Road, New Eltham, London SE9 3QS. He writes: ". . . I received my copy of *The Biologist*, the Journal of the Institute of Biology, and while going through it came upon the perfect answer to Mr. Belshaw's 'work'. Please read on. . . The Ministry of Agriculture, Fisheries and Food is considering proposals for amendments to the Veterinary Surgeons Act 1966 and has sent an outline of these to the Institute. Among the proposals is one to amend Section 27 of the Act on the following lines: It is proposed to include fish and amphibians in the definition of 'animals'. This is intended to promote the welfare of fish and amphibians by ensuring that health care is administered only by properly qualified persons. It is recognised that there are experts in fish health who are not veterinary surgeons and the position of these non-veterinary fish specialists would accordingly be protected by a specific exemption from the ban on practice by unqualified persons.'

"I think that this short, sharp answer is all that needs to be said about Mr. Belshaw. . . ."

Mr. Gawor continues with a different subject: ". . . Co-director Andrew Stagg, B.Sc., and I have just completed a series of coloured slides of a complete Laboratory/Fish Water Analysis together with notes. We are giving lectures on this subject to local clubs, but are also thinking about hiring the set to clubs around the country. What are your views on this. . . ?" (It seems a good idea to me because most of us live a long way from New Eltham. B.W.)

"In the March issue you published a photograph of a tank containing seaweed and asked those with experience of growing sea-

weed to pass on their information," writes Mr. M. Hurlie, of 60 Harborough Avenue, Sidcup, Kent. He continues: "From the photograph it appeared to be *Caulerpa prolifera* which I read is supposed to be the easiest species to cultivate. I managed to buy a batch for £2.00. The seaweed was placed in my 24 in. marine tank containing two yellow-tailed damsel fishes and three dancing shrimps. Imagine my despair when I discovered, the following morning, just a long stem with a couple of chewed leaves left attached to it. The culprit: one dancing shrimp which waved its feelers at me—probably in gratitude.

"I then separated the alga by a glass partition (sic), and I am pleased to report that there are three new leaves growing—so perhaps it will survive. It is interesting to note that I have two batches of another type of seaweed—which has feather-like fronds—which is completely ignored. I would recommend any marine aquarist to purchase some marine algae as they provide a restful colour to the almost-endless display of exotic colours seen in marine aquaria, however, I would recommend a weekly dose of a good brand of marine algae fertilizer—which is available commercially.

"I hope this letter is helpful to you and your readers. Congratulations to W.Y.O. on its 15th birthday."

Pair of Angels



THE AQUARIST



Cardinal Tetra



Scissortail



Glowlight *Hemigrammus erythrozonus*

The fish shown in the photographs are, in order, (1) a pair of angels; (2) a cardinal tetra; (3) a scissortail; and (4) a glowlight. I should be pleased to hear from you if you have bred or kept any of these species.

Miss Cheryl Girdler is 17 years old and resides at Ty-newydd, Nant-y-ffrith, Bwlchgwyn, Wrexham, Clwyd. She writes: "Just over a month ago I purchased a pair of rainbow cichlids—*Herocellapia multispinosa*—in excellent condition, from my local tropical fish dealer. This shop is not very big but I think it has a better selection of fish than some of the larger aquarist centres, and the quality is better. The male was about 5 in. and the female 4 in. long. I placed them in a 24 in. tank on their own. The temperature was 26-27°C and the tank was furnished with rocks and plants.

"I fed the fish on a lot of live foods, including earthworms and blood worms. About two weeks later I noticed the female looking very plump. The male started the courtship. The next morning both fish cleaned a flat rock vigorously. When I returned from college that evening the fish had spawned. The female hovered over the eggs and fanned fresh water over them. There seemed to be a lot of white eggs—which she removed. I noticed the male losing interest; he tried to attract the female from the eggs. The next day the eggs had been eaten. Much to my disappointment this happened again one week later. I was beginning to give up. Another week went by and they spawned again. I missed it but my mother watched the great event; she is now an avid aquarist after this experience.

"The fish seemed to take dummy runs over the flat stone before any eggs were released from the ovipositor; then the eggs came a few at a time and the male fertilized them. The fanning, by both parents, continued this time. Two days later I could see a dark shadow in the eggs; there hadn't been any white eggs. That evening the female turned black and I noticed that the rock was a mass

of quivering eggs. The male seemed to change, and he tried to eat them. Behind the male's back the female took the fry and placed them in a pit under the spawning rock. The male saw this and made for the rock; the female attacked him by hitting him in the side. At this point I took him out. The next morning I saw the female eat some fry: she seemed to be pining for the male. I took out the female and put her back with the male.

"The fry looked like a mass of vibrating jelly. The next day the eye pigment had formed and some of the fry were hanging from the weeds in bunches. Now the fry are free-swimming and accept Liquifry and small live foods. They are growing very rapidly. There's nothing more satisfying than seeing a tank full of young fish you have helped to spawn. It was well worth the wait. P.S. Once I wrote to you about the Japanese fountain plant. I sent you the actual plant that I propagated. I wonder, is it still alive?" (No; it did not survive. B.W.)

Mr. D. M. Armitage is an Associate of the Institute of Biology and his address is 2 Close End, Robert Road, Hedgerley, Bucks. He states: "First, thanks for publishing my earlier letter on anabantids. This drew forth several reactions from your readers, not least from the secretary of the newly-formed Anabantid Association; his address is 4 Nelson Avenue, Nelson Village, Cramlington, Northumberland.

"Fish genetics: While composing an article on the genetics of the three-spot gourami for the Anabantid Association's journal it occurred to me how little we know about this subject compared, for example, to bird fanciers. For instance, when the red variety of the dwarf gourami first appeared in a well-known fish emporium in Colnbrook there were only two very large males, about the size of thick-lipped gouramies, which I was assured were the first imported into the country. The

breeder was keeping their identity a secret, presumably to ensure high prices, and the importer was not even sure of the species. Neither was I.

"However, acting on a guess I bought the two for a price slightly less than the accumulated costs of Concorde, and with them a pair of ordinary female dwarf gouramies. Luckily the guess was correct and the new variety of dwarf gourami bred successfully—as did the offspring. The few fish I raised at the time were males and of the red variety and I wondered if the mutant gene could be dominant. However, bearing in mind the effects of differential mortality of the young this is unlikely. Today we have a blue variety of the dwarf gourami as well as the red and wild type; we also have a red form of the honey gourami. It would be very interesting to find out the genetics involved in these new varieties and, thereby, if undiscovered varieties still exist. One hopes the new Anabantid Association may investigate this area when it outgrows its infancy." (I have a red male and a blue male—and very attractive fish they are. B.W.)

That's this month's space filled. For a future W.Y.O.? please send me your opinion on any of the topics mentioned above; and on any of the following: (a) freeze-dried foods; (b) dried foods for special purposes, e.g. colour-producing foods; (c) cultivating *Hygrophila* species; (d) water changes; (e) cultivating *Echinodorus* (sword

plants); the cost of filter wool; (f) public aquaria; (g) cleaning power filters; (h) aquarium lighting for good plant growth; (i) breeding any barbs; (j) breeding tetras; and (k) your opinion of the TV series *Fancy Fish*. Please write to me. Best wishes until next month. I hope the summer weather when you read this will be as good as the April weather was during the time I took to write it.

## An Appreciation

Dear Mr. Editor,

Through the pages of your magazine I would like to heartily congratulate all the members of the trade and of the aquatic hobby, who took part in the recent 'BBC 2 Series of Fishkeeping'.

This was in my opinion, the best presentation that has ever appeared on National TV in the U.K., for the aquatic interest. The series was Serious, Interesting, and above all made people want to keep fish as a hobby.

Every member of the trade and the hobby will I am sure, join me in paying tribute to all our colleagues who did such a superb job, coming across as genuine people devoted to an interest, projecting a depth of knowledge and know-how. Whilst retaining an approachable and friendly manner.

Gentlemen, we cannot praise you highly enough,

Yours sincerely,

Keith Barraclough A.M.B.I.M.  
Managing Director.

(Keith Barraclough Aquarist Ltd)

## LIVE FOOD — "A 15p BAG OF TROUBLE?"

Any serious hobbyist will tell you how important it is to feed fish regularly on live food. Regrettably, they will probably also know that due to their origin (sewer outlets and stagnant ponds, etc.) certain live foods can carry very harmful diseases and parasites. A gamble one has to take! All that was before we came along with "Super Shrimp" (alias Artemia Brine Shrimp.) "Super Shrimp" is cultured in our laboratories under strict clinical conditions. They carry no disease,

are easily digested, and due to controlled feeding by us, they are up to three times as nutritious as any other live food. All fish, freshwater and marine, will readily accept Artemia costing from only 25 to 50p for a generous portion with 500-1,000 adult shrimps. Why settle for anything less. The next time you buy live food, don't take the gamble, don't buy a 15p bag of trouble, ask for "Super Shrimp" by name. You know it makes sense.

AQUA-LABS (SHRIMP FARMS), ESSEX. Tel: 0621 741966



I DON'T THINK I am alone in believing that the fishkeeping hobby sadly lacks a central entity of some kind to look after its general interests and to keep together a steady, indeed, growing, membership. It is quite true that most newcomers to fishkeeping separate into two main lines, namely those who are content with a modest tank or two to brighten up the home, and those who just like spending most of their spare time messing about with the bits and pieces. There are also those whose artistic instincts lead them towards the creation of decorative aquaria, which subjects are all too rarely seen by most members of the public. Although the fishkeeping press aims to create a community of interest within the scope of its pages, it can at best only maintain a readership, whilst it is a *membership* of something or the other which appears to be lacking.

This state of affairs puzzles and disappoints many people who would like to belong to something nationwide—as things are, there is just nothing to attract them. Or if there is, like *Nessie*, it is lying very low indeed. There will certainly be protests from those enthusiasts around the country who form the backbone of the

local clubs, but as these hard working individuals more or less carry much of the hobby on their shoulders already, is it not time for some more lofty organisation to pull together all those aspects which just get ignored today? This is not to suggest that the past was any better as, so far as I know, there never has been any national club which appealed to the ordinary aquarist: considering the number of people likely to be interested, this is quite astonishing.

#### High turnover

It probably also accounts for the high rate of turnover of practising aquarists, many of whom seem to lack just that little bit of cement in times of trouble necessary to keep them attached to the fraternity. The consequence of such a fragmented hobby has been the establishment of scores of local clubs up and down the country, a number of specialist societies dealing with specific families or groups of fish, and organisations like FBAS which do much but seem to ensure that their considerable light is well concealed beneath the proverbial bushel.

This is all a very great pity from the point of view of the very average person who wants to keep in touch with the annual trends and the new techniques, but not so very much more. The structure existing today is almost entirely based on competitiveness of one sort or another, with the notable exception of the specialist societies, some of which undertake important research and isolate a lot of original material which, unfortunately is not disseminated very far beyond an already initiated and converted membership. Thus after a few tentative visits to the local club and repeated table shows the potential life enthusiast drifts away to his community tank and may now finally succumb to the ultimate boredom of taped breakfast TV.

#### Yearbook?

I often wonder about the possibilities of a broadly based society of some sort with an annual Yearbook to keep the members together. The AA and the Royal National Rose Society, for example, publish excellent books of this sort, and in the latter case at any

rate a very high proportion of the membership have never been to a rose show, don't particularly want to go, and certainly never have any inclination to show a rose competitively. Yet they have the greatest possible affection for the flower and cheerfully pay their quite modest subscription every year. The publication of quarterly bulletins enable them to flay the trade if they feel so inclined, and they are encouraged to make their feelings known. Communication—ever important in any activity—is established and functions very well.

The Yearbook idea is a very valuable one. Into such a vehicle one can pack the sort of information which you can never quite find by looking through the press or some of the more useful books on the subject. Lists and addresses of suppliers of all the odd things would be included, together with the details of the specialist groups. The latter should be invited to forward papers for inclusion, not just recruiting matter, but research material capable of being understood by the average reader. I can recall an endless search a year or two ago for the address of the secretary of the Goldfish Society, who eventually helped me most generously over some manuscripts, but I could certainly have done with a Yearbook at that time to help shorten the hunt. And I suspect that many more fishkeepers who at present become frustrated by a lack of basic information would like some directory or annual to help them on their way, to supplement the more technical and immediate material contained in their monthly magazine.

Oddly, most of the demand seems to come from fishkeepers, and not from so many members of the trade. Herein probably lies the reason for much of the apathy, as I still hear retailers saying that they have no time for advertising—they can get along without it. In this day this sort of admission speaks for itself—those who utter such nonsense will surely fade away unmourned. With the rapid pace of modern life you are going to be unnoticed unless you place yourself squarely in the eye of the potential buyer—perhaps there is some common purpose in all this which can be exploited to a wider benefit.

# NEWS...



## SOUTH EAST



**Catfish Association Great Britain 1982 open show results:** *Bagridae*, The Jan Cup: 1, P. Scarr, E.K.A.S.G. (*Lelocassis stenosoma*); 2, D. Studdell, Abingdon (*Lelocassis stenosoma*); 3, H. Johnson, Hendon (*Mystus microstomus*); 4, M. Howells, E.L.A.P.A. (*Lelocassis stenosoma*). *Callichthyidae*, F & D Trophy: 1, A. Rowley, Portsmouth (*Dianema longibarbis*); 2, J. Rowney, Beclerthorpe (*Dianema longibarbis*); 3, J. Miles, C.A.G.B. (*Hoplosternum thoracatum*); 4, Tony and Dave, Sheaf Valley (*Hoplosternum pectorale*). *Doradidae*, J.C. Trophy: 1, D. Studdell (*Acanthodoras spinosissimus*); 2, T. Morris, C.A.G.B.N. Group (*Agostynus pectinifrons*); 3, M. Field, C.A.G.B. (*Grinodorus nigromaculatus*); 4, A. Brown (*Acanthodoras casapichuanus*). *Loricariidae*, Chairman's Cup: 1, W. Noble, Amersham (*Hypoclinemus punctatus*); 2, K. Bevan, Hastings (*Pectotia oligopoda*); 3 and 4, J. T. Morris, C.A.G.B.N. Group (*Otocinclus brachius*). *Mochloziidae*, Committee Cup: 1, G. Arnold, Havant (*Synodontis rugiflora*); 2, C. Coser, C.A.G.B. (*Synodontis waterloti*); 3, P. Burton and C. Leman, (*Synodontis waterloti*); 4, Tony and Dave (*Synodontis contractus*). *Pimelodidae*, Ben Martin Trophy: 1, A. Brown (*Pseudopimelodus zungari*); 2, Tony and Dave (*Microglanis iberingi*); 3, T. A. Dowell (*Pimelodus pictus*); 4, M. Field (*Microglanis iberingi*). *Schilbeidae & Siluridae*, Harlow Aquarist Supplies Trophy, Con Ted Cup: 1, Jim Handley, Portsmouth (*Entopomoxenus buffei*). A.O.S. Catfish, Gordon Howes Trophy: 1, D. Smith, Amersham (*Arius seimensii*); 2, J. T. Morris (*Agostynus*); 3 and 4, Mr. and Mrs. Chester, Bedford (*Polypterus coryphaena*). Best Catfish, Ivy Brown Trophy: 1, D. Smith (Class G); (*Arius seimensii*); 2, J. T. Morris Trophy, best Baiter: J. T. Morris (Class G); (*Agostynus*). *Mudfy* Trophy and J. Carney Trophy for best Catfish 12 in. or over: W. Noble (Class G); (*Hypoclinemus punctatus*). R.G. & J.C. Trophy: C. Corner (Class GM) (*Synodontis waterloti*). *Brochii*, The Bounty Cup: 1, Colin Sykes, Banbury (*Brochius splendens*); 2, H. Johnson (*Brochius splendens*); 3, W. A. Knight, Havant (*Brochius splendens*); 4, J. Rowney (*Brochius splendens*). *Corydoras* 57 mm and under, The Southview Trophy: 1, J. T. Morris (*Corydoras melano*); 2, A. Waller, S.I.A.D.A.S. (*Corydoras natus*); 3, P. Handley, Portsmouth (*Corydoras undulatus*); 4, J. Adams, Romford (*Corydoras natus*). *Corydoras* over 57 mm, May Trophy: 1, H. Smith, Sudbury (*Corydoras trilineatus*); 2, J. T. Morris (*Corydoras ornatus*); 3, J. T. Morris (*Corydoras leopardus*); 4, Colin Sykes (*Corydoras agassizii*). *Corydoras* Types, Brian Barrett Trophy: 1 and 2, Colin Sykes (*Corydoras* sp.); 3, J. Rowney (*Corydoras* sp.); 4, J. Adams (*Corydoras* sp.). Best *Corydoras* or *Brochii*, The Cruckbank Trophy: J. T. Morris (Class H); (*Corydoras melano*). A.O.S. Catfish Pairs, Old Nev's Trophy: 1, Colin Sykes (*Hoplosternum pectorale*); 2, F. Scarr, E.K.A.S.G. (*Lelocassis stenosoma*); 3, J. Ellis, E.K.A.S.G. (*Hoplosternum pectorale*). *Corydoras* & *Brochii* Pairs, Five Nev's Trophy: 1, H. Smith (*Corydoras pygmaeus*); 2, Colin Sykes (*Corydoras undulatus*); 3, Colin Sykes

# From Aquarists' Societies

(*Corydoras habroana*); 4, D. Studdell (*Corydoras pygmaeus*). Best Pair of Fish, G. Buzz Trophy: H. Smith (Class X); (*Corydoras pygmaeus*). A.O.S. Catfish Breeders, Frank Tomkins Trophy: 1, Bert Rogers, C.A.G.B. (*Sturisoma pinnatum*); 2, S. and J. Topping, C.A.G.B.N. Group (*Lophobrogus cyclophorus*); 3, D. Studdell (*Tayloriella acuta*); 4, D. Studdell (*Ancistrus* sp.). *Corydoras* & *Brochii* Breeders, Hendon Trophy: 1, J. T. Morris (*Corydoras bondi coppenmansii*); 2, J. T. Morris (*Corydoras natus*); 3, M. Kirkham, C.A.G.B. (*Corydoras pygmaeus*); 4, J. T. Morris (*Corydoras melanostomus brevirostris*). May Sunlife Trophy for Best Breeders Team: J. T. Morris (Class X); (*Corydoras bondi coppenmansii*). President's Choice Trophy: S. and J. Topping (Class X); (*Lophobrogus cyclophorus*). Special Class, Duvy Trophy: 1, A. Brown (*Hemiancistrus* sp.); 2, P. Handley (*Ampelisca* sp.); 3, Colin Sykes (*Anachanistrus* sp.); 4, Peter Wheeler, C.A.G.B. (*Diagra* sp.). Show Secretary's Choice: Colin Sykes (Class Sp) (*Anachanistrus* sp.). The Dennis King Trophy and the AQUARIST Gold Pin for Best Fish in Show was awarded to D. Smith of Amersham with an *Arius seimensii*.

**RESULTS of Southend, Leigh & D.A.S. open show, 1st May:** Class Ag. Furnished: 1, T. Waller; 2, P. Mills; 3, L. Somner; 4, E. May. Ak. Aquascopes: 1 and 2, P. Mills; 3, A. Waller; 4, P. Cos. R. Barber: 1 and 3, C. Tonna; 2, B. Witteridge; 4, J. Edwards. Ba. Barber: 1, A. Filbeson; 2 and 3, L. Somner; 4, D. and P. Lambert. C. Chacacias: 1, W. Hastings; 2, J. Edwards; 3, B. Witteridge; 4, A. Filbeson. Ca. Chacacias: 1, H. Smith; 2, J. Post; 3, Mr. Powell; 4, P. Ratcliffe. D. Cichlids: 1, T. Walewley; 2, D. Henman; 3, J. Rowney; 4, F. May. Db. Cichlids: 1, A. Fuller; 2, Mrs. D. Winder; 3 and 4, J. Rowney. Dg. Cichlids: 1, R. Thoday; 2, D. Henman; 3, A. Fuller; 4, R. Scovring. E. Labyrinth: 1, J. Edwards; 2, A. Hurd; 3, W. Hastings; 4, D. Ridgewell. Ea. Betta Splendens: 1, B. Witteridge; 2, Mr. Powell; 3, Mrs. E. May; 4, T. Laughlan. F. Killies: 1, M. Smith; 2, L. Harvey; 3, G. Chewright; 4, D. Newman. Fo. Killies: 1 and 4, A. Farrow; 2, C. Chewright; 3, P. Chapman. G. Catfish: 1, F. May; 2, J. Edwards; 3, R. Thoday; 4, D. Henman. H. Catfish: 1 and 2, J. Adams; 3 and 4, C. Tonna. I. Barbosus: 1, P. Ratcliffe; 2, J. Edwards; 3, W. Hastings; 4, P. Chapman. K. Danios/W.C.M.M.: 1, D. Millin; 2, W. Chapman; 3, M. Smith; 4, T. Laughlan. L. Loaches: 1 and 2, R. Thoday; 3, L. Somner; 4, B. Witteridge. M. A.O.S. (Eggs/over): 1 and 3, B. Witteridge; 2, Mrs. D. Winder; 4, W. Hastings. Ns-m. Pairs (Eggs/over): 1, Mrs. Hurd; 2, H. Smith; 3, T. Laughlan; 4, P. Ratcliffe. Ns-t. Pairs (Livebearers): 1, M. Clark; 2, F. Scarr; 3, D. and P. Lambert; 4, J. Edwards. O. Guppies (Male): 1 and 3, T. Laughlan; 2 and 4, P. Holding. P. Guppies (Female): 1, Mrs. J. Harrison; 2, W. Chapman; 3, D. Jones; 4, C. Tonna. Q. Niph. Belleri: 1, A. Cooper; 2, Mrs. F. Edwards; 3, W. Hastings; 4, K. Haines. R. Pines: 1, R. Light; 2, D. Newman; 3, C. Tonna; 4, H. Smith. S. Molies: 1, J. Smith; 2, Mrs. C. Smith; 3, A. Waller; 4, W. Hastings. T.A.O.S. (Livebearers): 1, F. Scarr; 2, P. Ratcliffe; 3, C. Tonna; 4, S. Fursewden. Ts. Guppies: 1 and 4, P. Mills; 2, F. Scarr; 3, J. Edwards. U. Single-tail Goldfish: 1 and 2, M. Danley; 3, D. Shiner; 4, Mrs. E. May. V. Tensai Goldfish: 1 and 4, D. Shiner; 2 and 3, K. Shiner. W. A.O.S. (Coldwater): 1, D. Hart; 2, M. Smith; 3, D. Henman; 4, C. Chewright. Wa. Koi: 1, R. Davis. Xs-m. Breeders (Eggs/over): 1, F. Scarr; 2, D. and P. Lambert; 3, K. Haines; 4, C. Chewright. XOs-a. Breeders (Livebearers): 1, A. Waller; 2, Mrs. P. Edwards; 3, R. Neale;

Monthly reports from Secretaries of aquarists societies for inclusion on this page should reach the Editor by 3rd of the month preceding the month of publication.

4, W. Chapman. Xt. Breeders (Livebearers): A.O.S.: 1, S. Fursewden; 2, D. and P. Lambert; 3, J. Edwards; 4, C. Tonna. Za. Cottings Floating plants: 1, P. Mills; 2, R. Davis; 3, K. Lambert; 4, Mrs. F. Edwards. Zc. Rooted plants: 1, K. Lambert; 2, P. Mills; 3, C. Chewright; 4, G. Rowney. B-M. Junior (Eggs/over): 1, Miss Bryson; 2, G. Rowney; 3, S. MacKenzie; 4, Miss C. Smith. O-T. Junior Livebearers: 1, S. MacKenzie; 2, G. Rowney; 3, M. Holmes. U-W. Junior Coldwater: 1, Miss Cartway; 2, R. Davis; 3, R. Howells; 4, S. MacKenzie. Best Fish and Best Exhibit and Best Coldwater: D. Hart, Waltham and Beatrix. A.S. with 1 Minnow and *Poecilia* pinnatus. Best Breeders: F. Scarr. Best Pair: Mrs. A. Hurd. Best Junior: Miss S. Bryson. Best Charac: W. Hastings. Best Livebearer: F. Scarr. Best Catfish: E. May. Highest number of silver stars (80 points or over): J. Edwards. Highest pointed Individual: P. Mills, Waltham and D.A.S. Highest pointed Society: Waltham and D.A.S. Highest pointed Southern member: A. Waller. Total number of entries were 692. Number of species exhibited 663.

THE change of venue to Belling Memorial Hall proved a great success for the East Kent Aquarist Study Group when they held their meeting on 11th May. Sixty-four aquarists attended to hear Mr. G. Holloway speak on "The Keeping of Tropical Marine Fish." The talk was very informative and the accompanying slides illustrated the sheer beauty of these colourful coral reef fish. Mr Holloway gave a step-by-step explanation of how to establish a marine tank in the home and pictures of his own tank demonstrated that his method works. The Table Show was judged by Mr. K. Beadle, who congratulated the exhibitors on the quality and presentation of the exhibits. He awarded cards as follows: Class L: 1, J. Edwards; 2, K. Piggot; 3, Mrs. P. Edwards; 4, Miss S. Edwards. Class M: 1, P. Gunell; 2, Mrs. F. Edwards; 3, C. J. Bridgman; 4, P. Sibly. The chairman was proud to show members the trophy which was presented to East Kent A.S.G. for obtaining highest pointed society at the Stour Valley Inter-Club Competition which was held at Sillinge Hall on 16th May. Five societies entered the competition which resulted: East Kent A.S.G. (39 points), Ashford A.S. (35), Folkestone A.S. (30), Deal A.S. (13); Canterbury A.D.A.S. (3). Twelve members of this Society entered the 16 classes and took 18 cards, including five first places. The address of the new hall is: The Memorial Hall, Ryeview Road, Belling, Kent, where meetings are held on the second Tuesday of each month. All visitors can be sure of a warm welcome.

## SOUTH WEST



DOUG PAUL, speaking to Bristol A.S., started with a look back at folkkeeping twenty years ago and recalled the destruction caused in those days by Gill Flukes, a thing which today is scarcely mentioned. Discussing Axolotls, he intrigued members with his stories about these Mexican oddities. Remarkably they can reproduce both in the larval and adult form. They can regenerate lost parts, though sometimes they produce a front leg instead of a new back one, but always on the damaged side. They seem to be mainly nocturnal and do most of their feeding at night. They also seem to do



better with some vegetation in their tanks. Doug keeps both Black and White Anabits and brought along an extremely rare, if not unique, variegated specimen. Table Show Results: Fantails: 1, Vic Capaldi. Shubunkins: 1, D. Paul.

## MIDLANDS AND WALES



**RESULTS of Kettering A.S. open show held on 18th April, at the Boy's School, Windmill Avenue, Kettering:** Class B: 1, D. Cruckshank (Halesowen); 2, R. Stanforth (Kettering); 3, A. J. Hoise (Halesowen); 4, C. Richards (Sudbury). C: 1, R. Hastings (Selas); 2, B. Witteridge (Sudbury); 3, C. Richards; 4, M. and R. Coe (Wellingtonborough). Cat: 1, C. Richards; 2 and 3, R. Smith (Leicester); 4, P. Coe (Walthamstow). Cb: 1, E. Davies (Corby); 2, M. Henderson (Corby); 3, J. Rowney (Bewley Heath); 4, J. Richards (Leicester). D: 1, R. Hastings; 2, W. Crumpton; 3, J. Rowney; 4, C. Wright (Kettering). Da: 1, S. Vickers (Kettering); 2, N. Craddock (Kettering); 3, A. J. Hoise (Halesowen); 4, M. Hancock (Sudbury). Db: 1 and 3, C. Richards; 2, R. Stanforth; 4, G. Crumpton (Halesowen). Dc: 1, M. Sush (Kettering); 2 and 4, M. Laws (King's Lynn); 3, C. Swan (N.A.D.A.S.). E: 1, C. Richards; 2, P. Bradley (Kettering); 3, W. and M. Rodger (Loughborough); 4, R. Hastings (Selas). Ea: 1, T. Ward (Wellingtonborough); 2, B. Witteridge; 3, N. Boon (Leicester); 4, C. Richards. F: 1, 2 and 3, H. Johnson (Hindon); 4, G. Crumpton (Halesowen). G: 1, P. Burton; 2, H. Johnson; 3, J. Geary (King's Lynn); 4, D. Cruckshank. H: 1, J. Rowney; 2, B. Hastings; 3, H. Johnson; 4, J. Sheppard (Kettering). J: 1, B. Witteridge; 2 and 4, A. Brown (Bedford); 3, E. Davies (Corby). K: 1, B. Hastings; 2, R. Smith; 3, M. Wilkes (Banbury); 4, A. Brown. L: 1, and 2, C. Richards; 3, G. Crumpton; 4, K. J. Oakley (Leicester). M: 1 and 4, E. Davies; 2, B. Witteridge; 3, A. Jennings (Spetchley). N: on: 1, H. Sherriff; 2, J. Richards; 3, K. Haines (Spetchley); 4, B. Hastings. No: 1, W. Rodger (Loughborough); 2, S. Fursdon (Walthamstow); 3, B. Hastings; 4, W. Crumpton (Halesowen). O: 1, F. Chapman (London Transport); 2 and 3, T. Laboun (Newham); 4, R. Smith. P: 1, R. Stanforth; 2, J. Rowney; 3, N. Craddock; 4, T. Ward (Wellingtonborough). Q: 1, B. Hastings; 2, K. Haines; 3, N. Craddock; 4, A. Fox (Kettering). R: 1, F. Chapman; 2, K. Haines; 3, A. Fox; 4, K. Bryan (Kettering). S: 1, K. Rodger (Loughborough); 2, K. Haines; 3, W. Rodger; 4, B. Hastings. T: 1 and 4, S. Fursdon; 2, M. Craddock; 3, D. and P. Lambert (Kingston). U: 1, R. Wilkinson (B.C.A.); 2, S. Vickers; 3, W. Crumpton; 4, G. Packer (Wellingtonborough). V: 1 and 3, A. Barton (Wellingtonborough); 2, D. and P. Lambert; 4, F. Chapman. W: 1, A. Barton; 2 and 3, F. Chapman; 4, G. Crumpton. X: on: 1 and 3, G. Crumpton; 2, D. and P. Lambert; 4, K. Browner (Bedford). Xc: 1, S. Fursdon; 2, 3 and 4, D. and P. Lambert. Best Fish in Show: E. Davies, Class Cb.

## NORTH



**RESULTS of the Macclesfield A.S. open show held on 9th May at Ryles Park County School, Ryles Park Road, Macclesfield, Cheshire.** The total entry of fish was 386. The Best Fish in Show was a small cichlid with 79 points owned by Mr. and Mrs. Underwood (Bridgewater). Guppies: 1 and 2, A. Massey (Ind.); 3, N. Turner (Buxton). Platies: 1, J. and K. Corbett (Merseyside); 2, R. and I. Payne (Merseyside); 3, A. and E. Berry (Bridgewater); Swordtails: 1, C. Billings (Ind.); 2, J. Lynch (Merseyside); 3, S. Whiting (Ind.). Mollies: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, Mr. and Mrs. Whittaker (Sandgrounders); 3, J. Kidd (Macclesfield). A.O.V. Livebearers: 1, K. Buckley (Bridgewater); 2, N. D. Hartley (Sandgrounders); 3, Miss J. Baldwin (Sandgrounders). Smil. Anabantids up to 5 cm.: 1, M. and D. Hartley; 2, D. Armit (Buxton); 3, K. Buckley. Lge. Anabantids over 5 cm.: 1, Mr. and Mrs. Underwood (Bridgewater); 2, Master P. Underwood (Bridgewater); 3, M. and D. Hartley. Fighters: 1, J. and K. Corbett (Merseyside); 2, A. M. Redman (Blackpool); 3, C. Billing (Ind.). Smil. Cichlids up to 10 cm.: 1 and 3, Mr. and Mrs. Underwood; 2, D. Armit (Buxton). Lge. Cichlids over 10 cm.: 1 and 2, Mr. and Mrs. Underwood; 3, R. Jennings (North Staffs.). Angels: 1 and 2, Mr. and Mrs. Stevenson (Oldham); 3, Mr. and Mrs. Slater (Blackpool). Rift Valley: 1, Mr. and Mrs. Waterhouse (Merseyside); 2, Mr. and Mrs. Eatenough (Sandgrounders); 3, Mr. and Mrs. Baldwin (Sandgrounders). Smil. Barb up to 7.5 cm.: 1, Mr. and Mrs. Jennings; 2, Mr. and Mrs. Waterhouse; 3, Mr. and Mrs. A. Goddard (Macclesfield). Lge. Barb over 7.5 cm.: 1, Mr. and Mrs. Stevenson; 2, R. and D. Parr (Hyde); 3, A. and F. G. Fair (North Staffs.). Smil. Characins up to 5 cm.: 1, Mr. and Mrs. Mullis (Merseyside); 2, Mrs. A. Cook (Buxton); 3, Mr. and Mrs. Walsh (Darwin). Med. Characins up to 12 cm.: 1, P. Slater (Blackpool); 2, Mr. and Mrs. Walsh (Darwin); 3, R. and S. Parr. Lge. Characins over 12 cm.: 1, R. I. Payne (Merseyside); 2, Mr. and Mrs. Daniels (Blackpool); 3, A. and E. G. Fair. Toothcup Top Spawning: 1, R. Skellock (Oldham); 2, K. Buckley; 3, M. Agnew (Buxton). Toothcup: 1, Mr. and Mrs. Mullis; 2, L. Whittaker (Macclesfield); 3, Mr. and Mrs. Baldwin (Sandgrounders). Rainbow: 1, Mr. and Mrs. Mullis; 2, Mr. and Mrs. Stevenson; 3, D. Armit (Buxton). Corydoras and Brochis: 1, Mr. and Mrs. Mullis; 2, S. Waterhouse (Merseyside); 3, Mr. and Mrs. Kenyon (Sandgrounders). A.O.V. Catfish: 1, Mr. and Mrs. Waterhouse; 2, Mr. and Mrs. Underwood; 3, K. Buckley. Loaches: 1, Mr. and Mrs. Underwood; 2, Mr. and Mrs. Baldwin; 3, B. Barrow (Stratford). Sharks: 1 and 2, Mr. and Mrs. Underwood; 3, Mr. and Mrs. Baldwin. Flying Foxes: 1, Mr. and Mrs. Stevenson; 2, B. Evans (North Staffs.); 3, K. Buckley. Breeders (Egglayers) A and B: 1, J. T. Morris (Sandgrounders); 2, K. Buckley; 3, J. T. Morris (Sandgrounders). Breeders (Egglayers) C and D: 1, K. Buckley; 2 and 3, D. Milner (Darwin). Breeders (Livebearers) A and B: 1, K. Buckley. Breeders (Livebearers) C and D: 1, A. and E. Berry (Bridgewater); 2, K. Buckley; 3, P. Slater (Blackpool). True Pairs (Egglayers): 1, K. Buckley; 2, J. T. Morris; 3, Mr. and Mrs. Underwood. True Pairs (Livebearers): 1, E. and B. Callow (Bridgewater); 2, J. and K. Corbett (Merseyside); 3, N. and M. Rimner (Sandgrounders). A.O.V. L.M. and D. Hartley (Sandgrounders); 2, Mr. and Mrs. Baldwin; 3, J. Farrier (St. Helens). Goldfish and Comets: 1, Mr. and Mrs. Underwood; 2, P. Slater (Blackpool); 3, Mr. and Mrs. Colley (Oldham). Shubunkin: 1, A. E. Berry (Bridgewater); 2, J. Lynch (Merseyside); 3, Miss A. Stevenson (Oldham). Moons: 1 and 2, Mr. and Mrs. Finney (Macclesfield); 3, Mr. and Mrs. Colley (Oldham). Fantail: 1 and 2, Mr. and Mrs. Underwood; 3, J. Lynch (Merseyside). A.O.V. Fancy Goldfish: 1, Mr. and Mrs. Colley; 2 and 3, Mr. and Mrs. Finney. A.O.V. Coldwater: 1 and 2, A. and E. Berry; 3, Mr. and Mrs. Eatenough.

**RESULTS of the Accrington & District A.S. open show held on 16th May, which attracted over 500 entries.** The Best Fish in the Show was a Rift Valley Cichlid (*Haplochromis fasciatus*), owned by Mr. and Mrs. A. Waterhouse of Merseyside Society. Guppies: 1, Mr. and Mrs. Slater (Blackpool); 2 and 3, A. Massey (Ind.). Platies: 1, M. and J. Crocker (Nelson); 2, R. I. Payne (Merseyside); 3, P. Graham (Nelson). Swordtail: 1, Miss S. Jones (St. Helens); 2, S. Whiting (Ind.); 3, B. W. Carter (St. Helens). Mollies: 1 and 2, M. and I. Crowther; 3, P. Graham. A.O.V. Livebearers: 1, A. and E. Berry (Bridgewater); 2, M. and N. Rimner (Sandgrounders); 3, Master D. Hartley (Sandgrounders). Small Characins: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, R. and H. Johnson (Ponson); 3, K. Buckley (Bridgewater). Large Characins: 1, Mr. and Mrs. Eatenough (Sandgrounders); 2, Mr. and Mrs. Underwood (Bridgewater); 3, Paul Slater (Blackpool). Small Cichlids: 1, 2 and 3, Mr. and Mrs. Underwood. Large Cichlids: 1 and 3, Mr. and Mrs. Underwood; 2, Mr. and Mrs. Baldwin. Rift Valley Cichlids: 1 and 2, Mr. and Mrs. Waterhouse (Merseyside); 3, Mr. and Mrs. Eatenough. Angels: 1, Mr. and Mrs. Stevenson (Oldham); 2, W. and D. Hoare (Oldham); 3, Miss S. Holding (Accrington). Small Barb: 1 and 3, Mr. and Mrs. Waterhouse; 2, D. Milner (Darwin). Large Barb: 1, Mr. and Mrs. Stevenson; 2, R. Skellock (Oldham); 3, Mr. and Mrs. Baldwin. Toothcup: 1, R. Skellock; 2 and 3, K. Buckley. Rift Valley: 1 and 2, B. Drake (Atherton N.W.). A.O.V.: 1, R. Skellock; 2 and 3, J. Roberts (Nelson). Barbora: 1, K. Buckley; 2, Mr. and Mrs. Stevenson; 3, D. Armit (Buxton). Danas: 1, J. Roberts (Nelson); 2, A. Hughes (Skelmersdale); 3, Mr. and Mrs. Baldwin (Mosses). 1, Mr. and Mrs. Underwood; 2, S. Swift (Buxton); 3, Mr. and Mrs. Baldwin. Sharks: 1 and 3, Mr. and Mrs. Underwood; 2, Mr. and Mrs. Baldwin. Pairs (Egglayers): 1, Mr. and Mrs. Stevenson; 2, H. Hughes (Darwin); 3, W. and D. Hoare (Ind.). Fighters: 1, A. M. Rodman (Blackpool); 2, J. and K. Corbett (Merseyside); 3, Miss S. Jones (St. Helens). Small Anabantids: 1, D. Armit; 2, K. Buckley; 3, M. Hartley (Sandgrounders). Large Anabantids: 1 and 2, Mr. and Mrs. Underwood; 3, M. Hartley (Sandgrounders). Corydoras and Brochis: 1, J. T. Morris (Sandgrounders); 2, Mr. and Mrs. Baldwin; 3, J. Lynch (Merseyside). A.O.V. Catfish: 1, J. T. Morris; 2, Mr. and Mrs. Waterhouse; 3, B. W. Carter. Loaches and Bettas: 1, Mr. and Mrs. Underwood; 2, Mr. and Mrs. Stevenson; 3, Mr. and Mrs. Baldwin. Pairs (Livebearers) C and D: 1, A. and E. Berry (Bridgewater); 2, M. and I. Crowther (Nelson); 3, R. I. Payne (Merseyside). Breeders (Egglayers) A and B: 1 and 3, J. T. Morris; 2, K. Buckley. Breeders (Egglayers) C and D: 1, J. T. Morris; 2, D. Milner (Darwin); 3, B. Drake (Atherton N.W.). A.O.V. Tropical: 1 and 2, Mr. and Mrs. Baldwin; 3, A. and E. Berry. A.V. Marine: 1, 2 and 3, B. Leyland (St. Helens). Junior A.V.: 1, Master P. Underwood (Bridgewater); 2 and 3, Miss J. Baldwin (Sandgrounders). Mini Jar: 1, Mr. and Mrs. White (Barry); 2 and 3, Mr. and Mrs. Stevenson (Oldham). Ladies A.V.: 1, Mrs. Baldwin (Sandgrounders); 2, Janice Bellamy; 3, A. Massey (Ind.). Common Goldfish and Comets: 1, Mr. and Mrs. Underwood; 2, Paul Slater (Blackpool); 3, S. Walsh (Accrington). Moons: 1, G. Whitley (Accrington); 2 and 3, C. Walbank (Accrington). Shubunkins: 1, P. Foote (Accrington); 2, A. and E. Berry; 3, J. Lynch (Merseyside). Fantails: 1, S. Holding (Accrington); 2, C. Whitley (Accrington); 3, J. Lynch (Accrington). Catfish: 1, C. Walbank (Accrington); 2, Mr. and Mrs. Slater (Blackpool); 3, C. Whitley. Fantails: 1 and 2, Mr. and Mrs. Underwood; 3, C. Whitley. Lionheads: 1 and 2, Mr. and Mrs. Hindle (Accrington); 3, Mr. and Mrs. Colley (Oldham). Grandas: 1 and 2, Mr. and Mrs. Hindle (Accrington); 3, S. Holding (Accrington). A.O.V. Fancy Goldwater: 1, Mr. and Mrs. Colley (Oldham); 2, Mr. and Mrs. Hindle (Accrington); 3, C. Whitley. A.O.V. Coldwater: 1 and 2, A. and E. Berry; 3, S. Walsh (Accrington).

**RESULTS of the B.I.M.B.I. A.S. open show held on 2nd May:** Class Dc: 1 and 4, C. A. Evans (Bilbrough); 2, Mr. and Mrs. Jennings (Ind.); 3, C. March (N. Arcliffe). Dc: 1, G. Brington (Stanley); 2, D. Clark (Hexham); 3, D. Hodgson (Stanley). Eg: 1, T. Jaynes (Bishop Auckland); 4, A. Scott (Bishop Auckland); 5, P. Bowdler (Throckley); 7, J. Brady (BIMBI); 3, R. Pascott (Ind.);

1, Miss S. Jones (St. Helens); 2, S. Whiting (Ind.); 3, B. W. Carter (St. Helens). Mollies: 1 and 2, M. and I. Crowther; 3, P. Graham. A.O.V. Livebearers: 1, A. and E. Berry (Bridgewater); 2, M. and N. Rimner (Sandgrounders); 3, Master D. Hartley (Sandgrounders). Small Characins: 1, Mr. and Mrs. Baldwin (Sandgrounders); 2, R. and H. Johnson (Ponson); 3, K. Buckley (Bridgewater). Large Characins: 1, Mr. and Mrs. Eatenough (Sandgrounders); 2, Mr. and Mrs. Underwood (Bridgewater); 3, Paul Slater (Blackpool). Small Cichlids: 1, 2 and 3, Mr. and Mrs. Underwood. Large Cichlids: 1 and 3, Mr. and Mrs. Underwood; 2, Mr. and Mrs. Baldwin. Rift Valley Cichlids: 1 and 2, Mr. and Mrs. Waterhouse (Merseyside); 3, Mr. and Mrs. Eatenough. Angels: 1, Mr. and Mrs. Stevenson (Oldham); 2, W. and D. Hoare (Oldham); 3, Miss S. Holding (Accrington). Small Barb: 1 and 3, Mr. and Mrs. Waterhouse; 2, D. Milner (Darwin). Large Barb: 1, Mr. and Mrs. Stevenson; 2, R. Skellock (Oldham); 3, Mr. and Mrs. Baldwin. Toothcup: 1, R. Skellock; 2 and 3, K. Buckley. Rift Valley: 1 and 2, B. Drake (Atherton N.W.). A.O.V.: 1, R. Skellock; 2 and 3, J. Roberts (Nelson). Barbora: 1, K. Buckley; 2, Mr. and Mrs. Stevenson; 3, D. Armit (Buxton). Danas: 1, J. Roberts (Nelson); 2, A. Hughes (Skelmersdale); 3, Mr. and Mrs. Baldwin (Mosses). 1, Mr. and Mrs. Underwood; 2, S. Swift (Buxton); 3, Mr. and Mrs. Baldwin. Sharks: 1 and 3, Mr. and Mrs. Underwood; 2, Mr. and Mrs. Baldwin. Pairs (Egglayers): 1, Mr. and Mrs. Stevenson; 2, H. Hughes (Darwin); 3, W. and D. Hoare (Ind.). Fighters: 1, A. M. Rodman (Blackpool); 2, J. and K. Corbett (Merseyside); 3, Miss S. Jones (St. Helens). Small Anabantids: 1, D. Armit; 2, K. Buckley; 3, M. Hartley (Sandgrounders). Large Anabantids: 1 and 2, Mr. and Mrs. Underwood; 3, M. Hartley (Sandgrounders). Corydoras and Brochis: 1, J. T. Morris (Sandgrounders); 2, Mr. and Mrs. Baldwin; 3, J. Lynch (Merseyside). A.O.V. Catfish: 1, J. T. Morris; 2, Mr. and Mrs. Waterhouse; 3, B. W. Carter. Loaches and Bettas: 1, Mr. and Mrs. Underwood; 2, Mr. and Mrs. Stevenson; 3, Mr. and Mrs. Baldwin. Pairs (Livebearers) C and D: 1, A. and E. Berry (Bridgewater); 2, M. and I. Crowther (Nelson); 3, R. I. Payne (Merseyside). Breeders (Egglayers) A and B: 1 and 3, J. T. Morris; 2, K. Buckley. Breeders (Egglayers) C and D: 1, J. T. Morris; 2, D. Milner (Darwin); 3, B. Drake (Atherton N.W.). A.O.V. Tropical: 1 and 2, Mr. and Mrs. Baldwin; 3, A. and E. Berry. A.V. Marine: 1, 2 and 3, B. Leyland (St. Helens). Junior A.V.: 1, Master P. Underwood (Bridgewater); 2 and 3, Miss J. Baldwin (Sandgrounders). Mini Jar: 1, Mr. and Mrs. White (Barry); 2 and 3, Mr. and Mrs. Stevenson (Oldham). Ladies A.V.: 1, Mrs. Baldwin (Sandgrounders); 2, Janice Bellamy; 3, A. Massey (Ind.). Common Goldfish and Comets: 1, Mr. and Mrs. Underwood; 2, Paul Slater (Blackpool); 3, S. Walsh (Accrington). Moons: 1, G. Whitley (Accrington); 2 and 3, C. Walbank (Accrington). Shubunkins: 1, P. Foote (Accrington); 2, A. and E. Berry; 3, J. Lynch (Merseyside). Fantails: 1, S. Holding (Accrington); 2, C. Whitley (Accrington); 3, J. Lynch (Accrington). Catfish: 1, C. Walbank (Accrington); 2, Mr. and Mrs. Slater (Blackpool); 3, C. Whitley. Fantails: 1 and 2, Mr. and Mrs. Underwood; 3, C. Whitley. Lionheads: 1 and 2, Mr. and Mrs. Hindle (Accrington); 3, Mr. and Mrs. Colley (Oldham). Grandas: 1 and 2, Mr. and Mrs. Hindle (Accrington); 3, S. Holding (Accrington). A.O.V. Fancy Goldwater: 1, Mr. and Mrs. Colley (Oldham); 2, Mr. and Mrs. Hindle (Accrington); 3, C. Whitley. A.O.V. Coldwater: 1 and 2, A. and E. Berry; 3, S. Walsh (Accrington).

**RESULTS of the B.I.M.B.I. A.S. open show held on 2nd May:** Class Dc: 1 and 4, C. A. Evans (Bilbrough); 2, Mr. and Mrs. Jennings (Ind.); 3, C. March (N. Arcliffe). Dc: 1, G. Brington (Stanley); 2, D. Clark (Hexham); 3, D. Hodgson (Stanley). Eg: 1, T. Jaynes (Bishop Auckland); 4, A. Scott (Bishop Auckland); 5, P. Bowdler (Throckley); 7, J. Brady (BIMBI); 3, R. Pascott (Ind.);

4, D. Dawson (Ind.); F: 1 and 2, T. Seyers; 3, S. Osborough (Notts); 4, D. Hodgson; G: 1, F. Bell (Stanley); 2, N. Wood (Bridley); 3, A. Scott; 4, K. Pearson (Sunderland); H: 1, S. Kelly (N. Aycliffe); 2, D. Dawson (Stanley); 3, P. Blackburn (Throckley); 4, R. and M. Hepton (Sunderland); J: 1, J. Middlemas (Stanley); 2, A. Venes (Throckley); 3, Mr. and Mrs. Roe (Bishop Auckland); 4, A. Richardson (Gh. Forrester); K: 1, S. Kelly; 2, D. Dawson; 3, D. Clark (Hexham); 4, D. Russell (Stanley); L: 1, J. Brady; 2, R. and S. Kirkup (Caer Urf); 3, D. Turnbull (Ind.); 4, F. Bell; M: 1, J. Greer (Gh. Forrester); 2, S. D. Smith (Ind.); 3, Mr. and Mrs. Roe; 4, P. Thompson (BIMBI); N: 1, F. Bell; 2, R. and S. Kirkup; 3, D. Corran (N. Aycliffe); 4, D. Turnbull; N-n: 1, Mr. and Mrs. Roe; 2, F. Bell; 3, Mrs. Lakay (Throckley); 4, R. and S. Kirkup; No-r: 1, J. W. Johnstone (NGLS); 2, A. H. Maw (S. Shields); 3, R. and M. Hepton (Sunderland); 4, Mr. and Mrs. Barrow (Caer Urf); O: 1, C. Smith (Hexham); 2, T. Seyers (Stanley); 3, L. Burdus (Hexham); 4, C. Chisholm (Ind.); P: 1, Mr. and Mrs. Roe (Bishop Auckland); 2, J. Middlemas (Stanley); 3, R. Williamson (Caer Urf); 4, R. and M. Hapton (Sunderland); Q: 1, D. Russell (Stanley); 2 and 3, N. Foster (Bishop Auckland); 4, D. Grimes (Ind.); R: 1, D. Hodgson; 2, F. Riley (Stockton); 3, Mr. and Mrs. Roe; 4, D. Russell; S: 1, C. Smith; 2, Mr. and Mrs. Roe; 3, D. Nightingale (Caer Urf); 4, W. Hornsby (Bishop Auckland); T: 1, F. Bell (Stanley); 2, J. Hunter (Hebburn); 3, J. W. Johnstone (NGLS); 4, A. H. Maw (S. Shields); U: 1, A. Fidler (Bishop Auckland); 2, J. Brady (BIMBI); 3, R. Williamson (Caer Urf); 4, Mr. and Mrs. Roe; V: 1, J. Hunter; 2, D. Grimes; W: 1 and 3, Mr. and Mrs. Barrow (Caer Urf); 2, J. Hunter; 4, Mr. and Mrs. Roe; X-n: 1, F. Bell; 2, R. and S. Kirkup; 3, A. H. Maw; 4, Mr. and Mrs. Jennings (Ind.); X-r: 1, T. Seyers; 2, F. Bell (Stanley); 3, Mrs. Ormsby (Sunderland); 4, Mr. and Mrs. Roe.

**RESULTS of 7th annual open show of Whitley A District A.S. held on 2nd May, at the Spa Pavilion, Whitley, Berbs (Large):** 1, D. Anderson (Whitley); 2, G. McLaren (Whitley); Berbs (Small): 1, 3 and 4, G. McLaren; 2, Mr. and Mrs. Forbes (Whitley); Small Characins: 1, M. Graham (Redcar); 2, W. Sowersby (Scarborough); 3, D. Wilson (Ind.); 4, P. Diddot (Whitley); Nannostomus and Poeciliobryon: 1, J. and P. Duffill (Redcar); 2 and 4, W. Sowersby; 3, A. and I. Bowman (Whitley); Large Characins: 1, Mr. Stirling (Redcar); 2, J. Priestly (Stanley); 3, J. and P. Duffill; 4, W. D. Sturdy (Redcar); Anguis: 1, Mr. Stirling; 2, Mr. and Mrs. Hind (York); 3, Hodgson & Jackson (Darfield); 4, M. Gibson (Whitley); Dwarf Cichlids: 1, Mr. Stirling; 2, B. Howgate (Stanley); 3, S. and N. Burgess (Whitley); 4, G. McLaren; Rift Valley Cichlids: 1, J. Robertson (Redcar); 2, Mr. and Mrs. Gowland (Newton Aycliffe); 3, J. Watson (Hartlepool); 4, R. Lacey (Redcar); Cichlids (Large): 1 and 3, A. Mason (Whitley); 2, A. and J. Bowman; 4, Mr. and Mrs. Gowland; Betta Splendens: 1, Mrs. S. Sowersby (Scarborough); 2, G. Taylor (Whitley); 3, Mr. Houston (Scarborough); 4, J. and P. Duffill; A.O.V. Labryinth: 1, Mr. Robson (Darlington); 2, A. and J. Bowman; 3, H. Hargreaves (Stanley); 4, R. Bell (Houghton); E.L.T.C.: 1, H. Hargreaves; 2, Mrs. S. Sowersby; 3, S. Tipper (Ind.); 4, Mr. Maxwell (York); Tropical Catfish: 1, Mr. Stirling; 2, Mr. and Mrs. Walters (Redcar); 3, F. W. Parker (Redcar); 4, Hodgson and Jackson; Corydoras and Brochis: 1 and 2, Lynn Emberton (Anfield Plain); 3, Mrs. Armstrong (Anfield); 4, G. Taylor; Rasbora: 1, T. Wilson (Whitley); 2, G. Taylor; 3, S. and N. Burgess; 4, B. Lacey; Dania and W.C.M.M.: 1, G. R. Seyers (Anfield Plain); 2, S. Riley (Anfield Plain); 3, J. Chapman (Darlington); 4, S. Unsworth (Ind.); Loach: 1, H. Hargreaves; 2, S. Riley; 3, M. Gibson (Whitley); 4, B. Lacey; Labo: 1, J. and L. Wilson (Redcar); 2, F. Wilson; 3, A. Atkinson (Redcar); 4, S. Riley; A.O.S. Egg (Tropical): 1, J. Watson (Hartlepool); 2, Mr. Marshall (Redcar); 3, Hodgson and Jackson; 4, J. Chapman; Pais (Egg-layers): 1, S. Riley; 2, W. Sowersby; 3, R. Bell (Houghton); 4, S. and N. Burgess (Whitley); Pais (Livebearers): 1, Mr. and Mrs. Heron (Anfield Plain); 2, W. Sowersby; 3, J. Chapman; 4, L. Gray (Billingham); Guppy (Male): 1 and 2, Mr. and Mrs. Clark

(South Shields); 3, G. R. Seyers; Guppy (Female): 1, R. Bell; 2 and 4, M. Graham (Redcar); 3, A. Mason (Whitley); Swordtails: 1 and 2, Mr. Dearing (York); 3, Mr. Houston; 4, S. and N. Burgess; Fry: 1, P. Riley (Stockton); 2, G. Taylor (Whitley); 3, E. Harridge (Whitley); 4, J. Chapman (Darlington); Molly: 1, Mr. Dearing; 2, B. Atkinson (Anfield Plain); 3, S. Kendal (Anfield Plain); A.O.S. (Livebearer): 1 and 2, J. Chapman (Darlington); 3, A. Mason; 4, W. Sowersby; Single Tail Goldfish: 1, Mr. Dearing; 2, A. Stockley (Bishop Auckland); 3, A. and J. Bowman; 4, R. Bell; Twin Tail Goldfish: 1 and 2, A. Stockley (Bishop Auckland); 3, Mr. Herbet (Redcar); 4, R. Bell; A.O.S. (Coldwater): 1 and 2, Mr. and Mrs. Hind (York); 3, P. Diddot (Whitley); 4, W. D. Sturdy (Redcar); Breeders (Egg-layers): 1, J. Priestly (Stanley); 2, A. Atkinson (Redcar); 3, S. Tipper (Ind.); Breeders (Livebearers): 1 and 2, M. Graham (Redcar); Best Coldwater Fish: Mr. and Mrs. Hind (York); Best Exhibition: Mr. Stirling (Redcar); Best Fish in Show: Mr. Robson (Darlington).

**18th July: CAISTON & DISTRICT A.S.** open show at Caistor Town Hall, 2 p.m. Meetings held fortnightly at Fleace Inn, Caistor. All welcome, details from V. R. Black, 16 Caistor Lane, Tralby.

**25th July: SCARBOROUGH & DISTRICT A.S.** open show at Friarage County Primary School, Friarage Scarborough. For further information & show schedule please contact Mr. R. Soons, 9 Calton Street, Scarborough, North Yorks. (Tel: 0723 88088).

**31st July: Hull Show** at the East Park, Holderness Road, Hull.

## AUGUST

**1st August: BLACKPOOL AND FYLDE A.S.** open show at St. John Vianney School Hall, Glastonbury Avenue Blackpool.

**1st August: LEICESTER A.S.** 2nd open show at St. Matthews Community Centre, Malabar Road, Leicester. All enquiries for schedules and information should be made to Show Secretary, J. Richards, 26, Hutter Close, Rusby Mead, Leicester. (Tel: Lincs. 663114).

**1st August: BLACKPOOL AND FYLDE AQUARIUM SOCIETY** open show at St. John Vianney School Hall, Glastonbury Avenue, Blackpool. Schedules from Mrs. J. Slatyer, 103 Kewwick Road, Blackpool, with s.a.e. for return of schedules.

**2nd-7th August: PORTSMOUTH A.S.** annual exhibition at the Wesley Centre Hall, Fratton Road, Portsmouth. Open 10 a.m. daily to 9 p.m. Saturday 10 a.m. to 6 p.m.

**7th August: NORTHERN GOLDFISH AND PONDKEEPERS SOCIETY** 6th open show at the Sports Centre, Silverwell Street, Bolton, Greater Manchester. Open to the public from 1 p.m. Details and entry forms from D. W. Lord, 40 Hospital Road, Bromley Cross, Bolton, Greater Manchester. (Tel: 0204 58196).

**7th August: BRISTOL TROPICAL FISH CLUB** open show at W. D. & H. G. With Recreation Hall, New Charlott Street, Redminister, Bristol. Benching 9.00 a.m./12.00 (noon). Schedules will be available from mid-June from the Show Secretary, Mr. L. Littleton & Little Stoke Road, Stoke Bishop, Bristol BS9 1HQ, S.a.e. with application, please. Show will be to F.B.A.S. rules and incorporate Aqvavit Gold Pin, Championship Trophy class and Brooch scheme.

**8th August: OLDHAM & DISTRICT** annual open show at Werneth Park, Oldham. Further information and show schedules can be obtained from A. Chadwick, 9 Brookville Close, Chadderton, Oldham OL1 2RH. (Tel: 061-652 6207).

**15th August: DORCHESTER TROPICAL FISH SOCIETY** 2nd open show at the Boy's Brigade Hall, Sawmills Lane, Weymouth Avenue, Dorchester, Dorset. Schedules from B. Symes, 8 High Street, Fordington, Dorchester, Dorset. Please send s.a.e.

**21st and 22nd August: YORKSHIRE AQUARIST** Festival at Doncaster Racecourse. Details from Mr. N. Bolton, 11 Sherburngate Drive, Pocklington, Yorkshire. (Tel: 07592 3177).

**27th, 28th and 29th August: IRISH FEDERATION OF AQUARIST SOCIETIES** open show in Bangor Leisure Centre. Details from A. Robbins, 160 Boonbridge Road, Belfast, N. Ireland.

**28th August: ASHFORD & DISTRICT A.S.** second open show. Secretary R. J. Scoring, 6 Manse Way, Ashford, Kent.

**29th August: LONG EATON A.S.** open show at Gregorys Rose Gardens, Toton. Benching 12 noon to 2 p.m. Further details from P. Simpkins, 47 Pinfield Lane, Stapleford, Notts.

**30th August: Yorkshire Koi Festival** arranged by the YORKSHIRE KOI SOCIETY incorporating the 6th Open National Show. Venue: Harwood House, Harwood, Nr. Leeds, Yorkshire. For further information—general or trade stands—contact Mr. P. Dalton, 151 Hunsworth Lane, Cleckheaton, West Yorkshire. (0274 875904).

## Dates for the diary

A monthly information column to keep you up to date on forthcoming events.

## JULY

**4th July: KING'S LYNN** 6th open show at the Corn Exchange, King's Lynn.

**4th July: GLOUCESTER A.S.** 8th open show at Greshdown Community Centre, Churchdown, Gloucester. Further details from T. Tapping, 66 Blenheim Road, Gloucester.

**4th July: LYTHAM A.S.** 16th annual open show at Ansdell Institute, Woodlands Road, Ansdell. Further details from Show Secretary, Mr. P. Hays, 1 Wyndene Grove, Frockleton, Preston. (Tel: Frockleton 633182 or 635221).

**4th July: CHARD & DISTRICT A.S.** open show at Furbham School, Chard, Somerset. Details from Show Secretary, Mr. D. Shephard, 30 Forton Road, Chard, Somerset. (Tel: Chard 3985).

**4th July: CASTLEFORD A.S.** open show at Woodhouse 161 W.M.C., Normanton, nr. Castleford.

**19th July: WESTON SUPER MARE A.S.** first open show at the Emmanuel Church Hall, Oxford Street, Weston Super Mare, Avon. Benching at 10.30 a.m.—12.30 p.m.

**19th and 11th July: ROMFORD & BEACONTRIE A.S.** open show at Dagenham Town Show, Central Park, Dagenham. Schedules from Garry Soperow, 35 Coniston Way, Elm Park, Harechurch, Essex RM12 5ZL. (Tel: Harechurch 44057).

**11th July: BILLINGHAM A.S.** annual open show, Billingham Community Centre, Billingham. Schedules from Mr. D. Anderson, 109 Cavote Road, Hartlepool, or Mr. D. Bradman, 1 Lovat Avenue, Redcar, Cleveland. (Please enclose s.a.e.).

**18th July: SANDGROUNDERS A.S.** 12th annual open show at Meols Cop High School, Meols Cop Road, Southport, Merseyside. Schedules available on receipt of s.a.e. from B. Baldwin, 18 Olive Grove, Southport, Merseyside. (Tel: 0704 43584). 50 Perpetual trophies. New Photograph Contest.