

JUNE 1981 60p

AQUARIST

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The Magazine for Fishkeepers



The Idle Aquarist

Keeping maintenance simple

A Lesser Known Barb

Courtship of Platyfish and Swordtails



THE AQUARIST

AND PONDKEEPER

Britain's Leading Magazine for Fishkeeping

Published Monthly 60p

Printed by Buckley Press,
The Butts, Half Acre,
Brentford, Middlesex.
Telephone: 01-568 8441

Subscriptions:

Renewable 31st December
annually Magazine (Surface
mail). June-December 1981
£5.80. Airmail quoted on
request.

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

Founded 1924
as "The Amateur Aquarist"

Vol. XLVI No. 3, 1981

Editor: Laurence E. Perkins

Advertisement Manager:
J. E. Young

Our Cover:
Lamprologus brichardi
Photo by
A. van den Nieuwenhuizen

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The Editor accepts no responsibility for views expressed
by contributors.

CONSERVATIONISTS' efforts to gain sanctuaries for overfished bass at their favoured haunts around our coasts, like the Eddystone Reef, did not succeed. But the Government increased the minimum size of catches by 6 cm. to 32 cm. on 1st May and a further increase to 38 cm. in 1983. This will build up a bigger breeding stock. The Ministry would not agree to banning nylon monofilament nets. Conservation of depleted lobsters is being achieved by increasing their minimum catch size to 83 mm. carapace length, and to 85 mm. in 1983.

The Nature Conservancy helps to conserve our diminishing ponds and wetlands of special interest by grant-aided work. Its 100-page annual report for 1979-80, received recently, includes £84 to rehabilitate the Great Pond on Epsom Common, £423 to fence Farlington marsh reed-bed from cattle in Hampshire as well as £150 to produce a guide for the underwater identification of sponges. £29,680 for a five years' survey of British freshwater ecosystems ended in March, as did as a £7,992 survey of English and Welsh rivers. A £15,200 hydrological study of Welsh wetlands ends in October. £1,573 was granted for a field study of disused parts of the Shropshire Union Canal. The English otter-survey I mentioned last month cost £9,028. In recent years the Nature Conservancy paid £10,957 for another survey of Welsh wetlands, £8,421 to survey freshwater invertebrates and the vegetation in the Aberdeenshire Dee, £950 to study the ecology of Loch Morar and Loch Shield and £11,140 for a 2½ years' survey of southern chalk streams.

Reptiles in Crete

Many holiday parties have been organised to visit Crete's proliferation of spring wild flowers and its varied birdlife. At least some interest is being aroused in its reptiles which provide tourists with sightings of about a dozen species not native to Britain. The flat, keel-shelled, stripe-necked terrapin, for instance, replaces the common pond terrapin and differs not only with its neck, but inhabits larger, faster waters. It ranges from the Iberian peninsula to the Balkans but is here darker beneath than its western forms. The slender grey Balkan whip-snake replaces Dahl's whip-snake. The variable leopard-snake with black-edged brown spots is also there, along with the equally variable aquatic dice-snake and, in stony places hunting green lizards is the cat-snake.

The cat-snake's prey includes the large Balkan green lizard which replaces the common European green lizard. Instead of the Balkan wall-lizard, there's the smaller Erhard's wall-lizard with some variations, especially in the female's orange belly, the body stripes and blue spots sometimes on the hind legs. Large, glossy, thick-necked, ocellated skinks may be met burrowing near sandy coasts, in vineyards or scuttling into crevices in sunny stone walls. At night, house lights often attract large, slender, pale Turkish geckoes from their haunts along dry stone walls, but the less agile, greyer Kotschy's gecko seldom comes to lights. Chameleons with their



From a Naturalist's Notebook

by Eric Hardy

large, cocked eyes, slow movements and quick colour changes, attract the less sophisticated tourists, and while Crete apparently has no salamanders or newts, sunset brings on the nightly chorus of amphibians. These lead you to high-pitched voices of green toads and rapid notes from common tree-frogs. The croaking chuckles of Europe's largest frogs, marsh-frogs, may be heard by night or day, when many a strolling visitor sees one leap suddenly into water from the bank.

Marginal plants

Down by the garden waterside, marginal plants may be overcrowding and need thinning out. From now till July tiny China mark moths make their way to water, laying their eggs on the undersides of lily-pads where their caterpillars become disfiguring leaf-miners. Male newts are losing their swimming tails and taking to dry land again, but the female still swims around and some young may be seen. You may dig the pupae of *Dytiscus* water-beetle out of the bank.

June brings bearded irises whose clumps add captivating colours when the tulips finish and before the main pomp of herbaceous borders. They grow best in soil well drained and sweetened with lime, propagated from cuttings of young shoots in spring or autumn. Tall bearded irises, flowering from late June in the north, need to be

well fed and cultivated, being more demanding than April-flowering dwarfs and May-flowering mediums. Seedling Japanese kinds flower later and Californian kinds are difficult in our later northern season. Dolomite chalk makes good drainage for *Onoclycus* and bearded irises. After flowering they can be dried off in pots on greenhouse staging. They don't want such wet ground as our native yellow flag. Every 3 or 4 years lift overgrown clumps, cut away the spent rhizome and replant the vigorously growing parts in clumps of three or four pieces, a foot away. Avoid nitrogenous manure but top-dress with bonemeal, bonfire-ash, hop-manure or superphosphate of lime. They can be planted shallowly from now to September, spreading the roots in a 3-inch trench, planting the rhizome firmly in but barely covered, just showing, and pointing south, in a sunny place. Irises are healthier when their root-stems are baked by the sun. Two crossed twigs will hold the rhizome in position.

Irises

Dwarf crested iris in lilac and blue is ideal for small pools. Beardless irises, purple *versicolor* elegantly floriferous *et masse*, blue and white *sibirica* and white and yellow *ochroleuca*, share with yellow flag more perpetually moist sunny margins of pools and streams. Garden cultivars of yellow flag include pale yellow *bastard* without orange marks, *acoriiformis* with brown veins instead of purple on its petals, and *variegata* with creamy yellow, striped leaves. Some 30 species of these sun-loving floral aristocrats are in cultivation, all with decorative though poisonous seed-heads.

The luck of the iris, if you pardon the pun, is surviving brown rhizome-rot. Cut any of it away, steeping the rest of the rhizome for 15 mins in potassium permanganate solution or a fungicide, then plant elsewhere with a pinch of superphosphate as a tonic. A swamp iris in its native Louisiana, *hexagona* willingly accepted a dry situation in Yorkshire. Hybrid Californians are variable in colour.

Farmyard manure is too rich, leading to sappy growth, though light dressings help. Likewise use bonemeal and basic slag, 2 oz. per sq. yard. One seldom sees *kaempferi* irises or the waterside *laevigata* growing so well in Britain as the great blooms of blue, white and purple, waist high in gardens of their native Japan because, unlike our climate, they want plenty of moisture, sunshine, well-manured clay not chalk in summer, and dry conditions in winter when transplanted. The former thrived in loam at Knapp Hill in Surrey, where springs could be turned into ditches in summer and kept out in winter. It can be sunk in a half-filled cask of loam in a sunny spot, and lifted in winter. Double varieties have immense flowers, up to 10 ins. Potato-root eelworm or cyst-nematode sometimes attacks iris.

Skullcap's drooping tubular lilac flowers hang gracefully from waterside stones and banks until September. More purple alpine and Asiatic blues and even yellow *orientalis* have been imported. A variety of common creeping jenny or moneywort has yellow-tinted leaves

but it sprawls just the same all over muddy margins of the pool. Its tall relative, yellow loosestrife, which isn't a loosestrife, also creeps to cover a large surface, flowering into August but not setting seed here. A variety of it, *angustifolia* grows at Thompson's Holme on the west side of Windermere.

Arrowheads are now flowering in loamy shallows. Our often too vigorous native *Sagittaria sagittifolia*, one of the few with arrow-headed leaves, and *japonica* with larger, 3-petalled white flowers (its double form with six petals) is outshone by the giant of them all, half-hardy *montevidensis* growing to 6 ft. with sword-like leaves up to 2 ft., its purple-blotched white flowers spanning 3 ins. Mexican *macrophylla* has more yellow-centred flowers and its leaves bronze in autumn. These half-hardies can now be planted out for summer along with bog-arums, and brought into the greenhouse before winter frosts.

Brooklime, distinguished from watercress by blue, not white flowers, though often confused by impatient collectors and subsequently having violent disagreements with their stomachs, and from forget-me-nots by four, not five petals, has a variety *robusta* with all its leaves submerged and translucent. Blue water-speedwell, now commonly in flower grows right across Europe to Japan. I've seen it widespread in the Holy Land. In hot summers, lesser duckweed may flower on the water surface, but that is a rare event.

NEXT MONTH

How to create a breeding tank for **BRINE SHRIMP**, colour feature.

Martin Heywood will focus our **SPOTLIGHT** on the **REGAL ANGEL FISH**.

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Billy Whiteside escorts us round the aquarium department at London Zoo.

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Coldwater Jottings

by Frank W. Orme

READING THROUGH an old journal, of almost 50 years ago, I came across an article written by a Dr. Podmore, D.Sc. In this were described the various types of fancy goldfish produced by the Japanese. I found the descriptions most interesting, and, thinking that fellow fishkeepers might also find them interesting, I thought that I would devote this month's 'Jottings' to his descriptions of some of these varieties.

Ten varieties

Dr. Podmore commences by informing the reader that "Japan produces ten varieties of Goldfish. The largest is the Wakin, and the most hideous is the Lionhead or Ranchu. The serious cultivation of Goldfish began in 1703, when the industry was started at Koriyama, and has been continuous ever since."

The Wakin is very similar to the Common Goldfish; however, it has a double or, very often, tripod-shaped caudal fin. Dr. Podmore states that it can reach a length of 16 inches, and can vary in colour from pure black to pure white. Nevertheless, "The typical Wakin is bright red, often with larger or smaller areas of pearly or silvery white. It grows to between 6 in. and 10 inches. This fish loses its beauty and grace when it breeds in open waters.

"The Lionhead or Ranchu: the length, depth, and breadth of the body are about equal, and the back and belly are broad and rounded. The head is short and as broad as deep, and the snout is broad, short and rounded. The back is nearly straight and shows no trace of a fin. The caudal is short and three lobed, with the lobes rounded and the two lateral ones having a tendency to spread horizontally. The pectoral and pelvic fins are small and present no peculiarities. The anal is short and double. A curious sickle-shaped appendage sometimes appears on the dorsal edge of the caudal fin.

"Until the fish is two or three years old, the head does not show any peculiar features, but it then begins to

develop a mass having the appearance of a warty tumour. In some specimens, the warts are uniform in size and of a very regular distribution. In others they are irregular in size and shape. So far as is known the mass does not take on any malignant character. The amount of surface covered by the growth varies, and this, together with the differences in the warts themselves, give rise to several sub-varieties."

Red, pink or white warts

"The Lionhead proper has the entire head, except the lower jaw, covered with red, pink or white warts. It reaches a length of 6 inches, including the caudal fin. The absence of a dorsal fin, combined with the nearly globular body, has resulted in a loss of ability to maintain a normal position, and in consequence the fish often swims upside down or vertically with the head downward. It is weak and difficult to cultivate.

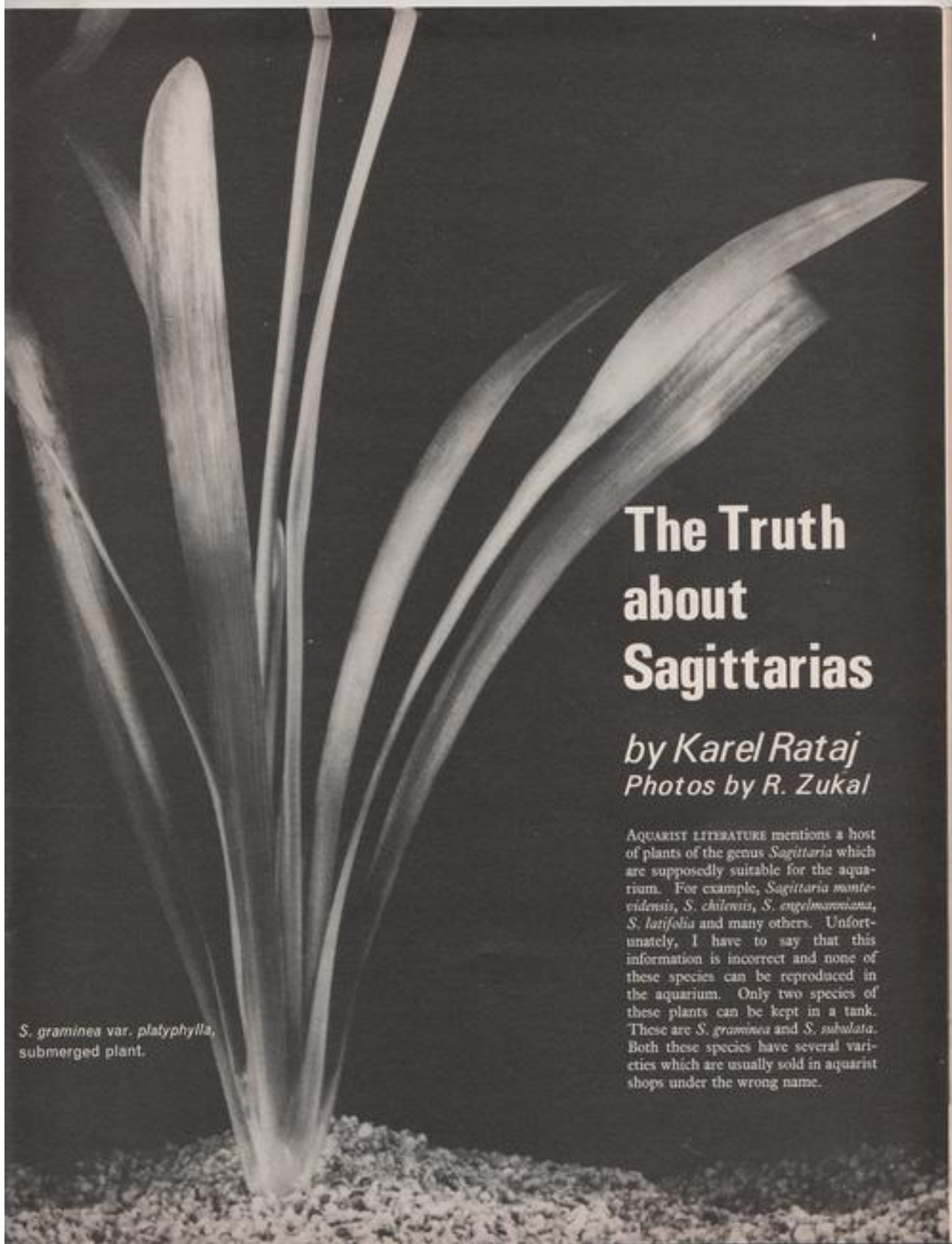
"The Protruding-eyed Ranchu was unknown in Japan prior to 1902. This fish has a most grotesque appearance. The eyes are very large and, in full-grown specimens, their diameter is more than half the length of the head. It was first shown at the 1883 'Fisheries Exhibition' in Tokio, where it created a great impression. In general form it is similar to the Wakin, but the body is shorter, thicker, and rather deeper, and all the fins are larger. The colours are usually red and white.

"The Autumn Goldfish or Long-tailed Ranchu has a bright golden or red body, a red head with red excrescences and red and white fins. This is one of the most beautiful and attractive of the Japanese Goldfish, and will repay efforts at cultivation. Its swimming powers are far superior to those of the Ranchu."

Dutch Lionhead

"The Dutch Lionhead is a much hardier fish and should thrive in England. The fish is a cross between the Ranchu and the Ryukin, and was first bred in Koriyama about

Continued on page 55



S. graminea var. *platyphylla*,
submerged plant.

The Truth about Sagittarias

by Karel Rataj
Photos by R. Zukal

AQUARIST LITERATURE mentions a host of plants of the genus *Sagittaria* which are supposedly suitable for the aquarium. For example, *Sagittaria montevidensis*, *S. chilensis*, *S. engelmanniana*, *S. latifolia* and many others. Unfortunately, I have to say that this information is incorrect and none of these species can be reproduced in the aquarium. Only two species of these plants can be kept in a tank. These are *S. graminea* and *S. subulata*. Both these species have several varieties which are usually sold in aquarist shops under the wrong name.

Sagittaria graminea Michx

Sagittaria graminea belongs to the family Alismataceae. Its distribution ranges from the southern states of the USA to north-eastern Canada. It is not found, however, in the west of America. In all there are seven varieties. Three or four of these are suitable for the aquarium. Commercially they are usually given quite incorrect names. For example, *Sagittaria sinensis* or *S. chinensis*.

They are amphibious plants which in the wild form emergent leaves on long stems in shallow waters or marshes. Their leaf blades are lanceolate, narrowing almost to a thin strip at both ends and are 5 to 15 cm long and 3 to 5 cm wide. During the months of spring this species grows under water, where it forms broadish, strip-like leaves of varying length with straight edges. These are so-called phyllodia and are, in fact, broadened leaf stems. Plants growing in shallow waters develop this submerged form only temporarily, whereas plants growing in deeper water in the natural state (30-40 cm) remain submerged throughout the whole time of their growth. It goes without saying that only the submerged form is suitable for the aquarium.

The following three varieties of this species, which can be identified in their submerged form by the width of their strip-like leaves (phyllodia), are grown in aquaria: Width of the submerged leaves about 1 cm—*S. graminea* var. *graminea*; width of the submerged leaves about 1.5 cm—*S. graminea* var. *platyphylla*; width of the submerged leaves about 2.5 cm—*S. graminea* var. *wertherbiana*.

The basic variety, *Sagittaria graminea* var. *graminea* is found in relatively large areas of the USA and Canada. It is the most resilient of the varieties mentioned as far as low temperatures are concerned and is suited, therefore, to both tropical and coldwater aquaria.

The submerged leaves (phyllodia) are strip-like, slightly curved or bent over, green or brownish green with dark, long veins and measure 10 to 40 cm in length and about 1 cm in width. If the plant is kept in more than 30 cm of water it almost never

grows out of the water and so does not form emergent leaves. Nevertheless, it frequently flowers. It is happy in water which is hard to medium hard. A slightly alkaline pH reading and a water temperature of 15 to 23°C are also beneficial. It needs sufficient light and a planting medium low in nutrients, as do all the varieties of this species. In winter a certain amount of artificial light does the plant good, but this is not as important in this case as it is for other varieties coming from warmer areas.

Sagittaria graminea var. *platyphylla* Engelm. is probably the variety grown most and is commonly described as *S. chinensis*. Previously it was con-

sidered a separate species with the name *S. platyphylla* (Engelm.) J.G.Sm. It differs from the variety described above in having large, emergent leaves. The submerged, strip-like leaves are broader and more decorative, up to 45 cm long and about 1.5 cm wide. It needs more or less the same conditions as the foregoing variety, but a temperature of 18 to 25 is called for. Lanceolate, emergent leaves are sent up even from deepish water. If one wants to restrict the plant to a permanently submerged existence it should be planted in a sparse medium consisting of sand.

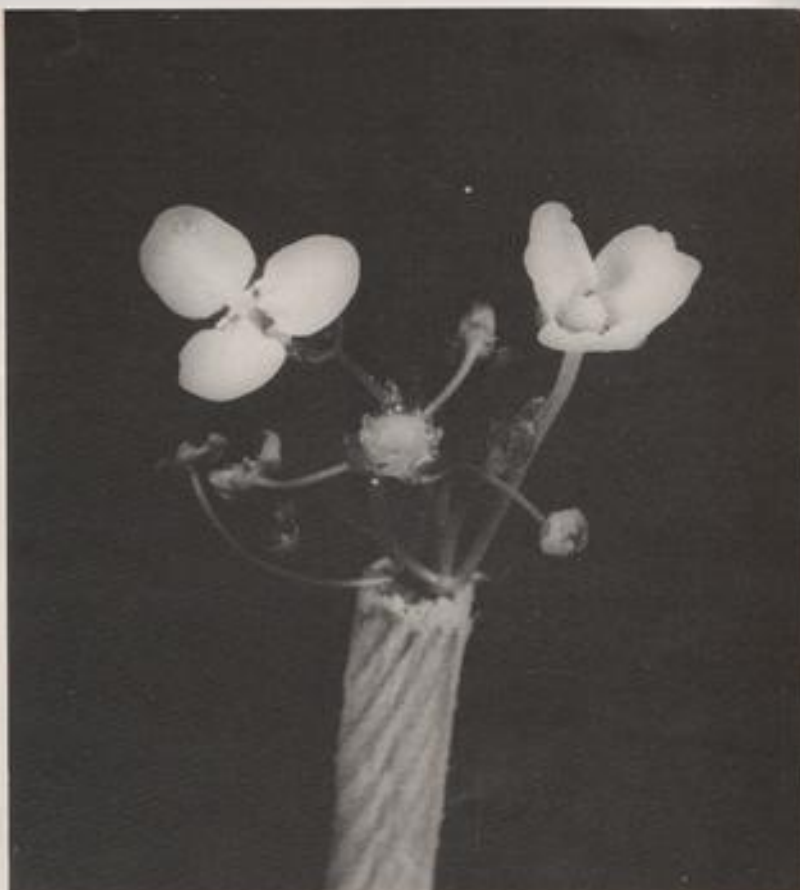
Sagittaria graminea var. *werther-*

Multiple fruit of *S. graminea* comprising many easily germinating achenes.



biana Fernald/Bogin comes from the Atlantic coast, predominating in the southern states. It differs from the preceding variety in its very robust growth. The small stems of its female flowers are up to 4 cm in length. The submerged strip-like leaves are up to 50 cm in length and 2-5 cm wide. It is the largest variety of this species and consequently appears in specialist shops under the commercial name of *Sagittaria gigantea*. It shares the same needs approximately as var. *platyphylla* and is especially suited to aquaria containing the larger species of cichlids, which take advantage of its leaves in order to deposit their eggs.

The final variety of this species



S. subulata var. *subulata*. Female flower on left, male on right.



which is suitable for the aquarium is *S. graminea* var. *teres* (S.Wats). Bogin. It comes from the narrow coastal area of the eastern states of the USA running from Massachusetts to Florida, where it grows predominantly in acid peat marshes. In the past it was considered to be an independent species under the name *S. teres*, *S. Wats* or *S. isoetiformis* J.G.Sm. It is mentioned frequently in aquarist literature, but it is my opinion that it has never been grown in aquaria so far and where earlier authors have referred to *S. teres* or *S. isoetiformis* they were, in fact, describing mistakenly a form belonging to another species, *S. subulata*. *Sagittaria graminea* var. *teres* forms oval leaves 5 to 10 cm in length during its first year of growth. In subsequent years the leaves are between 10 and 30 cm long and have oval, spongy stems with narrow,

lanceolate leaf blades. In contrast to the foregoing types it can be grown in poor light and acid water.

All the varieties of the species *S. graminea* just described flower readily. The inflorescence consists of upper, male flowers and lower, female flowers, which are self-pollinating and as a result one can obtain a large quantity of quickly germinating seeds from plants grown in artificial conditions. This manner of reproduction is very troublesome, however. All the varieties of the species will reproduce themselves vegetatively. The plants send out runners from the rootstock along which new plants are formed at intervals of 10 to 15 cm. During the winter time the plants develop bulbs which measure between 0.5 and 3 cm in close proximity to their roots. New plants grow from these bulbs in the spring.

Sagittaria subulata (L.) Buch

Practically all small or low-standing plants of the genus *Sagittaria* are included within this species. In older aquarist literature, for example, the following names are mentioned: *Sagittaria pusilla*, *S. minima*, *S. gracillima*, *S. natans*, *S. lorata* and so on. In most cases these are commercially used for incorrect names for plants belonging to the species *S. subulata*. These come from the eastern states of the USA where they grow in marshes and shallow waters.

The submerged leaves are strip-like and there is no division into petiole (leaf stem) and leaf blade. These are so-called phyllodia which, basically, are broadened stems on which a leaf blade is formed only when the phyllodia reach the surface of the water.

During the summer time genuine leaves are often formed, on the end of long, very narrow stems which reach up to the surface so that the leaves float there. They are egg-shaped or oval, infrequently sagittate—that is, having lobes at their base which vary from rounded to pointed. The inflorescence consists of long, filiform, high-growing stems which form a cluster of flowers in close proximity to the surface of the water. The first whorl consists usually of a single, infrequently of two or three female flowers.

The rest are male flowers. These small flowers are about 1 cm in diameter, they are white and open directly on the surface of the water, or grow on the end of small stems a few centimetres above it. The fructification resembles a green raspberry and

is composed of a large number of achenes which are serrated on the back and the inner side.

If there is a drop in the water level, *S. subulata* readily develops into a land form, with petiolate leaves 5 to 6 cm in length. The leaf blades are usually set horizontally, a roundish oval in shape, 2.5 to 5 cm long and 1 to 1.5 cm wide. When the land forms flower the stem of the inflorescence is only slightly longer than the leaves, it is firm and stands vertically.

Sagittaria subulata has three varieties which are commonly grown and easily distinguishable from each other. They are distinguished one from another according to the following key: submerged leaves with a maximum length of 15 to 20 cm—var. *subulata*; submerged leaves up to 90 cm in

S. subulata var. *kurziana*, submerged plant.



length, maximum width 7 mm—var. *gracillima*; submerged leaves up to 90 cm in length, broader than 1 cm—var. *kurziana*.

Sagittaria subulata var. *subulata* (incorrectly *S. pusilla*, *S. minima*; has submerged leaves which are 5 to 10, infrequently up to 20 cm in length and 1-7 mm wide. They are usually sturdy, bright green and have a curved sword-like shape. The plant flowers in very shallow water (up to 15 cm), so the flowers can not usually be studied in the aquarium. It is the so-called small *Sagittaria*, which is most usefully planted along the front of the tank, where it quickly reproduces vegetatively and soon forms a dense, bright green adornment to the aquarium. It tolerates both soft and hard water and needs quite a lot of light. If one wants to keep it as a very low-growing plant, it should be placed in a spot where, for part of the day at least, it stands in direct sunlight. Then it will restrict its growth to a height of 5 to 8 cm.

Sagittaria subulata var. *gracillima* (S.Wats.) S.G.Sm. is often sold by aquarist dealers under the name *S. nataans* or *S. lorata*. Its submerged leaves measure 30 to 90 cm and are 1 to 6 mm wide. In contrast to the foregoing variety, this one is most suitably planted in the corners or rear of the tank, because its leaves grow vertically and coil beneath the surface in a similar fashion to the leaves of *Vallisneria*. When the leaves reach the water surface they often form oval, floating leaf blades and this variety flowers in the aquarium more than any other. A dense covering of vegetation such as is constituted by the leaves affords a suitable hiding place to a large number of live-bearing toothcarps and oviparous species. Var. *gracillima* tolerates a certain amount of light, but if it is exposed to too much light it tends to develop into a stunted form which can then not be distinguished from var. *subulata*. Consequently, it should be grown in corners of the tank in a shaded location where it will develop the desired tall form with submerged leaves.

Sagittaria subulata var. *kurziana* (Glück) Bogin. is the most decorative



S. subulata var. *gracillima*, submerged plant.

variety of this species. The submerged leaves are 10 to 40 cm, infrequently up to 90 cm in length, and 10 to 15 mm wide. This variety is found only occasionally in specialist shops and then usually under the incorrect name of *S. japonica*. It sometimes resembles the large *S. graminea*, but its leaves are softer and at their narrowest at the bottom, getting broader towards the top, their widest point being about 6 cm before the tip. They can be used for planting in the middle area of the tank, where five or six plants are placed in a group. This variety, too, is liable to develop stunted forms in bright light and it is a characteristic of the plant that it has its longest, widest and most attractive leaves during the winter, with the result that it has become a very highly valued one.

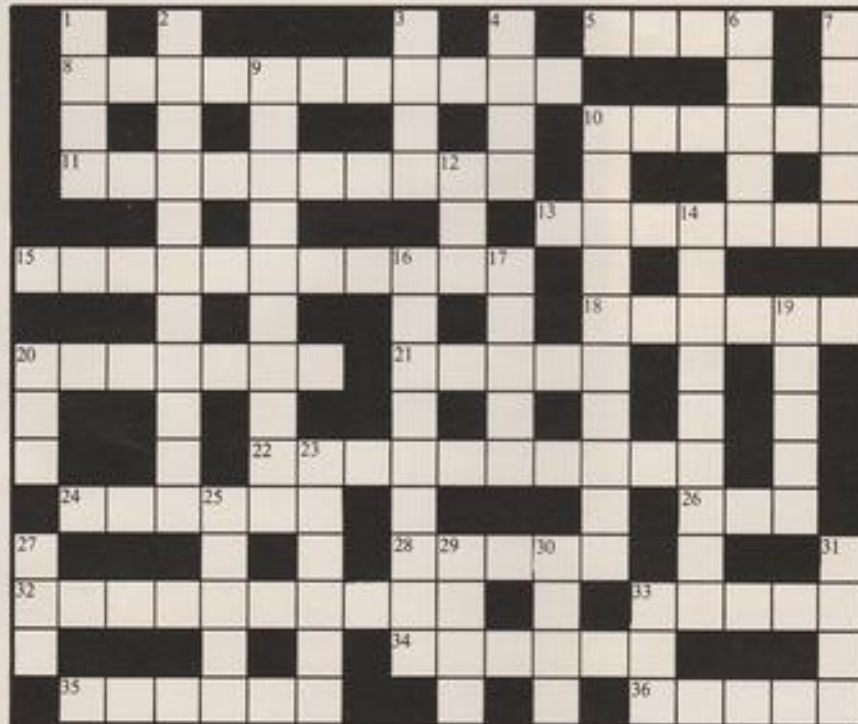
All varieties of the species *S. subulata* tolerate both hard water and water which has a high salt content and organic substances. They are

suitable for all kinds of aquaria and, since they are not demanding with regard to the water temperature, they can be especially recommended to beginners. Neither should they be neglected by more experienced aquarists. Furthermore, they are perfectly at home in a planting medium which is rather low in nutrient content. As already mentioned, the low-growing varieties and dwarf forms demand intensive lighting; varieties with long leaves attain their full attractiveness only in dispersed light, when they develop a splendid growth of long, fresh green foliage.

S. subulata and all its varieties reproduce by continuously forming new plants on shoots sent out from the rootstock, in a similar manner to *Vallisneria*. Specific growing areas must be delineated in the tank by means of large stones, or one must uproot the plants regularly if they reproduce quickly and spread to areas of the tank where they are not wanted.

Crossword Puzzle

Compiled by Dave Roberts
Merseyside A.S.



Clues Across

5. Put this in, to give your fish a tonic (4)
8. See "22" across
10. Mount your tanks on these (6)
11. Genus of catfish (10)
13. *Boria horae* and *B. sidthimunki* are such (7)
15. Characin genus (11)
18. The festive, has an oblique one (6)
20. *Heterandria* . . . the least killifish (7)
21. *Ospromemus gourami*, the . . . gourami (5)
22. & 8. The paradisefish (10, 11)
24. See "9" down
26. Common term for white spot (3)
28. *Aequidens* . . . cichlid around 5 inches (5)
32. Common name for *Hypophessobrycon pulchripinnis* (5, 5)
33. Species of pencilfish (5)
34. Colour of "23" down
35. *Poeciliopsis* . . . easy to breed livebearer (6)
36. Livebearer of the West Indies (5)

Clues Down

1. You would construct one for koi (4)
2. . . . *ocellifer*, the beacon (11)
3. You would associate these with a convict (4)
4. Pectoral and ventral are such (4)
6. Native British fish (5)
7. Anabantids build them (5)
9. & 24. Cichlid of Ecuador (10, 6)
10. *Aphyosemon* . . . killie (10)
12. Frozen water on a pond (3)
14. Genus of goldfish (9)
16. *Barbus tetrazona* (5, 4)
17. *Barbus chola* . . . barb (5)
19. The Texas, is the Rio Grande one (5)
20. There is a flying one (3)
23. Common Corydoras (6)
25. They are marine fish (5)
27. Target for the archer (3)
29. The heater/stat will keep water this way (4)
30. *Crenichia* . . . a cichlid (4)
31. Peru's capital will tell you this sorubim species (4)
33. A slippery character (3)

Solutions on page 77

SPOTLIGHT

Edible Frogs

by Laurence Perkins

ECONOMICALLY, Britain is now regarded as part of Europe but it remains, geographically, a group of offshore islands. This fact of life has advantages and disadvantages, the appreciation of which relies upon personal opinion and interests. So far as flora and fauna are concerned, the narrow Channel separating Britain from the coast of France has much to answer for and from it stems isolation which has afforded these islands an impoverishment of innumerable animal species found on the mainland of Europe.

For herpetologists Britain offers a slender collection of indigenous species comprising: three snakes, three lizards, two toads, one frog and three newts. The disparity between this modest group of reptiles and amphibians and those abounding in Europe is a matter for speculation but even more puzzling is the fact that countless attempted introductions of some European species have met with very little success.

The Edible Frog (*Rana esculenta*) is a prime example of relative failure to establish a continental species in the British Isles and reasons for most of such attempts becoming abortive are legion. Whatever the reason, this species has not been established with sufficient success to regard it as a native (as with the grey squirrel for example) only a small number of isolated pockets of tenure maintaining a slender hold. This is regrettable for those who foster an interest in frogs and who admire the bright coloration, agility, cunning and vocal prowess of this lively creature.

It is possible to colonise a garden pond and, with luck, the frogs will breed and, with more luck, the tadpoles will metamorphose. Those illustrated here are the three-year-old remnants of a large spawning in a garden pond, the majority having decamped to the local village pond which they later forsook, turning up in ponds and streams further afield, but at length disappearing altogether from the locality and heading in a southerly direction—vaguely towards France.

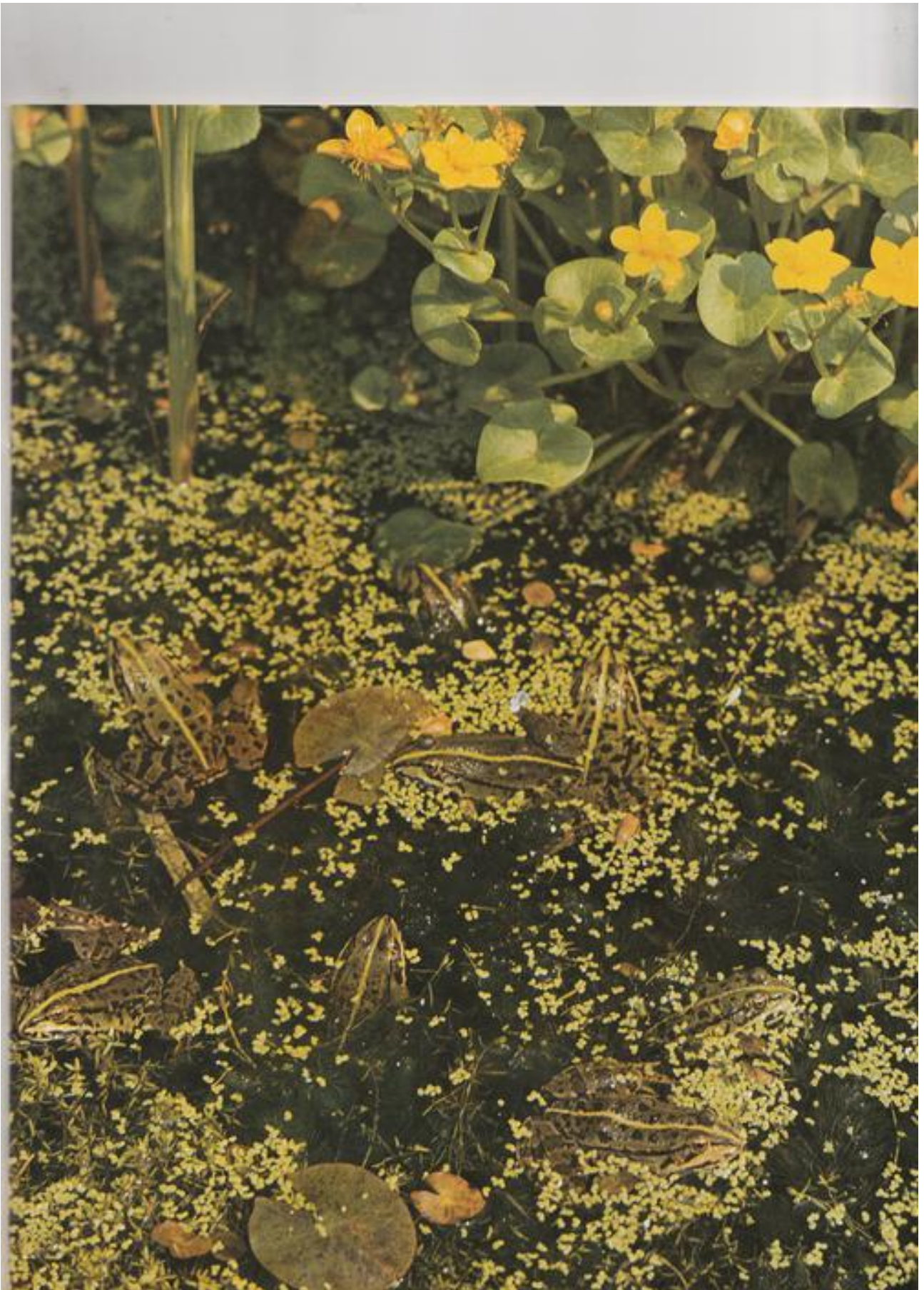
While they remain in the garden pond these frogs afford a great deal of pleasure, interest and amusement but some concern on the part of neighbours becomes apparent when they complain of the males' summer long croaking, seem-

ingly less acceptable than a plethora of man-made noise pollution.

The Edible Frog is a hungry frog and less content with a sparse diet of flies, worms and beetles than our native ranid. *Esculenta* likes large gobbets of food and will relish juicy tadpoles, newts, smaller frogs, including those of its species, and small fish. Not content with the passing of likely prey, he will coast around the pond's surface in search of anything manageable and after heavy rain will leave the water and hunt for worms, slugs, etc., often straying so far from the home pond that other pockets of water encountered will suffice for aquatic sanctuary. It is the incidence of sustained rainfall that motivates the search for pastures new and this, in Britain, could be the reason for the demise of small colonies which, becoming divided at such times, end up individually and scattered with little hope of pairing when the next breeding season comes around. In Europe every ditch, dyke and pond supports a colony of *R. esculenta* and such safaris are unlikely there to estrange the sexes. But this is only a personal theory in lieu of a more appealing one.

While heavy rain may be the catalyst that motivates the edible frogs' move away from the ponds in which they have been sequestered, the reason behind such removals is likely to be the need for food, especially when small ponds have been involved. *R. temporaria*, our native frog, can be quite content with small ponds and individuals will remain in and around such ponds for many years. *Esculenta* is a gregarious aquatic creature which favours large stretches of water and it seems that the need to explore and find such expanses of water will always constitute the main problem for anyone endeavouring to maintain a small colony of this species in a garden.

A short term answer to the problem could be the construction of an escape-proof compound comprising a moderate sized pond with planted surrounds and encircled by a ledged perimeter. It could be successful in its confining intention but the inmates would require regular feeding to avoid cannibalism. From the point of view of a study project this could be viable but the plan is not compatible with the ideals inherent in a garden pond where all but the fishy residents are afforded freedom of choice to come and go as they please. In short, if you are tempted to brighten your pond with some of these lively amphibians, be prepared for them to desert you when the urge so takes them.



TODAY TERRAPINS are becoming increasingly popular. Hardly surprising; these tortoise-like creatures make ideal pets.

Their housing requires no elaborate set-up. I use an ordinary fish-tank without gravel on the bottom. The need for daily cleaning eliminates the addition of plants too, unfortunately. A simple 'cave' can easily be constructed by breaking a piece from the side of an earthenware flower-pot, thus forming an 'island'. Situated under a lamp, this will enable the terrapin to bask... something they really enjoy. You'll probably find it necessary to place a sloping piece of rock against the side of the pot; make sure that your pet can get out of the water!

For the tropical terrapin, you'll need a heater, thermostat and thermometer. Temperatures ranging from 76°F to 80°F are essential for his well-being and digestion. You'll find that any stockist of aquatic supplies will be able to supply these.

CARE OF TROPICAL TERRAPINS

by Janis Robertson

Once you've organised his future home, you can now think about acquiring a terrapin. More than one, if possible for they are sociable creatures; the company of their own kind is important to them.

So, what are terrapins? Members of the reptile family known as Chelonians, which also includes tortoises and turtles. Tortoises are a land species, turtles live in marine waters while terrapins constitute the fresh water variety. An external skeleton is the main feature of the group. Basically, this consists of an upper shell or carapace which is connected to a lower shell, the plastron. In times of stress they can withdraw into the safety of this mobile fortress.

Of the sixty-odd species of terrapin, only two tropical varieties are likely to be found in your local pet shop. From South America there is the Ornate Terrapin (*Pseudemys ornate callirostris*). It is easily identified by faint red markings behind the ears, yellow spots on the mouth and chin plus markings on its greenish shell. The trade-marks of the red-eared terrapin (*Pseudemys scripta*

elegans) from North America are as follows: Yellow lines on the head and neck together with prominent red marks behind the eyes.

Surprisingly easy to keep, these creatures usually fall prey to only a few ailments. Of these, the most common is worm-infestation. Frothing around the mouth or worms wriggling in the motions clearly indicate this problem. Proprietary worming medicine from your vet will soon put things right. Colds too, which have a tendency to turn to pneumonia are quite simple to avoid; a warm draft-free environment should be all that is required. More seriously, the shell may come under attack from a microbe. If given a chance, this will burrow through the flesh thus killing the unfortunate sufferer. Caught early enough, iodine can be painted on the holes which are then filled with a mixture of oil of cloves and zinc oxide. Normally this treatment will effect a cure. The underside being more susceptible, I inspect it regularly for signs of trouble. A softening of the shell may also occur: Calcium deficiency. Short-sightedness often accompanies this condition making it awkward to treat; blind, a terrapin will refuse to eat, so medicine cannot be given. Still, provided food is still being consumed, the affected animal can be cured. Powdered cuttle-fish on shredded lettuce, plus some bread soaked in cod-liver oil and orange juice are quite effective. Provided a well-balanced diet has been provided, this problem should never arise. Food is the single most important factor influencing any animal's welfare. With terrapins, earthworms, insects, spiders and raw herring go down very well. Chopped raw steak, liver or kidney can also be offered with confidence; terrapins are avid meat-eaters. Less likely items would seem to be fruit, lettuce, watercress or even white bread; these too should be devoured. For a toothless creature, the terrapin manages a surprising variety of foods. His horny beak makes an effective cutting tool.

Don't be afraid to take him out after his meals to clean out his water. On warm days, he'll even enjoy a stroll outside... but don't leave him alone. Terrapins tend to wander; you might be surprised at the speed at which they can travel. At the latter end of the year, he might not only get lost, but go into hibernation. If that happened, he could easily freeze to death before spring.

Hibernation! The strange torpor that affects all terrapins when the cold weather sets in. What is to be done about it? Imagining this to be a problem puts many people off; nothing, in fact, could be simpler. Fill a large box with damp earth and moss. The terrapin may burrow down in this himself, or you may have to 'bury' him. It doesn't matter which. Then, place the box into a mouse-proof container. Do make sure that there are plenty of air-holes, though. Keep this in a cool dark place, well away from frost. I keep mine in the cupboard under the stairs; not too warm, not too cold. Sometime in spring, your terrapin ought to wake up ready for a meal and a swim. You'll be delighted to see him again!

Looked after properly, you and your terrapin can look forward to many such re-awakenings through the years to come.

DR DAVID FORD is the well-known aquarist who developed the Aquarian range of flake foods, water treatments and remedies. He is a Chartered Chemist with a Food Science degree and higher degrees in the physical chemistry of aqueous systems. With such a collection of unusual qualifications, coupled with his life-long interest in the hobby, he was obviously the ideal man for this development job.

He has moved on to new research projects now but remains a consultant to the manufacturers of Aquarian, Thomas's of Halifax. David lives with his wife and youngest of three sons in a bungalow at Melton Mowbray in Leicestershire.

David is an honorary president, vice-president or member of many aquarium societies. He has lectured to most clubs in the U.K. and many European and American aquarist societies too. He has also dealt with over 7,000 mailed queries since his Aquarian Advisory Service began.

So how does such a busy, professional aquarist cope with home aquariums? By keeping maintenance as simple as possible, Dr Ford explains how:

Meet the aquarist No 11

The Idle Aquarist by Dr David Ford of Aquarian



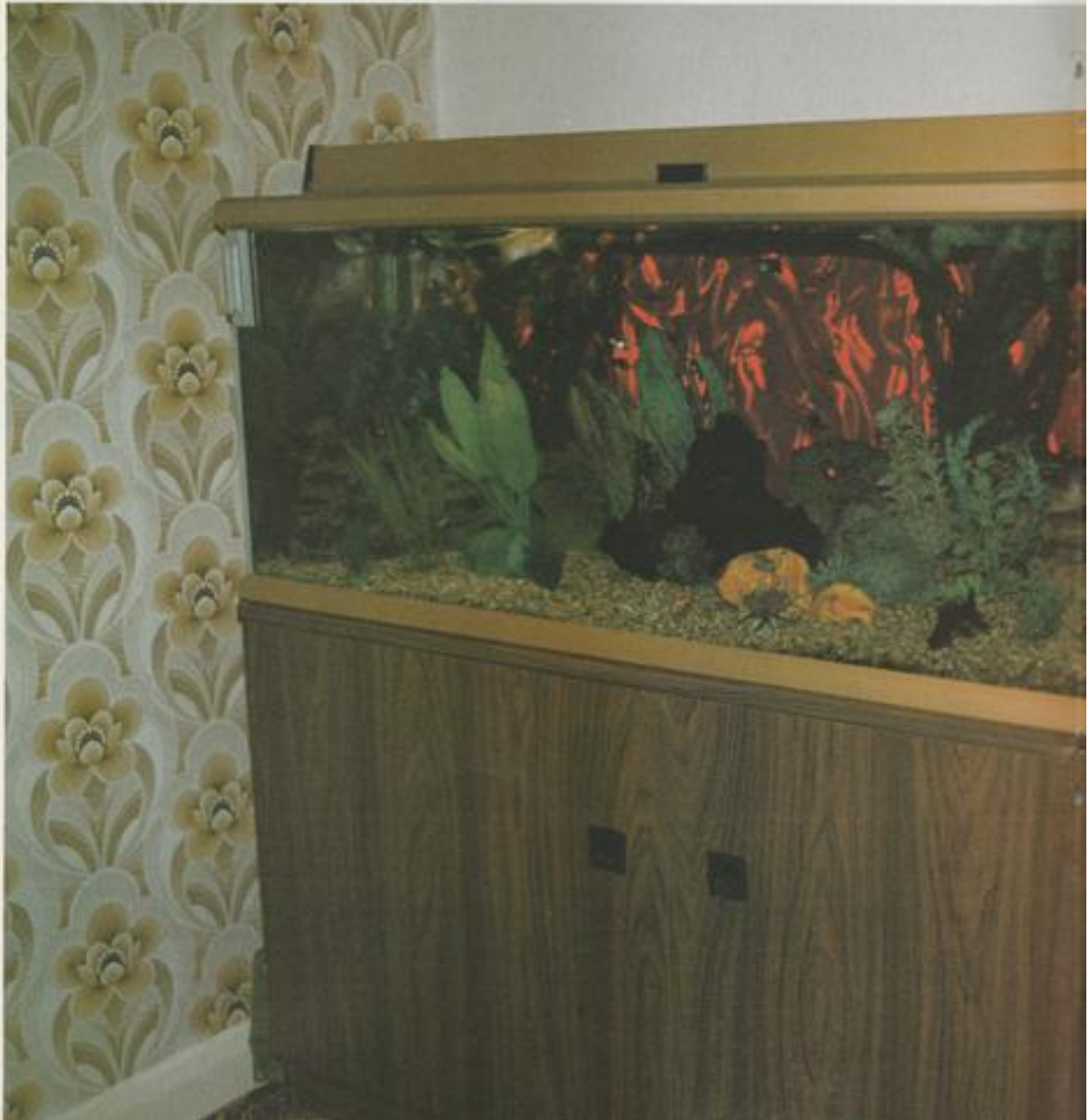
Being a consultant fish scientist means maintaining dozens of laboratory aquaria as the example shows in Figure 1. Therefore aquarists often ask me if I keep aquaria too. Of course I do—the rule, once an aquarist always an aquarist, applies to the professional just as much as the hobbyist.

Using the experience gained during my work developing Aquarian, I built a home aquarium tailor-made for that exact spot in the living room. The usual 10 mm glass,

precut and silicone-sealed into place, is shown in Figure 2. (This photograph shows how one can become immersed in the hobby!) Note the use of dichroic spotlights to throw beams of light into the tank through the coverglasses. These coverglasses are hidden by a Formica pelmet glued onto the aquarium. This is a very simple system and looks most natural. This is actually a marine aquarium with a breeding pair of clownfish (but that is another story).

In another suitable corner a freshwater tank is installed, as shown in Figure 3. A typical community aquarium, there are over fifty fish contained in this 40 gallon 4 ft. x 18 in. x 18 in. tank.

These tanks represent a lot of work which may be a labour of love to the hobbyist but is just an extension of my daily work to me. Hence I have become that special fish-keeper, the Idle Aquarist. This really means maintain the home aquarium with the absolute minimum of work. The methods may not appeal to the purist, but my fish are colourful and healthy, their water gin-clear and the aquascapes as attractive as any show tank.



First, the marine tank. The tank is filled with artificial seawater at S.G. 1.020. This is lower than usual, but helps keep the oxygen levels higher than usual, aiding the biological filtration. There is no undergravel filtration, but just a scattering of coral sand. This is easy to keep clean—in fact the stirring actions of the Clownfish are enough to maintain a free-flowing, algae-free state. Filtration is via an Eheim power filter tucked away under the tank. The filter medium is carbon in a nylon bag sandwiched between pads of nylon wool. Every 2 to 3 months the nylon wool is replaced and the carbon swilled clean under a coldwater tap. This maintains the nitrifying



Fig. 2

bacteria in a healthy state and occasional checks have never shown a nitrite reading above zero. The nitrate value increases slowly, of course, but twice yearly 1/3rd seawater changes are enough to keep the fish healthy. The decoration is bleached coral. This material looks very attractive in the marine aquarium but suffers from perpetual growths of green, brown or even red algae. I know of hobbyists who spend practically every weekend bleaching and then purifying their coral decoration—not for me! To avoid this chore, the lamps in the dichroic spotlights are coloured, one red and one green (100 watt). This produces very pretty effects when the aerator flow is directed through the beams, and even the most tenacious variety of algae can't grow in red/green light.

The freshwater tank holds the local tapwater. Terrible stuff, alkaline and full of chlorine, but the fish thrive therein once it is mature. To maintain the maturity, a power filter is installed, tucked away in the undertank cupboard, as shown in Figure 4. The Interpet Heatsaver is used since it runs cool, which is essential when kept in a closed cupboard. Also under the tank, the aerator is the silent "Hy-flo" piston pump. The cupboard also contains a multi-socket set so each accessory (lighting, filter, aerator, heater) can be easily unplugged for cleaning as required. The idle aquarist can't be bothered with plants of course,

Fig. 3

so the decoration is easy to clean glass, rock and bunches of plastic plants. When massed together these "Hong Kong" varieties can look very natural as can be seen in Figure 3. The gravel is the fine (2 mm) variety which doesn't trap food and excreta and with the occasional stir will stay clean. Algae is kept at bay by using low lighting (one 30 watt fluorescent—a 4 foot tank with real plants needs twice this amount of light) and any brown algae that forms is removed with magnetic algae cleaners permanently installed in the corner of each glass piece.

One essential chore is the weekly 1/5th water change. To make life easier, this has become a 1/4 water change every fortnight or so. A garden hose has a small section of nylon mesh tied around it's inlet (this prevents fish being sucked down the pipe). The hosepipe is dipped into the tank and the other end connected to the kitchen tap and the air flushed out. The tap end is then disconnected and placed outside the kitchen door so the tank drains without having to walk backwards and forwards with heavy buckets. When 1/4 of the water has been removed the pipe is reconnected to the tap and a slow trickle of water started to refill the tank. This must be a slow process of course to prevent a drop in temperature. The chlorine is neutralised by adding a dechlorinator and running the filter system to give mixing of the waters. An hour or so later, the tank is full again and the hosepipe removed. This system takes much longer than the traditional "hoover siphoning" and corrected temperature water topping—but it is a lot easier.

The idle aquarist isn't prepared to dig in the garden for

worms or fall into ponds seeking *Daphnia*, but uses nothing else but the so convient proprietary flake food. The marine and freshwater fishes receive a few flakes each evening during the week and nothing at the weekend. This light but nutritious feeding keeps the fish healthy and the water very clean. Incidentally, you non-idle aquarists who keep frozen foods in the fridge, shred beef heart, peel shrimps, blend liver and bemax, boil lettuce, buy vitamin supplements and even breed fry as food, please note that my neglected fish have remained colourful and active for many years now. And I have never seen White Spot, Fungus, Oodinium, popeye, dropsy or any of the other problems hobbyists write to me about. Perhaps the fish like to be owned by an idle aquarist!

So what do I do with all the spare time not devoted to maintaining my home tank? What else but read about the hobby and browse through my collection of several hundred volumes on fish and fishkeeping, and not one book explains how to keep fish the easy way!

Fig. 4





ABOUT TURN FOR BAF

by A. Darby



THE 30TH ANNIVERSARY of the British Aquarists' Festival is definitely to be held at Belle Vue, Manchester with the promise of a bigger and better festival than ever before.

At the Annual General Meeting of the Federation of Northern Aquarium Societies, held in March, the plans of Mr. David Sands, to take the British Aquarists' Festival to Blackpool, were vetoed.

Mr. John Hall's willingness to organise the Festival at Belle Vue, or any other venue chosen by the Federation, gained him the majority votes for the official position of the British Aquarists' Festival Organiser.

John, an ardent aquarist, has been keeping fish since the age of seven. He has received awards for "Best Fish" at the B.A.F. and also at numerous Open Shows throughout the country. Better known as an "A" Class Judge and a lecturer on various subjects in the North of England.

For the last few years, John has assisted within the framework of organising the British Aquarists Festival and also with other popular shows.

Within forty eight hours of taking over the B.A.F. Organiser's position, John selected a working committee, and set the wheels in motion to strive for a true competitive exhibition, a "Festival of Festivals".

Whilst being aware of the difficulty of making a silk purse out of a sow's ear. John and his committee have pledged to give the hall at Belle Vue a face lift. It will be made to look bright and cheerful, to stimulate a pleasant show atmosphere. With additional heating and more comfort.

The "Champion of Champions" stand, a long time eye sore, especially for people who have worked so hard to gain a place on it, will be given a new and attractive appearance.

Additional seating will be provided for visitors, and for those visitors who enjoy a little deviation from the fish and tableaux, there will be Tombola, Raffle, other Sideshows and Refreshments.

John and his committee have also taken into consideration that a lot of children soon become bored of constantly

walking around, and to give them a break are to provide some form of entertainment for them.

With the assistance of the Judges and Standards Committee, under the chairmanship of Mr. Roy Johnson, the classes for fish entry are being revised. The proposals made are more classes for single fish and streamlining of the pairs classes. These revisions will bring the single fish classes, more in line with other major shows in the country, but the emphasis of the show will remain on the Furnished Aquaria and the Pairs exhibits.

The Judges and Standards committee have discussed the possibility of inviting judges from other Federations and have decided to invite judges from five of them, together with a new face or two from within the Federations own ranks, who have not judged at the B.A.F. previously.

Specialist societies will be invited to the B.A.F. this year and will be given the option of displaying a competitive tableaux or some other form of display stand.

Tableaux prizes were one of the items discussed at the first B.A.F. Committee meeting. It was agreed that extra money would be made available to encourage additional societies from further afield to bring in more entertaining tableaux.

John hopes also to be able to encourage traders to bring more fish, as recent years have seen a decline in the number of fish for sale to the General Public.

Exhibitors and Traders at the show, will experience friendship and a warm welcome from Mr. Hall and he will be only too pleased to help them in any way he can in his office of B.A.F. Organiser.

Any Society, Trader or Specialist Society who wish to participate in the 1981 British Aquarists' Festival, who are not on the usual mailing list, are cordially invited to reserve space by sending a S.A.E. to Mr. J. Hall, who will make every effort to allocate them the floor space required.

The address to write to is:— 54a Carr Road, Calverly, Pudsey, Leeds LS28 5RH or Telephone—Leeds 574609

More detailed information will be published in this magazine when it is available.



D. affinis. Young, recently imported, approx. 2 inches in length. The red coloration in the fins will gradually fade as the fish matures.

Experiences with the *Distichodus* Tribe of the Characin family

by Dr. P. A. Lewis

ANY HOBBYIST who either shows his fish at local Society shows or who visits public aquaria will come to realize the importance and size of the order of fish which belong to the *Characiformes*. Along with the catfish and cichlids this class of fish probably represents the largest number of entries at any show or exhibits at any aquaria. *Characiformes* represent more than 1,300 species at present estimates and although they may be classified as one basic type, they are extremely divergent in both life style and body forms encompassing the diminutive pencil fish, the legendary piranha and the beautiful cardinal. This article is about none of these types, it is about a little publicised genus of the tribe *Distichodontini*, part of the sub family *Distichodontinae*, the genus is, of course, that of *Distichodus*.

The family tree briefly depicted below illustrates how the genus relates to the general order *Ostariophysi*:

Order *Characiformes*
 Sub-Order *Characoidei*
 Family *Citharinidae Erythrinidae Characidae*
Characidae
 Sub-Family *Citharininae Distichodontinae*

Tribe
 Genus

Naanaethiopiini Distichodontini
Distichodus

A major feature of the family *Citharinidae* is the fact that the lateral line of these fishes is straight and not curved as it is in the family *Characidae*.

The genus *Distichodus* comprises approximately twenty species most of which are large and often only seen in large public display aquaria. The genus includes fish which are typical vegetarians as well as detritivorous, eating anything edible that happens their way. The smallest of the genus is likely to be *D. decemmaculatus* and the largest *D. mossambicus*. The larger fish are often caught by local native fishermen using bait as varied as earthworms and banana slices.

The genus *Distichodus* is endemic to Africa, found for the most part in and around the Congo region. They generally prefer to inhabit areas of swampland and muddy regions where the pH of the water is low, i.e., acid, pH 5 to 6.5. They will shy away from areas where the pH is high, i.e., alkaline, and the plant growth is poor. Each member of the genus has an adipose fin, located on the back of the fish between the dorsal fin and the tail fin,

and both this fin and the caudal fin lobes are covered with small scales. The scales of the genus are exclusively Ctenoid, that is the scales are rounded in shape with serrations on one edge, often the leading edge.

Sex distinctions of the species do not manifest themselves externally and it is thus very difficult to choose a pair with total success. This, coupled with the fact that it may take four or five years for the species to reach maturity, has resulted in no reports having been filed to date describing the breeding of this genus. Additionally, most members grow so large that a tank much larger than that normally maintained by the hobbyist would be required to ensure success once a mature pair had been obtained.

Once the hobbyist has acquired any member of the *Distichodus* genus, he will find, in general, that he has a fish which is easy to keep and is likely to live as long as 10 years, fate permitting. Temperature is not critical, within the range 74 to 82 F is normally adequate. Feeding can be difficult, particularly with the larger fish such as *D. lussuo* and *D. sexfasciatus*, and here the aquarist must experiment in order to find an economical, yet beneficial, source of food. When these fish are young, they will consume large quantities of *Daphnia*, White Worm, Bloodworm and flake foods; as they become larger, these foods require supplementing with large flake food, pelletised foods, food tablets, earthworms, snails, lettuce leaves, beef heart, liver, chopped spinach, maggots, oatmeal, sprats, shrimp, garden peas and unwanted fry. This is, of course, only a partial list but it does serve to illustrate the imagination required to come up with foods for these larger fish. I personally have fed all the above foods at one time or another to both specimens of *D. lussuo* and *D. sexfasciatus* that I have owned. The *D. lussuo* grew to 14 inches within 3 years and the *D. sexfasciatus* to 12 inches within 4 years.

One question the hobbyist must have at the forefront of his mind when contemplating the purchase of any *Distichodus* is, "to what size will it grow?" With this question in mind, I have compiled the table contained in the article in an attempt to classify the genus in terms of increasing size.

The genus *Distichodus* size Ranking & Geographic Grouping

Species	Range	Size estimate
<i>D. decemmaculatus</i>	Central Congo basin	3 inches
<i>D. nobili</i>	Upper Congo	3-4 inches
<i>D. notospilus</i>	South Cameroon to Angola	4-5 inches
<i>D. affinis</i>	Congo basin	4-5 inches
<i>D. albus</i>	Upper Congo	8-9 inches
<i>D. sexfasciatus</i>	Congo basin	12-13 inches
<i>D. fasciolaris</i>	Congo basin and Angola	12-13 inches
<i>D. maculatus</i>	Congo basin	14-15 inches
<i>D. lussuo</i>	Congo basin and Angola	16-18 inches
<i>D. hypostomatus</i>	Gaboon	15-18 inches
<i>D. petersii</i>	East Africa	17-18 inches
<i>D. altirostralis</i>	Congo basin, Stanley Pool	17-18 inches
<i>D. schinga</i>	Lake Kariba	20-22 inches
<i>D. antonii</i>	Congo basin	22-24 inches
<i>R. rostratus</i>	Nile, Senegal, Lake Chad and Niger	Above 24 inches
<i>D. niloticus</i>	Nile	Above 24 inches
<i>D. brevispinis</i>	Nile, Senegal and Niger	Above 24 inches
<i>D. largi</i>	Congo basin	Above 24 inches
<i>D. enyocephalus</i>	Nile and Niger basin	Above 24 inches
<i>D. mossambicus</i>	Zambezi River	24-30 inches

As can be seen from the table, of the twenty species listed, only four are likely to attain lengths of less than 6 inches. It is as a result of the large size reached by most of the genus, coupled with the fact that many of the genus are drab coloured and somewhat aggressive, that their importation is very infrequent and it is often only the specialist aquarist shops that will import such fish.

Three of the genus are, however, available at more frequent intervals than the rest and it is these three, examples of all of which I have owned, that I would like to deal with in more depth.

The first of the three is *D. affinis*, hailing from the Congo basin. As shown in the photograph of a young fish approximately two inches long, *D. affinis* is a uniform silver with a faint blue-green edge to the back and sides. The red-orange coloration seen in the dorsal, ventral, anal and caudal fins coupled with the black in the leading edge of the dorsal fin are colours which are only present in the young fish and which will sadly disappear as the fish grows and matures. By the time the fish has grown 4 inches, all coloration will have gone, even the black in the dorsal fin. The aquarist will then be left with a



D. sexfasciatus. Photograph shows a tank reared specimen 12½ inches long. This fish won the "Champion of Champions" prize at the British Aquarists' Festival in 1979.

rather oddly shaped silver coloured fish which looks as if its head is disproportionately smaller than its body. The fish is, however, full of character, easy to keep but a little timid when it comes to showing visitors the tank and its occupants. It has been my experience that whenever *D. affinis* is suddenly disturbed or when something about the environment is not quite right, the fish will appear with a black blotched pattern across its body. This fact alone makes it very difficult for the aquarist who would like to show this species of *Distichodus* since the fish requires a considerable time to settle down and assume its natural silver coloration. Young fish closely resemble *D. notospilus* which is also similarly

coloured when young; *D. notospilus* will not, however, lose the red coloration in the fins.

One point worthy of note is that *D. affinis* has a deeply forked caudal fin, the fork is so deep in fact that it appears as if the fish has a deeply split tail fin. This is not a fault or deformity but quite a natural feature of the species. Additionally, both the caudal fin and adipose fin are heavily covered with Ctenoid scales, offering added protection. The *D. affinis* I owned grew to a length of 5.25 inches and lived in captivity for a total of 8 years.

The second member of the genus which I have owned on more than one occasion in my involvement with the hobby, is *D. sexfasciatus*. This fish is a truly remarkable Characin as can be seen from the photograph accompanying this article. Again, this fish is found in the Congo, particularly the Stanley Pool. The fish inhabits areas rich in rocks and submerged roots and makes good use of its elongated snout in searching out food which has become lodged in crevices between the rocks and the roots. *D. sexfasciatus* has a yellow-bronze body covered with scales which are relatively small in contrast with the size of the fish. As the name implies, the fish has six broad, black transverse bars crossing the body, in fact, the bars often totally encircle the body and do not stop in the stomach region as these bars do in the related species *D. fasciolatus* and *D. lusoso*. All the fins are coloured a rich, deep red, even the adipose fin, thus making the fish one of the most colourful, large Characins available in the hobby. One of the specimens which I owned from it being about the size of a tiger barb, grew to an overall 12.25 inches (standard length) and lived for 9 years, dying only as a result of an unforgettable accident. When young, the fish ate a truly detritivorous diet consisting of *Daphnia*, bloodworm, dried food, trout pellets, earth worms and dog food, which was fed to the cichlids present in the tank, along with the *D. sexfasciatus*. The fish was housed in a 5 ft. x 2 ft. x 2 ft. (150 gallon U.S.) tank containing a bed of gravel with cleaned peat under the gravel such that a 0.5 inch bed of peat was under a 2-3 inch layer of lime free gravel. Thus, the water was maintained soft and acid (pH 5.8-6.5) as preferred by this genus. The only decoration in the tank consisted of a selection of slate and granite together with a few select pieces of waterlogged driftwood and bogwood. The other fish in the tank were mainly South American cichlids such as *C. severum*, *C. spilargenteus*, *G. jurupari* and both a lemon scat and a tiger scat. All the fish lived in relative harmony since each was growing as fast as its tank mates. No plants were kept in the tank since either the cichlids or the *D. sexfasciatus* would have made short work of them. In order to give the fish the necessary vegetable matter in the diet, I would feed garden peas, chopped spinach or lettuce on a regular basis throughout each week. The best way I found to feed lettuce was to take a medium sized head, wash it well under hot water to bruise the leaves and clean off any pesticide, etc., attach a large piece of lead to the base of the lettuce and then throw the whole assembly into the tank. The lettuce would normally be eaten within the day and all that remained

for me to do was to remove the lead weight from the tank. Removal of this lead is particularly important in this tank which contained soft, acid water and in which lead is soluble and poisonous to aquatic life.

Unfortunately, as the *D. sexfasciatus* grew larger, the fish also grew more aggressive, terrorizing cichlids some 3 inches larger than itself. As a result, I moved the fish to a 4 ft. x 2 ft. x 18 inch deep tank which it occupied on its own. In this tank, the fish grew from 9 inches to 12.25 inches and became so tame that it would accept food from the hands of my family. On one particular occasion, the fish ate over 200 freshly thawed garden peas which my daughter fed to the fish one at a time over a 30-minute period.

The third and final member of the genus which I have kept is *D. lusoso*, a fish very similar in appearance to *D. sexfasciatus*, especially when young. A few obvious points will, however, aid in the identification of this species. *D. lusoso* has a very long snout, considerably longer than any other species in the genus. Often the fish will have 7-8 transverse bars crossing its body and these bars will not fully encircle the body in the region of the stomach. Additionally, *D. lusoso* is not as intensely coloured as *D. sexfasciatus* and will grow some 6-8 inches larger. Again, the fish hails from the Congo, particularly the Stanley Pool, and Angola. It has been my experience that this fish also becomes rather aggressive as it grows larger and older. At one stage, I kept young specimens of both *D. lusoso* and *D. sexfasciatus* in the same 40 gallon tank along with some South American catfish. Harmony existed for about 2 weeks after which time each *Distichodus* lay claim to its own territory in the tank and vigorously defended this territory against all intruders, including the catfish. For the sake of peace and quiet, I removed the *D. sexfasciatus* which was generally coming of worse in the battles. The *D. lusoso* grew rapidly on the type of diet already discussed, although in addition, this fish seemed to have a taste for any deformed or unwanted fry that I would cull from the broods of dwarf cichlids I was breeding at the time. Shortly, the fish was moved to a 5 ft. x 2 ft. x 18 inch deep tank where it grew in the company of a large South American catfish, *P. peronno*, to a length of 14 inches. Earthworms became the favourite meal of this fish as it matured, often eating as many as 30 at one meal.

In conclusion, I would like to add that the fish discussed in this article, although notably large and heavy eaters, are particularly colourful and rewarding fish when maintained under correct conditions. They are a worthwhile addition to the collection of any aquarist who has a penchant for large fish and large tanks.

Suggested Sources of Further Information

Exotic Tropical Fishes T.F.H. (H-907L).
Naturalists' Guide to Fresh-water Aquarium Fish, By J. J. Hoedeman Sterling Publishing Co., Inc., New York.
Characoids of the World, By J. Gery T.F.H. (H-961).

Beginning with Tropicals (11)

by Roy Pinks

MY LAST ARTICLE TOOK us to the point where I had introduced a pair of Pearl Gouramis to my tank, inhabited by a quantity of the smaller species of egglayers of proven worth to the beginner. Their temperament, in my experience, has always been pretty staid, despite a tendency to chase away smaller fish from their immediate vicinity. But the association of large species with smaller ones is always a calculated risk because individual fish can act out of character, so our skills of management are often put to the test in creating conditions in which coexistence is practicable. I would stress at this point that I acknowledge a need for my collection to be augmented by a small number of fish significantly different from those already in it. This is a desire expressed by almost every collector at this point, and I think it is natural enough, but what I should like to get across is that in a high percentage of cases the gap is filled by the Angel, and no mistake could be more fundamental. The Angel is essentially a subject for individual treatment, partly because it is more likely to thrive in its own company, but also because its viciousness towards lesser species grows rapidly, just as it does, and something has to give way. In the case of the Gouramis, there is a reasonable chance that if the tank contains plenty of plants and hiding places, they will prove perfectly satisfactory.

A Catch

There is a slight catch, though—or at least, I came across one. Just after the Pearl Gouramis became available there appeared locally some very nice specimens of the smaller gouramis. It is not, perhaps, well enough realised that

colour stability with the Dwarfs (*Colisa lalia*) and the Honey Dwarfs (*C. chusa*) is so unreliable that some strains are often thought to be totally different species. At the same time there are some highly attractive hues, which are worth snapping up if they appeal to you, since they may well prove difficult subsequently to match. Some brilliant green-blue Dwarfs took my eye, together with some Honeys as yellow as any platy I have ever seen. What proved to be so surprising about these purchases was that the Dwarfs slunk away, only to appear weeks later, whilst the tiny Honeys asserted themselves from the outset, never looked worried in any sense, and absolutely thrived. This was something of a poser, as Honeys with me have never hitherto come into their own, and I was not optimistic. The Pearl Gouramis, especially the male, took up mildly aggressive stances towards the Honeys, but this never went any further. In the case of the Dwarfs, however, there developed an outright feud which could only end up one way. My sympathies were all with the Pearls, in the event as the Dwarfs cringed and slunk away and generally acted like cravens. Such different temperament from the Honeys! The former moved about slyly, like the Siamese Fighter, catlike, almost, untrustworthy. The Honeys were brisk and confident, bright and always on the move, and seemed to sense when discretion was the better part of valour, darting into a clump of plants if the pace looked like hotting up. In the course of a few months the Green Dwarfs disappeared, but the Honeys go from strength to strength, not just as individual fish, but as focal points of colour which stand out very clearly nearly all the time. They keep well to the fore of the tank, moving at all depths of water, and are far more mobile and showy than I would have guessed. They do mock battles, even though they are notionally a pair—surely no courting displays were quite like these!

Colisa chusa

photo: by Hilmar Hanson



Ghost Catfish

I think I may well be castigated for making my next purchase with the beginner in mind. *Kryptopterus bicirrhus*, a truly fearful name for the charming Ghost Catfish, did not deter me from adding four to my collection. They grow to a little under 4 in., but my specimens were less than half this size. Quite transparent, boomerang shaped and constantly quivering, they look delicate and fiddling to cope with, and possible poor feeders. They are said to pine away and die if kept alone, but even after disaster had

THE AQUARIST



Kryptopterus bicirrhus photo: by Hilmar Hanson

struck, the sole survivor seemed unaffected by solitude. After introduction they settled well, took up suitable positions and found no difficulty in imbibing large quantities of chopped whiteworm and the usual run of dried food. Unlike former specimens which I had lost quite quickly, these began to look really good, and growth was rapid. The role of mystery came across well, too, and they were a talking point for all our visitors. Like many other runs of good aquatic fortune, this also came to an end with an outbreak of White Spot which affected many other fish, but not the cats. What put paid to them was the side effect of WS3, which caused their body tissue to go milky-white, death following shortly after. I managed to isolate one specimen which had maintained most of its transparency, and it recovered partially after a water change, but with a greatly reduced appetite. It died several weeks later, victim of a medication which does kill White Spot but which can hardly be regarded as an aquarium cure. The point had been made, I feel, that these fish can and will provide a lot of interest, given a good start and reasonable chances. I shall certainly try them again when a good looking batch arrives.

Shortly after this episode I secured a trio of *Etropiella debausi*, the Congo Glass Catfish, which kept company with the surviving Glass Catfish until its demise. These attractive black and silver cats, similar in demeanour to *K. bicirrhus*, proved to be decidedly more fidgety and they also scrapped, harmlessly enough, with one another. Though they gave much pleasure to some viewers they were not an outstanding success, and the last has recently died after only about 6 months' residence. It could well be that these, too, were in some way affected by the malachite green in the medication, but they did not get a pass mark on my list, much as I had hoped that they would have proved worthy "unusuals" for the beginner.

At this particular point my tank was becoming overrun by small snails—flat like Planorbis, but never growing above about a third of an inch in diameter. They are a freshwater species, accidentally introduced to my tank via the rainwater butt via birds. They were taking toll of the plants and looking most unsightly against the glass, so some measure (apart from squashing them) had to be devised. Not surprisingly, I did not reach out for a snailicide mixture. Instead, I consulted Mr Cosnette of the Barrier Reef, Cheltenham, as to whether he could suggest a biological antidote. Not surprisingly, he could. We will go into details in a later article.

Coldwater Jottings—Continued from page 30

1840. As adult age is approached, a warty mass develops on the head, sometimes forming a cap from the eyes backward. Some of these fish are uniformly velvety-black with golden reflections below. Some are red with the abdomen canary-yellow instead of white, and various other colours are produced. The warty mass may be white, pink, vermilion, orange-red, black, or variegated. The fins are usually bright red with more or less white about the caudal. A strikingly beautiful large male once had a red head, a yellow-golden body, black back, and black fins. The ordinary length of the Dutch Lionhead is 4 in. to 5 inches, with the caudal fin as much longer.

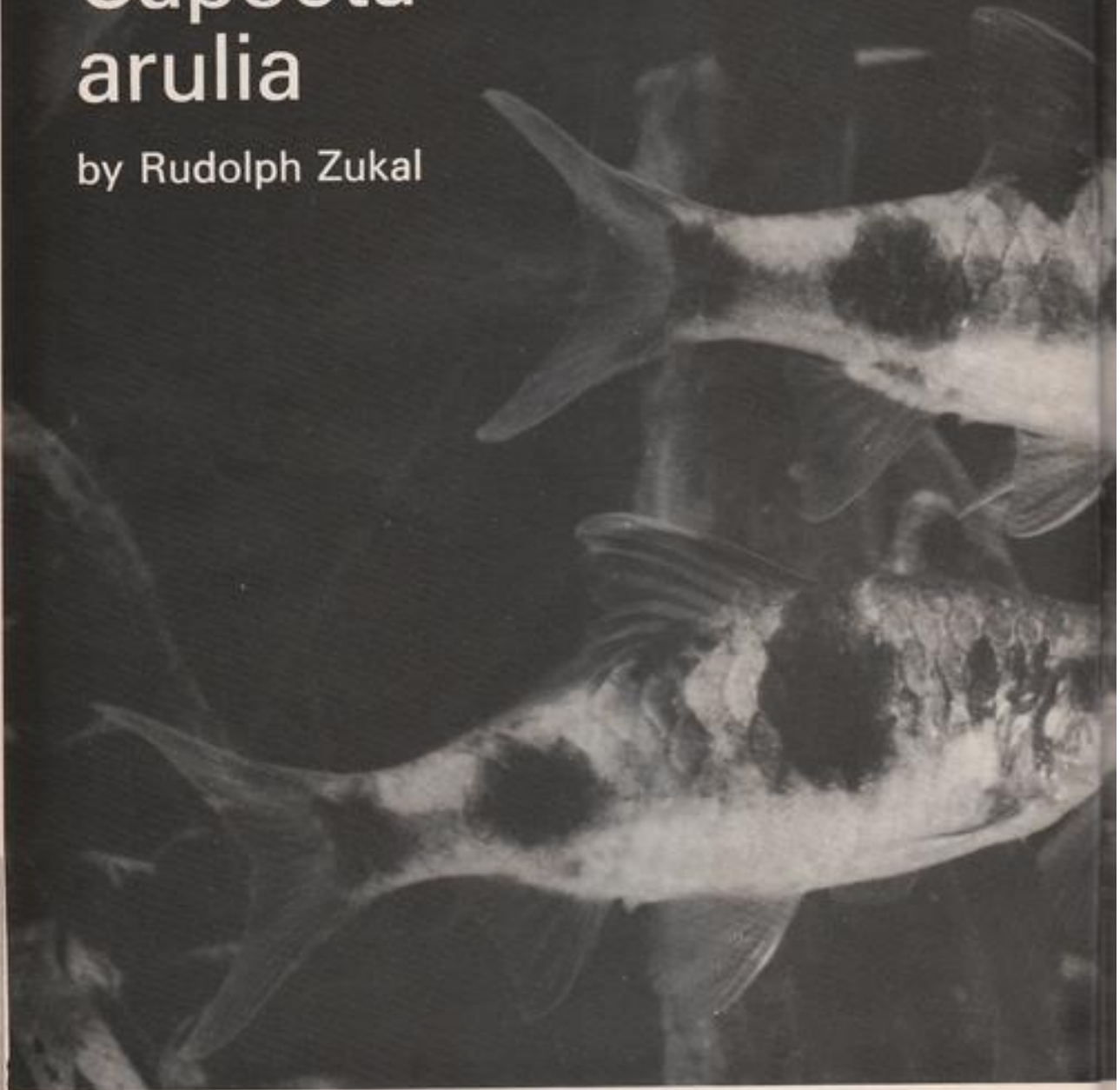
"The Ryukin or Fringe-tail Goldfish has a shortened body, a rounded and bulging abdomen, and long, flowing fins. The back is elevated, the head rather pointed in profile but broad when viewed from above. The shortening of the body in its long axis results in curvature of the spine that verges on the anal fin and is partly concealed by the caudal. The caudal fin exhibits the most striking development. It can be as long as the body or longer, and is either united or split along the median line. The depth of the fork equals half or more than half the total length of the fish. The anal fin is either single or double, and its base is nearly vertical beneath the two parts of the caudal, while its pointed extremity may extend beyond the middle of the fork of the caudal. The high dorsal fin extends beyond the base of the caudal. The colours of this fish are most beautiful. A unicoloured form is seldom seen, but a single colour may predominate. Vermilion is the usual colour which often occurs on the body, head, and fins which are often mottled with white. A golden reflection overlies the red on the head and body, and sometimes extends on its fins. Specimens with variegated back and side are the most highly esteemed. The maximum length from the mouth to the tip of the tail is rarely more than 8 inches, of which about half represents the caudal fin.

"The Vermilion Variegated Goldfish came into existence in 1900. It has a long compressed body and the dorsal and ventral outlines are decidedly curved. The peduncle is very distinct, and the scales are less conspicuous than in other varieties. The dorsal fin is elevated and wavy. The caudal is bilobed and deeply forked, and three-fifths to two-thirds the length of the body. The colour is often bright red, spotted black. Fish have been produced of a uniformly purple."

Since Dr. Podmore described these fish, in the December 1st., 1936 issue of the, now defunct, Water Life magazine, some of the varieties have become better known to U.K. aquarists. The Ryukin is quite often seen in the tanks of some dealers, and, of course the Lionhead or Rancho is now a well-known variety which has not proved 'difficult to cultivate' any more than it has been found to be a 'weak' variety. The 'Dutch Lionhead' is better known as the Oranda and is a very popular variety of Fancy Goldfish nowadays—having been much improved over the years by selective breeding. Even so, despite our greater familiarity with some of the described varieties, Dr. Podmore's descriptions still make interesting reading.

Capoeta arulia

by Rudolph Zukal





The breeding pair with the male below

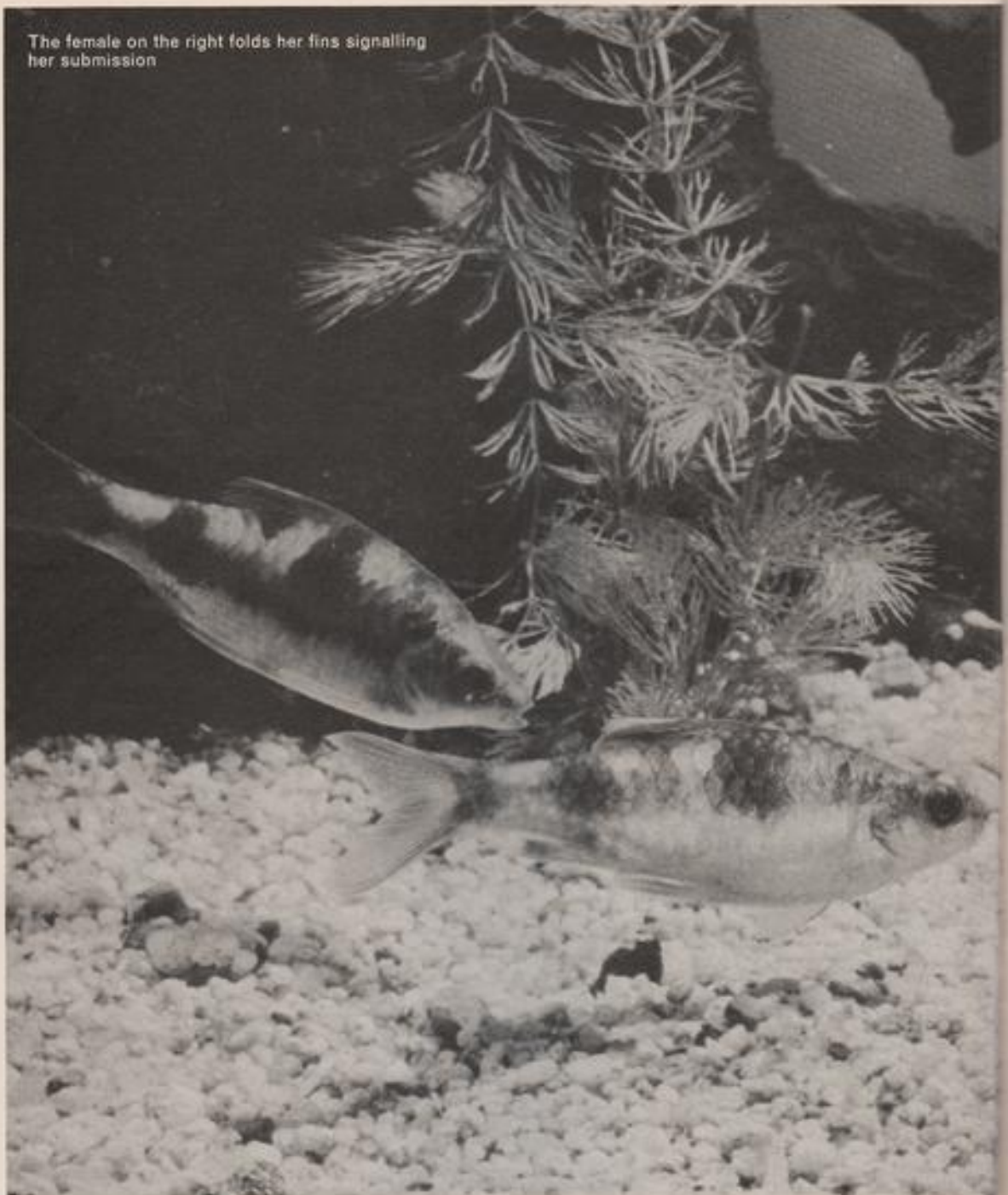
A Lesser Known Barb.

THIS REPRESENTATIVE of the barbs (Cyprinidae) which grows to a relatively large size is not very well known amongst aquarists. At least, not in comparison to other barbs of the genera *Capoeta*, *Barbodes*, *Puntius* and so on. It is worthy of more attention, since it is an attractive, not to say elegant fish up to 10 cm in length and, in spite of its size, peaceable towards smaller species. The appearance of the aquarium is enhanced by its quick and graceful movement. They must be kept in a shoal otherwise these barbs become shy.

They first appeared in Europe in 1954, brought from their natural habitat in peninsular India, and were soon successfully bred. Jerdon described them as early as 1849. The particular specimens, which were being described for the first time, came from Northern India, in the vicinity of Travankur. Present-day importers give their source of supply as Cauvery and, especially, to the north-east of Bombay.

The body of the fish is slightly elongated and rather compressed laterally. The mouth has a pair of barbels. The upper half of the body and the back are coloured in varying shades of brown, the lower parts are silvery with a reddish sheen. The scales, predominantly above the middle of the body, are decorated with a host of tiny, shimmering green dots. The body also bears dark lateral stripes and large dark spots. The caudal fin is yellowish to reddish with striking red tips. The anal fin is edged with crimson, the ventral fins whitish in colour. The dark eyes of the fish have a greenish sheen. Sexual differentiation is not easy in younger fish, adult fish are

The female on the right folds her fins signalling her submission



much easier to distinguish. The male has an elongated dorsal fin, whereas that of the female is rounded off.

These barbs are to be recommended to anyone who has a larger sized tank. Ordinary, soft drinking water, a temperature of 22°C and a relatively sparse array of plants suit these fish best of all. They prefer the bottom of the tank and this should consist of rather coarse grains of sand. The fish should be kept in a shoal of their own species and together with other types of barbs. The fish chase each other, make rapid playful movements or search the tank floor for food. Whatever they do, they are constantly on the move. Other species are not left in peace, for something has to be happening the whole time. The fish are omnivorous.

For breeding purposes I prepared an 80 litre tank. The neutral tap-water was filtered for three days, plants with delicate leaves were installed and the temperature was raised to 26°C. As soon as they were introduced the fish disappeared into the plants and several days passed before the fish were sufficiently at home for me to be able to watch a display of courtship. After a few hours of this courting and pursuit of the female by the male the fish pressed themselves against the plants. In typical barb fashion the male curved his caudal fin over the rear part of the female's body, the fish jerked backwards away from each other and the sexual products were produced simultaneously so that the eggs were fertilised immediately. These fell amongst the plants and down on to the floor of the tank. After about three hours, when spawning had been completed, I removed the fish and began gentle aeration. On the sixth day, by which time the young were free-swimming, I fed them with very fine food. They grew rather quickly and when they were still only about three weeks old, I noticed the appearance of the dark markings.



Courtship culminating in the spawning act

The male entices the female into the plants

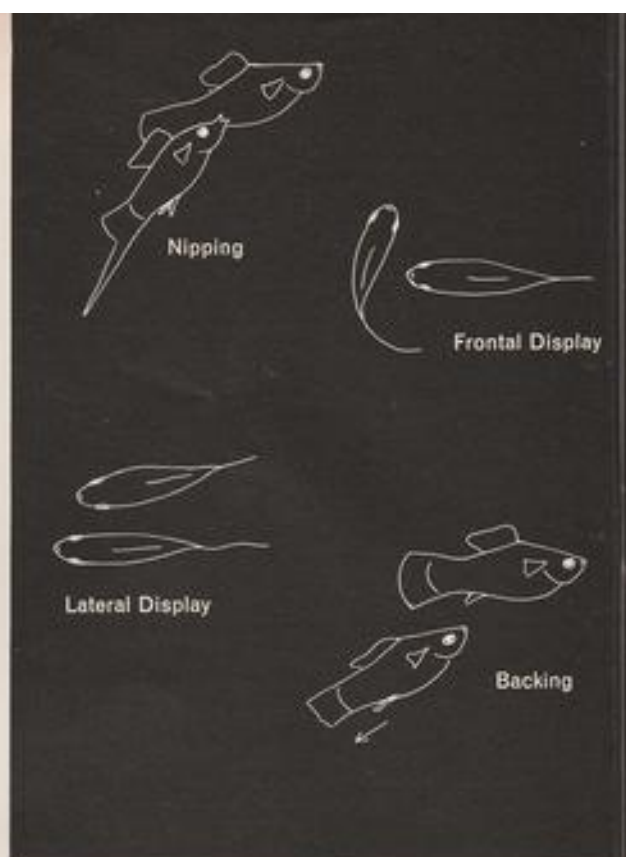


Courtship and Hybridization in Platyfish and Swordtails

by T. R. Hamilton

ALL AQUARISTS are familiar with platyfish (*Xiphophorus maculatus*) and swordtails (*Xiphophorus helleri*). They are available in a wide variety of colour forms and, being live-bearers, are quite easy to raise. Even though platys and swordtails are considered by taxonomists to be two separate species, they can easily be made to mate with each other and produce fertile hybrid offspring. Considering the ease with which these animals produce hybrids, it is interesting that platy-swordtail hybrids have never been found in the wild. The opportunity to hybridize in nature certainly exists because the two species generally inhabit the same streams and rivers in Central America. In fact, during scientific collecting expeditions to Mexico, it is not unusual for platys and swordtails to be captured in the same collecting net.

Biologists have long been interested in the ways in which animals avoid mating with closely related species. The means by which hybridization is prevented are called isolating mechanisms. One of the most important isolating mechanisms in platys and swordtails is their courtship behaviour. A careful comparative study of their courtship behaviour reveals some important differences. Courtship is often observed in home aquaria and can easily be induced by isolating a male from all females for at least 24 hours. When a female is placed in the male's tank, he will begin courting within a few minutes.



Below is a description of the courtship displays found in platys and swordtails.

Nipping—the male appears to bite the female on her side, or near her anal fin. This is often observed when a female seems to be avoiding the male's advances (see Figure 1,A). This may be seen in both species but it is most often performed by swordtails.

Frontal Display—the male positions himself in front of the female and curves his body into a U-shape. If the female remains stationary, the male will often swim backwards and slowly become parallel with her. Sometimes as he backs up, his tail will come in contact with his mate's side (Figure 1,B). I have never seen male platys perform this display.

Lateral Display—the male remains parallel with the female for several seconds with his dorsal and caudal fins held erect and his body stiff (Figure 1,C). Both platyfish and swordtails perform this display.

S-curling—the male distorts his body into a stretched-out "S". He remains in this amazing position for several seconds and only performs it in close proximity to his mate (Figure 2,A). This display is common in platyfish and rare in swordtails.

Retiring—occasionally the male folds his dorsal fin and backs away from the female. This often occurs if she has



S-curling



Pecking



Gonopodium Swing



Thrusting

been avoiding his advances (Figure 1,D). This display is only performed by platyfish.

Backing—this occurs when the male swims backwards and with his dorsal fin held erect. Backing often follows the frontal display and only occurs in swordtails.

Pecking—this occurs when the female is unresponsive. The male swims away from the female and begins to peck at the bottom of the tank. He appears to be searching for food (Figure 2,B). This behaviour, as a part of courtship, is only found in platyfish.

Gonopodium Swing—the male swings his gonopodium into the forward position. This sometimes occurs when the male is some distance from his mate (Figure 2,C). It is quite common in both species.

Thrusting—this often occurs if the male has been courting an unresponsive female. It involves the male making a quick dash towards the female with his gonopodium in the forward position. Though the gonopodium may make contact with the female's genital opening, this probably does not result in the successful transfer of sperm to the female (Figure 2,D). Thrusting occurs in both species.

Copulation—this should not be confused with thrusting which is very rapid. Copulation occurs only if the male's gonopodium remains in contact with the female's genital opening for one to three seconds and results in the transfer

of millions of sperm to the female. Copulations are actually quite rare.

Note that all of the above behaviour patterns are not found in one species. Each species differs in some significant way. These differences may serve as a signal and aid a female in identifying the species of the male which may be courting her. There are, of course, other signals which may aid the female in recognizing her prospective mate (body size, shape and colour) but it seems to me that behaviour is probably most important. A male, which does not perform a frontal display, is not likely to mate with a female swordtail and perhaps a male which performs Pecking, Retiring and S-curling has a greater chance of mating with a female platy. Only swordtail males perform frontal displays and only platyfish perform Pecking, Retiring and S-curling. They may recognize the species of the males simply by the way they behave. Ordinarily, in an aquarium containing platyfish and swordtails of both sexes, a male which courts a female of a different species is frustrated by the female's unresponsiveness: she turns away from him while he is displaying or occasionally she may even attack him. After a while a male will stop courting an uninterested female and seek out another prospective mate.

How then are hybrids produced if the females continually avoid the advances of males of a different species? The answer appears to lie in the fact that behavioural isolating mechanisms break down if male swordtails are placed with female platys and only female platys, or if male platys are placed with female swordtails and only female swordtails. In other words, if they are not given a choice, they will mate with members of a different species.

The wide variety of platys and swordtails which exist today are the result of hybridization between the two species and many generations of careful selective breeding. New forms seem to appear in the pet stores every year. Aquarists who contemplate breeding new varieties should remember that platy and swordtail females can store sperm from one male for over 3 months; therefore, only females kept in complete isolation from mature males are suitable for breeding experiments. The best way to do this is to isolate a brood of fish soon after birth and remove any fish which start to develop a gonopodium. The gradual elongation of the anal fin into a gonopodium is a sure sign that a fish is a male. It is important that the brood be inspected every day as the fish approach adult size because the males become sexually mature over a period of several weeks rather than all at the same time. One male is capable of inseminating many females.

Although there is an almost endless variety of crosses between the various forms of platy and swordtails, there are some hybrids which should be avoided. Hybrids resulting from swordtails mated with platys of the "Tuxedo" variety have a strong tendency to develop cancerous growths over much of their body. In fact, any platy with a lot of black body pigmentation should not be mated with a swordtail for this same reason. Though the growths may not be fatal they often cause the fins to degenerate producing unattractive fish.

What is Your Opinion?



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

"I HAVE JUST returned to fish-keeping after a break of six years, so the first thing I did was to get a regular supply of *Aquarist* magazines to see what the trends were. I find that things are just as confused as when I gave up fish-keeping," says Mr. W. F. Sells, of 62 Aylesham Way, Yateley, Hants.

He continues: "When I started to keep fish the big thing was under-gravel filters, which I used with tungsten lamps. Plant growth was excellent. Then I made the mistake of following fashion: I changed to Gro-Lux lighting. All I got was alga-covered plants. I put in a power filter. Plant growth slowed down. Finally I put in True-Lite. Result—expensive tube; dead plants. I then gave up fish-keeping.

"I have now started again with a 30 in. tank, U/G filter and two 40 watt tungsten lamps; the results so far seem good. I think the answer is to find a system that works for you and stay with it and don't follow fashion as I did.

"For background I used sheets of slate glued to the glass. The effect of the stratification in the slate was most decorative. My next project is to set up two tanks—one for scats, and the other for a couple of gar pike (*Belonesox belizanus*) when I have a good supply of live food (guppies?). Why is it that these fish are never mentioned in *The Aquarist*?" (I must admit to not having come across the fish Mr. Sells mentions.

A careful search through the F.B.A.S. *Dictionary* led to my discovering that the fish is a livebearer, the name of which is properly spelled *Belonesox belizanus*; its common name is given as the pike top minnow. Perhaps the fish is not very popular or common—which would account for its not being mentioned; however, now that we've mentioned it we may receive letters from readers who keep the species and find it interesting and attractive B.W.).

I tend to agree, in general, with many of Mr. Sell's comments about lighting. I have a fluorescent tube, plus a tungsten bulb, over one of my tanks and the plants in the tank are coated with a growth of a dark-coloured alga. Tomorrow I'll probably remove the fluorescent tube—it's an ordinary white one—and replace the 40 watt tungsten bulb with a clear, 60 watt tungsten bulb. I need hardly remind regular readers that I've tried most other forms of lighting some or many years ago and have given them up. Similarly I gave up U/G filtration some years ago after having used it for a considerable length of time. I prefer outside power or box filters, and clear, tungsten bulbs. I should, of course, mention that there are plenty of people who are keen supporters of fluorescent lighting of a variety of kinds and colours, and of under-gravel filtration. Whatever combination of light and filtration permits your fish and plants to thrive is most probably the best one for you. When you discover it, stick to it—unless, like me, you like the occasional change to add interest and variety to your participation in the hobby.

Leaking Tank

Last week I noted a slight dampness of the carpet beneath a batch of four tanks. Next day the water level in one tank had dropped an inch and the carpet and underfelt were rather worse than damp! An investigation disclosed the fact that an ageing, angle-iron tank, 18 in. × 10 in. × 10 in. in size, had rusted at the rear to an extent such that glass, putty and metal had parted company. The tank was not sealed with one of the modern compounds. The rusty frame and the mess made me decide to buy a replacement tank rather than strip everything down, get out cleaners, brushes, paint, etc., and spend money on new glazing compound as well as a silicone-rubber sealer.

I had to make a trip to Belfast to buy a replacement tank. I traced the Gem tank that I wanted in the third shop that I visited, and the tank—without hood—cost me £7.50. Last time I bought one, some years ago, it cost me about £4.00, if I recall correctly. Prices of many things continue to surprise me. I consoled myself with the thought that a double LP of Mahler's 10th Symphony had cost more so I decided that the tank—like the records—was good enough value. When I got the tank home I gave it my usual treatment, painting the base, back and one side glass with black paint, and the frame with dark green paint. Twenty-four hours later the paint had dried and I was able to set up the new tank.

The most disappointing aspect of the experience was the fact that a particularly interesting and attractive dwarf, foreground covering plant had been growing extremely well in the old tank, covering the gravel base with a carpet

of tiny green leaves on long chains. This plant, together with all the other plants in the tank, had to be replanted in the new tank. I decided to put new gravel in the new tank; but under the new gravel, at the rear, I put a thin layer of old, dirty gravel; and when I had the new tank set up, planted and crystal clear. I poured in about two cups of mucky water drained from the gravel in the old tank; after which I introduced some Malayan sand snails. The dirt gradually coated the plants' leaves, the gravel and the rocks, making them look dirty; so I gave the tank the occasional, gentle swirl to set the mulm in motion. Some has ended up in the filter wool and some has settled down into the gravel and behind rocks. I hope that the dirty gravel and mulm will 'seed' the new gravel with useful bacteria; and the snails will get the gravel moving and permit waste to reach the plants' roots. The new tank now looks as if it has been set up for some months and I'll probably introduce some fish tomorrow. I just hope that the dwarf plant will grow as well as it did in the previous tank. It was impossible for me to plant the chains of plants in chains, so I had to roll them up into little bundles and plant those in the front half of the tank.

Bulb Life

I've kept records of my experiences with one brand of tungsten bulb; readers may be interested to read my findings—although it should be borne in mind that I was not conducting a scientific experiment, with controls; I was merely keeping a record of how long a particular type of bulb lasted in the hoods of specific aquaria. Readers should not forget that the environment in the hood above

an aquarium—a humid atmosphere and a high temperature, with little air circulation—is far from ideal for a light bulb; and bulbs were obviously designed to operate ideally in a vertical, rather than a horizontal, position. The long-life bulbs used had a coiled filament and cost 39p each in a large chain store. One installed above a 20 in. tank on 1st November, 1980, gave up on 7th February, 1981 (98 days); one sited above an 18 in. tank on 25th October, 1980, failed on 16th March, 1981 (142 days); a 24 in. tank hood housing two bulbs produced the following results: left bulb fitted on 25th October, 1980, failed on 5th November, 1980 (only 11 days later), and the replacement fitted on that date lasted until 13th February, 1981 (100 days); while the right hand bulb fitted on 25th October, 1980, did not fail until 14th March, 1981 (140 days). All the bulbs were 40 watt, pearl lamps of standard shape; they were lit for about eight hours daily. (I was given a free replacement bulb for the one that lasted only eleven days.) The other four bulbs lasted for a total of 480 days, i.e. an average of 120 days per bulb. Each bulb burned for about eight hours daily so each provided about 960 hours of light before failing. Advertising material suggested that each bulb should have burned for about twice as long; but of course the latter figure would have been based on the bulb's being sited in an 'average' light, e.g. in a hanging, open, ceiling light. Each bulb therefore cost me roughly $\frac{1}{3}$ of a penny per day.

As I mentioned before, I'm now trying clear, 40 watt bulbs, of the Winfield brand (Woolworth), that cost me

A well-planted tank



95p for a pack of four, i.e. 23.75p each. Some other tanks are lit by identical bulbs except for the fact that they are pearl instead of clear. Other tanks still contain some of the original bulbs; others own-brand bulbs from another supermarket. Some of the latter bear the message 'packed for . . .', which suggests that they may be made by a famous manufacturer and supplied to the supermarket chains without the manufacturer's name appearing on them. If the cheap bulbs last for about the same length of time as the more expensive bulbs, I'll certainly stick to the former. The latter are said to give out more light for the consumption of the same amount of electricity.

Recently I stuck polystyrene insulation (ceiling) tiles onto the base and ends of a large aquarium to try to conserve heat. I have not kept a record but the neon light on the heating unit certainly seems to be lit less often and for shorter periods. Don't forget to insulate the bottom of your aquarium if you have it sitting on a frame that leaves its base exposed. The insulation should keep in heat, keep the plants' roots warmer, and keep stray light away from the plants' roots. The end result should be a slight saving in heating costs and a possible improvement in plant growth. (Remember to use an appropriate glue to stick on polystyrene tiles. Some modern adhesives are unsuitable as the solvent they contain dissolves the polystyrene.)

Tracheotomy

Mr. Peter Burgess, B.Sc., resides at 35 Macdonald House, Orkney Street, London, SW11 5DW. He writes: "I was very interested to read Mr. Robinson's account of a tracheotomy on an angel fish (March *W.Y.O.*). In fact, I was amazed. I was not aware that fishes possess a trachea. I understood the trachea to be part of the breathing apparatus of land vertebrates (with apologies to the whales and dolphins!) which terminates in the lungs. As most of us are aware, the majority of fishes do not have lungs for respiration; instead they have gills. I am therefore not sure what, if anything, was by-passed during the operation. In higher fishes even the air bladder is completely separated from the pharynx, so the by-pass could not have involved connections to this organ.

"The difficulty in breathing observed in Mr. Robinson's angel fish is a common symptom of many diseases and other factors, e.g. poisoning. It certainly does not automatically indicate a 'blocked throat'. I am sure that Mr. Robinson performed the operation with the best of intentions; however, I am left with the conclusion that the unfortunate angel fish was subjected to a very painful and totally unnecessary experience. Perhaps in future Mr. Robinson will consider chemotherapy alone. If he does insist on performing other operations, or, worse still, if he has influenced other readers to attempt micro-surgery, then may I suggest the use of anaesthetics such as MS-222 or benzocaine (ethyl-

4-aminobenzoate), the latter of which is much cheaper but requires acetone to dissolve before being added to water.

"While on the subject of chemicals, I would like to reply to your comments in the December, 1980, *W.Y.O.* concerning the price of potassium permanganate. You quoted the price of $KMnO_4$ prepared for use by aquarists to be 5g. for 45p. That is equivalent to £90.00 per kilogramme. I have just looked through a catalogue of chemicals supplied by a large British company which gives the 1980 price for high purity $KMnO_4$ at £7.28 for one kilogramme. The poor aquarist is being severely ripped off! Keep up the good work."

P.M. & J.A. Radley write from 36A Wistaston Road, Crewe, Cheshire. "In the January issue you asked for information on the following. (a) Tungsten lighting: We have always used the cheapest bulbs we could find—in our locality, Woolworth's own brand—and have found them to be perfectly satisfactory. The best combination in our 24 in. community tank we have found to be one pearlised pink 60 watt and one pearlised white 60 watt, wired up so that the white light can be switched on and off without affecting the pink light. Our tank receives very little daylight and we have found that the above arrangement ensures abundant plant growth without excessive algae. Incidentally, our fish seem really to like the impression of sunrise and sunset that can be created with judicious use of the pink light on its own.

"(b) Fry foods: We are raising pearl gourami fry at the moment. We started them off on Liquifry for Egglayers, which the fry seem to like, but we find that you have to be very careful not to put too much in as it easily fouls the water. To help combat this we used gentle aeration right from the start—in order to circulate the food well—but no filtration. Later on we changed to a mash of Liquifry, Biol and tank water, which seems to be bringing them on very fast. We syphon out waste food about once per week. After four weeks the fry are about $\frac{1}{2}$ in. long and are big enough to eat finely mashed flake food."

Fish surgery

"Next fish patient, please! Just swim along here" stated a headline in the *Kentish Times* dated 19th February. "Britain's first 'surgery' for fish, which opened in New Eltham only a few months ago, is attracting custom from across the country," began the opening sentence. The article continued: "The shop, Aquality, is based in Southwood Road, near Crossways, and is run by two graduates, Andrew Stagg and George Gawor, both biologists who have already designed many new products for big chemical companies." The article, illustrated with a photograph of Mr. Gawor in his surgery, goes on to tell how the co-owners not only sell fish but spend about one third of their time "being doctors to the wholesale trade—through

which they buy their fish". The partners also diagnose fish diseases and can usually give out some type of suitable treatment—which explains why they get visitors from all parts of London and "have had people calling from Devon and Taunton".

My thanks to Mr. Jerzy B. Gawor, B.Sc., M.I.Biol., who kindly sent me a photo-copy of the article concerning his establishment. I included a letter from Mr. Gawor in my April feature.

You may have read Mr. Martin G. Briscoe's articles about Siamese fighting fish in previous issues. Mr. Briscoe sent me the following letter from 1 Fields Court, Potters Bar, Herts. "I have read with interest about your difficulties with the *Aponogeton ulvaceus* (*sic*) plant expressed in recent copies of *The Aquarist* and *Pondkeeper*. . . . I have worked in horticulture and landscape gardening all my life as a propagator and have found shock treatment to give the best results with plants. I have applied this theory to aquatic plants and have been successful. I treat the rhizome of this plant as I would that of an iris, cutting away all bad parts of the rhizome and all roots during its rest period. Any food that is in the corm (*sic*) can then keep the leaves alive and is not diverted to feed the roots. After the rest period has passed, during which time I leave the rhizome in the tank, new roots will appear and following this new leaves will start to shoot. The existing larger leaves may go brown after about a week and I cut these off. I have never actually seen any leaves die back as those in your picture and all my leaves remain in good condition throughout the rest period.

"The water in my tanks is fairly soft, about 6°dH and the pH is about 6.9. Temperature ranges in my various tanks between 78-82°F. Light conditions have little effect and indeed I have grown the *Aponogeton ulvaceus* (*sic*) in a 24 in. all-glass cube containing discus fish (and) lit only by an 18 in. Gro-Lux tube. I usually place the plant reasonably centrally in the tank during the growth period. I have found Tetra Blackwater Extract to be beneficial to both fish and plants. The plant in my discus tank bore leaves of 22 in. in length.

"I have four flourishing plants in my tanks at the moment, two of which I have taken through their rest periods. Indeed the plant which grew in my discus tank and which went through a rest period, now bears leaves of about 9 in. again and is of a most delicate green.

". . . I have found as a propagator that I had to reduce foliage by cutting in half soft wooded cuttings to stop transpiration of foliage. I found plants give off water as a cutting instead of taking it up. Thus we used overhead spray to produce moisture; but of course this does not apply to aquatic plants." (A number of years have passed since the days when, as a student, I had access to heated propagating beds complete with mist propagation sprays and was able to root all sorts of difficult (land) plants under ideal conditions.

I've already told you how the introduction of another species of *Aponogeton* into the tank containing the *Aponogeton ulvaceus* that wouldn't grow did the trick: the new plant sprouted, and very soon the older plant started to grow as well. I suspect that the new plant released some substances—possibly hormones?—that caused the older plant to begin to grow too.

Newcomer

Mrs. Gail Hamer resides at 5 Alexandra Street, Hopwood, Heywood, Lancs. She says: "As an aquarium keeper of only six months I felt I must write and tell you how much I enjoy *The Aquarist* and *Pondkeeper*—especially *W.Y.O.* I made the usual mistakes in the beginning—such as over-feeding and buying unsuitable fish—but now my tank has settled down and is flourishing. The water is crystal clear and the plants and fish extremely healthy.

"I borrowed some back issues of *The Aquarist* from a friend—in fact, some of them go back 15 years—and the collection is complete back to 1968. It has taken me almost six weeks to read them all. I now feel as if I've known you personally: the time you gashed your hand; the reports on your old tortoise and finally its death; all the bits of information about yourself. I've almost read your life story in a few weeks.

"There are some small points I would like to ask about the smell of aquarium water. I've been told there should be no odour at all; but my tank has a lovely warm, earthy smell and I was wondering if this is okay. Also, my large, female swordtail, which is about two years old, has started to grow a

Emperor tetra—*Nematobrycon palmeri*



swordtail. Do they change sex as they get older? Will the bog wood I've been preparing for some weeks make my aquarium water soft or hard? I live in Lancashire and the water is very soft. Also, I have collected many fossils from the river Ribble—well inland. These include rocks of ancient coral and fossilized shells; they are very unusual and I wondered if they could be used to furnish a new tank which I am setting up."

I began writing for *The Aquarist* in 1964, when I was a full-time student, Mrs. Hamer, so you've probably discovered that I find aquarists' letters just about as interesting as my own fish and plants. I should say that if your fish and plants are thriving, then a slight odour from your aquarium water should not give any cause for concern. The water in most of my tanks has a slightly earthy odour. Do watch out for strong, unpleasant smells that could indicate decaying food, plants or fish corpses; or growths of an undesirable alga. It's useful to change about $\frac{1}{4}$ of the water in your aquarium every few weeks to prevent a build-up of mineral salts in solution. Hormonal changes in ageing female swordtails could cause a female to develop some of the characteristics of a male, e.g. grow a swordtail—just as some old ladies develop moustaches. You do not state where you obtained your bog wood. How are you preparing it? If you bought it in a shop it should not require much preparation. The most suitable types of bog wood should not make aquarium water hard or soft. Some such woods release coloured substances into the aquarium water—as does peat—and turn it a clear, amber brown colour. Avoid putting freshly-cut branches, stumps or wood into your aquarium as some can release harmful

Female dwarf gourami—*Colisa lalia*



substances. Bog wood bought in a dealer's shop should be safe. Were I you I should avoid putting fossilized shells or ancient coral rocks into a freshwater aquarium. Some such substances could contain a proportion of calcium carbonate (CaCO_3) which can dissolve in soft, acidic water rendering it hard. If I were you I should avoid all materials that could dissolve in, or release substances into, aquarium water. CaCO_3 -free gravel and rocks, together with a suitable selection of aquarium plants, can make any aquarium look extremely attractive without the addition of bog wood or fossils. You said that the fossils are "unusual"; and I feel one should keep unusual things out of decorative aquaria, if possible. What is your opinion?

Master David Henshaw is 16 years old and writes good English. His home is at 25 Trowell Road, Stapleford, Notts., and he says: "I have been a member of the Long Eaton Aquarist Society for 2-3 years now; and to anyone who is interested in and keeps fish, but who doesn't belong to such a club or society, what I say is—you're missing out; missing out on the chance to learn more about your hobby, make new friends, discuss any problems you may encounter, and visit places like fish farms and shows without the worry of having to sit behind a steering wheel for hours on end trying to find the places. On the whole, there are many advantages of being in a club or society."

"Long Eaton A.S. meets every month. One of the members runs a discount 'shop'. He buys bulk food and accessories from wholesalers, and sells them at reduced prices to members. There is also a library. This is a selection of books which anyone in the club can borrow, paying a small fee for every month he or she borrows a book. The profits from these two ventures go into the club to help pay for open shows, trips, lecturers' fees and slide shows, etc."

"Each month there is a members' table show. This means that at each meeting there is a different class to be shown. Each month the winner gets three points, second gets two, and third one point. At the end of the year there is an award for the Outstanding Aquarist, who gets most points. Points can also be obtained at open shows. The Long Eaton open show is on 30th August this year at Gregory's Rose Gardens. We all have fun organising the show but it can be hard work sometimes. Some nights we are invited to other clubs for various reasons. One month there was an auction of fish and plants, accessories, etc. The last club night we had was spent at Loughborough A.S. taking part in an inter-club competition. We won on that occasion; but later on in the year we are expecting a re-match. The quiz master was Mr. Dave Keeley."

"Occasionally a lecturer comes to talk to us and answer any queries we may have. Past lectures have been on discus, general fish-keeping, live bearers, parasites and other such topics of interest to aquarists. Trips have taken us to Solihull and Doncaster and we are planning a coach to Doncaster open show, and Bridlington."

"New members are always made welcome at Long Eaton—as I suspect they are anywhere else. So, if you are interested in fish why not go and have a look around your local club to see what it's like. If you have not got a local club there is no harm in gathering a few friends together to start one. That's how other clubs started."

Photographs

Photograph 1 shows a well-planted tank containing an interesting selection of plants. Please send me details if you have successfully cultivated any of the species you can recognise. The second shot is of an emperor tetra, *Nematobrycon palmeri*. Have you kept or bred this little jewel? Photograph 3 shows a female dwarf gourami, *Colisa lalia*, and photograph 4 a female honey gourami, *Colisa chuna*. Please send me a few lines if you have bred or kept either of these small gouramis.

Mr. R. S. Holmes sent me the following letter from his home at 5 Keals Croft, Lynton, Devon. "It was, I think, several years ago when fishes' life expectancies and cases of unusual longevity were last discussed in *W.Y.O.* I recall one lady writer bemoaning the fact that figures were not published in any aquatic book, and that different authorities, when asked, tended to give vague and often widely-differing estimates of life spans. Further correspondence on the subject should prove interesting. Readers, beginner and expert alike, could find out how long they may expect their latest acquisition to live, and I don't doubt that we would all be surprised by some of the entries in the long-life stakes. Obviously claims in the latter category cannot be verified, and aquarists are as prone to exaggerating their achievements as are other hobbyists.

"This train of thought was initiated by the recent celebration of a 'birthday'; well, date of purchase to be precise. No, I do not provide cakes with candles and party games in the celebrants' tanks! Now that I no longer exhibit fish in breeders' classes, when hatching dates must be carefully recorded and notified to club show secretaries, I tend to forget exact ages. Some purchase dates, though, I remember accurately, because they either coincided with or were close to other more momentous family occasions.

"One such purchase, exactly ten years ago, was a pair of *kribensis*. Since they were adult fish when bought, I estimate their ages to be nearer eleven years. Though they last raised a family more than four years ago, they are still active, in superb condition and growing. Rare references to fishes' ages maintain that, at around seven years old, dwarf cichlids are definitely senile.

"Seven years happens to be the known age of my other old timer. It was bought in a mixed bag at a club bring-and-buy sale. It is the size and shape

of a white cloud mountain minnow, but I cannot identify it other than believing it to be a rasbora. It is not included among 27 species described and illustrated by Professor Sterba. If it is a rasbora, I believe it should have died of old age at least three years ago.

"What are other readers' findings regarding average life expectancies, and what species have long exceeded them? No tall stories, now!"

Planting sticks

"Planting sticks? I've never heard of them," begins Mr. P. J. Biggs, of 47 Bayley House, Brownhills, West Midlands. He continues: "Seriously, now, to me they are a waste of time because they uproot quicker than you can plant them. Before I give you my opinion can I ask why it is that many aquarium owners seem to hate getting their hands wet. That one really puzzles me. Anyway, back to what I was saying. My community tank is 48 in. x 18 in. x 12 in. and all my plants—approximately 50—were planted by hand. All you need is a bit of patience and some small strips of lead. The lead then holds the plant in position while your index finger pushes home the roots and also covers them in one go. On the subject of plants, can anyone tell me where I can get Java moss from; also, how to raise a spatterdock as no sooner do I buy one than the leaves start going brown and eventually the plant dies? Anyone else had this problem?" (I'm typing this in March and note that at least one advertiser is offering the plant for sale—but under its correct name, *Vesicularia dubyana*. It's listed under the heading "Dwarf Plants" and the price is 35p. As postage and packing is 60p extra it would be sensible for anyone wishing to buy a bunch of Java moss by post to order a selection of other plants at the same

Female honey gourami—*Colisa chuna*



time. Perhaps some reader with a spare piece of Java moss may care to send it to Mr. Biggs. Unfortunately, I don't have any spare pieces of the plant at the moment; I think there may be one or two short strands growing under the top frame of one of my tanks. The others appear to be free of the plant. B.W.)

Mr. C. G. J. Carini resides at "Fairmount", Llangynidr Road, Garnlydan, Ebbw Vale, Gwent, and he kindly sent me a selection of some good monochrome photographs that he took of his fish. He shot them at 1/60 second at f/8 on Ilford XP1 (400 ASA) and printed them on Ilfospeed paper. Species photographed include angels, *Corydoras* and golden and black mollies. Mr. Carini does not mention the type of lighting he used.

Master David Underhill is 16 years old and his address is difficult (for me) to spell. It's Bryn Afon, Penmon, Beaumaris, Anglesey, Gwynedd. He says: "I enjoy your article greatly and have been meaning to write to you for months. Recently I set up a 24 in. tank in which to keep native marine fish and anemones prompted by the relevant article in the January *Aquarist*. I live near Penmon Point, which is at one end of the Menai Straits, and here there are some quite large rock pools. On my first trip I was lucky enough to get, amongst some long seaweed in one of the pools, a 5-6 in. fish that is olive green in colour with a brown underneath. It is quite pike-like in appearance and is attractive to look at. This fifteen-spined stickleback, as it is called in my books, was proudly intalled along with a small anemone in the tank that contains water taken straight from the Menai Straits.

"The fish is fed on chopped earthworm twice daily and was no trouble to induce to feed—as I had feared. Now the fish is fairly tame and if I approach the tank it rushes over hoping for some worms. Last weekend I went on another collecting trip but didn't catch anything. Ah well, I suppose that was asking too much.

"In another tank I have four *kribensis* that were uncoloured when I bought them last summer. They are now fully coloured; three are males and one is a female. One male grew quicker than the others and became boss, but the female took no notice of him and began to display to one of the smaller ones. This annoyed the large male and he attacked the fancied male; but he was repeatedly driven off by the female. Now the smaller male has grown in confidence and chases the larger around the tank. The small male and the female are nearly always together and I hope for a spawning.

Oswald

"Finally, I must tell you about a 9 in. oscar I keep in a 48 in. tank. Oswald, as the oscar is called, certainly lives up to the reputation oscars have for being messy eaters; and the power filter has difficulty in keeping the tank clean. This is even more surpris-

ing when you consider that he is fed only on floating pond pellets as these are all he will accept. He is a firm favourite with all my family but his favourite is my mother. Often when I am working in my bedroom above Oswald's room my concentration is shattered by my hearing my mother talking in a silly, high-pitched voice to Oswald. These one-sided conversations are quite lengthy, with Oswald happily opening and shutting his mouth and waving his body in response. Oswald is quite fussy and objected strongly when I fitted a light to his tank; so the room light is left on instead." (I've just received an electricity bill for £102 so my fishes and plants will be getting rather less artificial light in the future. Fortunately the hours of daylight have begun to increase quite noticeably now that the clocks have been put forward one hour—which won't make the day any longer but at least it will make it seem longer and make us think that there could be a summer this year. Good luck if you are doing C.S.E. or G.C.E. examinations this month. The sun usually blazed down when I was doing examinations in June. B.W.)

I should like to remind readers that queries that require a personal reply should be addressed to one of our experts—and a s.a.e. enclosed. Please don't address such queries to me unless you are happy to wait several months until your letter possibly appears in this column and possibly attracts some replies from other readers. If I wrote replies to all the letters I receive each month there would be no W.Y.O. because I just don't have the time to produce W.Y.O. and send personal replies. Of the two choices, it's obvious that the vast majority of readers would prefer W.Y.O. to continue.

For a future issue please send me a few lines on *Bacopa* species; air pumps; breeding large cichlids; garden ponds; or anything that takes your fancy! Goodbye until next month.

Oscar—*Astronotus ocellatus*

L.E.P.



THE AQUARIST



COLDWATER Queries

by Arthur Boarder

I have some smooth newts in a vivarium and wish to breed from them. How can I sex them? Any advice will be welcome.

The newts breed in early March and you will have to prepare a tank before this time. Have a few inches of water, and half the tank must have a good shelf above the water level with sand or gravel. Once the newts are ready to breed they will enter the water and change their skins. It is then that the males will take on a bright colour and develop the long wave on the back. The

Smooth newt



READERS SERVICE

Our experts are always pleased to receive your letters which should be addressed to:
Readers Service, The Aquarist & Pond-keeper, The Butts, Brentford, Middlesex, TW8 8BN.

All queries requiring a personal response must be accompanied by a stamped addressed envelope.

tank should then be filled with water and some water plants added. The best kind will be *Vallisneria spiralis* as these have strap-like leaves. The female newt will lay her eggs separately in a fold of a leaf. The eggs are much larger than goldfish eggs and as they are transparent, it is possible to watch the development of the embryo inside. Feed the young on *infusoria* or Liquid fry food and increase the size of the food as the young newts develop. When their external gills disappear they will be ready to leave the water. Lower the water level so that there is a good platform for them to crawl out of the water. A small piece of turf will give them something to hide in.

I have made a pond with concrete 3 ft. 6 in. by 3 ft. 6 in. and with non-sloping sides. I planted it with a water lily, an iris, a marigold and three oxygenating plants. All were set in containers with J.I. compost in them. Although the fish are all right I find a film of scum on top of the water every day. Why is this?

Your pond is small and so anything which is likely to contaminate the water will have a much more concentrated effect than if there was a larger quantity of water. I expect the trouble is caused by the soil in the containers. The J.I. compost is composed of loam, peat and sand with the addition of small amounts of lime, hoof and horn grit, superphosphate and sulphate of potash. The loam, especially is likely to contaminate the water for a time, but this should lessen if the water is changed now and again. No soil need be given to the plants, except a little for the water lily. One important function of the water plants is to use up the waste matter from the fishes. This they do by sending out roots from the containers and so attracting the mulm etc. The more you feed the plants the less will they do the task they are intended for.

I have a pond of about 300 square feet surface area. In it I have oxygenating plants and about forty fishes of various sizes and species. Last week-end after heavy rains I found all but three of the fishes dead. Can you explain this please as I do not want this to happen again when I restock?

Obviously the water became foul but what caused this is questionable. When water gradually turns foul only a few fish are likely to die at first, and these may well be the larger ones, but when so many deaths occur so suddenly

there must have been a specific reason. An amount of uneaten food decaying on the bottom would soon pollute the water. You state that there had been a lot of rain and if it was possible for some of this to run off surrounding land into the pond, there may have been something harmful in it. It is unlikely that spraying to kill pests would have taken place at this time of the year but it is very obvious that something poisonous entered the water and in a fairly large proportion for it to have fouled the water so much. Clean the pond out thoroughly before restarting with fishes and check up on any causes which you think may have polluted the water.

I have some fancy goldfish in a 3 ft. tank and one of the comets and two of the moors have small white patches on their eyes. They swim with erect fins and eat well but what can I do to cure the fish? I have tried salt baths.

The trouble may be that the fish have cataracts or that they may have been infested by a tiny worm. It is difficult to suggest a cure without knowing exactly the cause of the trouble. I can only suggest that you try painting the eyes with a solution of T.C.P. reduced in strength to one in four parts of water. Hold the fish in a wet cloth and carefully wipe any surplus moisture from the eyes and dab with the mixture. Then add a smear of Vaseline before returning the fish to water. A few applications may bring a cure and a water temperature of about 70°F. will help.

I have obtained some moors and have decided to keep them at a temperature of 68°-70°F., for the winter. They are only about an inch long. Do you think that the warm water is likely to encourage them to lose their black and become bronze or is this only likely to happen with adults?

I do not think that warm water will adversely affect the moors, but do not keep them at any temperature above 70°F. I have known adult moors to lose their sooty black when kept at too high a temperature. It is probable that your fish have been raised at a temperature in that range.

Can I breed *Daphnia* to feed shubunkins and if so how?

It is not difficult to breed *Daphnia* if you have a spare small pond or a fairly large tank. If you have a pond take some water from it for filling the pond or tank. Strain it through a fine mesh net to remove any pests which may be in it. If the water is green with Algae so much the better. If not you must cultivate some *infusoria* as food for the *Daphnia*. This can be encouraged by adding to the water some crushed lettuce leaves. When you see plenty of *infusoria* in the pond add some *Daphnia*. See that they do not have any pests with them. Then wait for the *Daphnia* to breed. They will not do so in the winter unless you are able to supply some form of heating. When there are plenty of *Daphnia* take a few at a time for feeding and make sure that the water remains fairly pure by removing some and replacing with fresh. You will have to maintain a good supply of *infusoria* as food for the *Daphnia*.

I have a goldfish with a white type of growth on its body. It is raised a little and does not appear to be fungus disease. The fish is 16 years old and seem otherwise to be in good condition. I have tried antibiotics as supplied by a vet., but they do not have much effect. Is there anything else to try? The fish is kept apart from the others.

The trouble appears to be a growth and if antibiotics will not cure the fish you can try another treatment but you must realise that the fish is getting old and many do not live much longer than yours has. It is similar to a human being of 75. Hold the fish in a wet cloth and wipe away any surplus moisture. Then dab the spot with neat T.C.P., smear it with Vaseline and return to water, keeping it on its own. You could repeat the treatment if necessary every two days.

Is there any way of keeping newts from my pond? About a dozen appeared in my pond this year and I have found some of my fish had been mortally bitten.

I do not think that any damage to your adult goldfish would have been caused by the newts. These creatures have no teeth and in my opinion could not bite and injure a goldfish. Newts could certainly eat very small fishes but not adults. It will be difficult to keep newts from entering your pond to breed every spring. The only way would be to erect a nine inch wall all round the pond with an outward sloping lip. You can catch any which you find in the pond as they come to the surface to breathe or catch them in a trap made from a preserving jar and a funnel. Fit the funnel in. Secure with the screw top, place garden worms inside, secure with string and drop into the pond. Examine at times as the newts will die if unable to get to the surface for air.

I have been told that a great deal of time has to be spent every day in looking after a tank of goldfish. Is this true?

It is not true. If the tank is well-planted and is not overstocked with fish, then removing excess sediment from the bottom is about all that is necessary to keep it in good condition. The sediment is quite easy to remove with the aid of a siphon—or dip-tube. Normally, this operation should be carried out about once a week; a few minutes' work. Scraping the viewing glass free of clouding algae and removing dead or decaying submerged vegetation takes roughly the same time.

Could I overwinter three 2½ in. koi in a tank of goldfish kept in a warm living room?

Koi can stand quite a wide range of temperature but they do demand plenty of swimming space in well-aerated water. Provided your tank is large enough to support the young koi as well as the goldfish in comfort, then you have little, or nothing, to worry about. Presumably the koi will be introduced into a pond when the temperature of the water outdoors is high enough for the move to take place?



TROPICAL Queries

by Dr. C. Andrews

I have recently bought a catfish which I believe is *Heteropneustes fossilis*. Has it a common name, and can you send me some information on its tank care?

With a scientific name like *Heteropneustes fossilis*, it is perhaps fortunate that this fish has got a common name—the Asiatic brown catfish! It comes from tropical Asia, where it lives in ponds, swamps, ditches, etc. This type of environment is often deficient in oxygen, and *Heteropneustes* has air breathing sacs situated in the muscles of its back. In the aquarium it may be kept with other fish of the same size, at a temperature of around 20-25°C. Since this fish may reach 50-70cm. in length, you should provide quite a large tank. The substrate should be soft, with plenty of hiding places in the aquarium. Feed this fish on all forms of live food, meat, fish, tablet and pelleted food.

Please can you send me some information on *Leporinus fasciatus*?

You are no doubt aware that several colour variations/subspecies of *Leporinus fasciatus* occur, and very striking they are too! This fish comes from South America, where it may reach a length of 25cm. It prefers a large tank, but is not particular over pH or water hardness. Naturally, you should avoid sudden changes in water quality, and extreme values. A water temperature of around 25°C should be fine, and you should aim to provide plenty of vegetation/hiding places. Since some large *Leporinus* can do a lot of damage to live plants, plastic plants are an alternative. You must ensure that the tank has a good cover, since this fish is said to be a good jumper. You can feed *Leporinus* on soft vegetable matter and a vegetable conditioning flaked food. Very little is known about the breeding habits of these fish, although they are quite peaceful in the aquarium.

Everyone is always talking about tropical catfish, but I would like to know if there are any species which will live in a coldwater aquarium?

There are a number of coldwater catfish (e.g. *Ictalurus* from North America), although most of these are not really suitable for the home aquarium. Whilst they are rather unusual in appearance (which appeals to some people!), they grow quite large and cannot be kept with smaller fish. If you require a scavenger for your coldwater tank, may I suggest a small green or golden tench?

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

Oscars (*Astronotus ocellatus*) are a large, very popular cichlid that come from the Amazon region of South America. They are relatively easy to care for. You should be able to keep two or three of these fish in a three or four foot aquarium. They can be mixed with other similarly large sized cichlids. The water temperature should be kept steady between 20-25°C, and oscars have no special requirements regarding pH or hardness of the water. Regular partial water changes, along with good filtration via a power filter or one or more poly-foam cartridge filters, are an important part of tank maintenance. Since oscars may reach 30cm. in length, any rocks or tree branches in the tank must be sufficiently large or stable that they cannot be easily moved by these fish. Since live plants do not usually survive very long in an oscar tank, plastic plants are an alternative. Oscars are omnivorous, and can be fed on all kinds of flaked, tablet or pelleted foods, raw lean meat, fish and soft plant material. Further information may be found in "Oscars" by Neal Pronek (TFH Publications, about £2.00), and I have also sent you a Tetra Information Sheet on oscars.

A friend of mine said that fish from different habitats or countries should not be mixed in the same tank. Have you any comments?

Whenever you consider setting up a "community tank" of fish you have to bear several factors in mind, and reading through a good, basic book (such as "Aquariums" by Anthony Evans, Foyles, about £1.25) may be of some help. First of all, the species of fish you wish to keep in the same tank must all be compatible, and your local aquarium shop (or the above book) will be able to offer some guidance on this subject. At the same time, some account should be taken of the fish that you are going to keep. If the tap water in your area is rather hard, then it will be better suited to (for example) keeping live-bearers than many of the South American tetras. If you wish to keep tetras successfully, there are ways of softening the tap water.

Therefore, I would say that you should keep fish in a community tank which are compatible, and which have roughly the same requirements regarding water hardness and pH. Some hobbyists may argue the virtues of a "South American" tank (or the like), although for a beginner I think that this is an unnecessary consideration.

I recently bought a fish called a ruby shark. Despite looking through several books, I cannot find any information on this fish. Can you help?

The ruby or redfin shark (*Labeo erythrurus*) is a cyprinid fish which originates from certain parts of South East Asia. Adult fish may reach 10-12cm. in length, and are sometimes territorial and aggressive towards other fish in the same tank. It is best kept in a large tank, with plenty of plants, rockwork and hiding places. The temperature should be around 22-23°C, and the water neutral or slightly acid and not too hard. This fish can be fed on flaked and tablet foods (with regular feeds on a vegetable-based diet), lettuce, algae and safe live foods.

Product News and Views

NAUTILUS ELECTRONIC HEATER-THERMOSTAT, manufactured by Dolphin Electronics Ltd., of Chestnut Lodge, Eye Road, Hoxne, Diss, Norfolk, available in a clear-glass tube at a recommended retail price of £13.99, including V.A.T. Negotiations concerning distribution and distributors were being conducted when I was testing the preview sample in early February.

This equipment is manufactured in Britain from predominantly British-made components, and seems to have solved successfully the problems associated with the micro-chip and the combined heater/thermostat.

The version of the Nautilus that I tested is available in two wattages: 100 and 200, these being recommended respectively for 16 gallon (75 litre) and 25 gallon (115 litre) tanks. The Nautilus is equally suitable for freshwater and marine tropical tanks. In the Owner's Manual, provided with this interesting new unit, a director of Dolphin Electronics Ltd., Mr. Hunwick, who personally designed the Nautilus, says: "... The Nautilus is the result of an extremely comprehensive development programme and an equally extensive study into what you, the aquarist, really require in terms of reliability and performance. ..." He goes on to say that the unit was subjected to 14 months of continuous testing and evaluation.

"What's so special about the Nautilus?" asks the Owner's Manual, and continues with its reply: "The Nautilus, utilising the very latest silicon chip technology, offers many distinct advantages over the conventional mechanical aquarium thermostats that use bi-metallic strips, with their silver plated contacts. When a mechanical bi-metallic thermostat is operating and the contacts open and close, very often a spark bridges the gap between the contacts and thus 'electrical sparking' can be generated to cause interference to your television, radio or audio equipment; more seriously this 'sparking' action wears out the contacts leading to excessive temperature variations and ultimately the failure of the unit with disastrous effects upon your valuable stock of fish."

The leaflet continues: "The electronic switching employed in the design of the Nautilus Electronic Heater-Thermostat means that there are no contacts to wear or burn out and electrical interference is eliminated. The accuracy of temperature control, typically plus or minus a $\frac{1}{2}^{\circ}\text{C}$ or better if installed as recommended, not only ensures that your fish will live happily but also that you can expect a reduction in the amount of electricity consumed."

What does the Nautilus look like and how does it work? There is a measure of secrecy about the latter—because, I assume, as I suggested earlier, at the moment numbers of other manufacturers are attempting to produce successful thermostatic heaters using the micro-chip. I've made

some approximate measurements for the benefit of readers. The Nautilus is a quite heavy unit, partly because of its extremely sturdy, glass tube—which is about 10 in. long by 1 in. in diameter. The clear glass tube on the test sample I received was about one tenth of an inch thick and I understand that the tube easily sailed through all the safety tests that such tubes must pass.

The Nautilus is sealed with a khaki-coloured bung of about one and two tenths of an inch in length; and it certainly looks like a better seal than some I've observed in other units intended for submersion in an aquarium. Inside the unit under test there is a section of approximately 4 in. in length that extends from the base of the bung to what I may call the separator that separates the thermostatic section from the heating section. In the upper, 4 in. section mentioned are the printed circuit 'board', the proverbial silicon-chip, a neon indicator bulb that lights up when the unit is on, i.e. heating, and a number of other electronic components.

The lower section of the tube is about $4\frac{1}{2}$ in. long; the upper half of it is 'empty', while the lower $2\frac{1}{2}$ in. section houses the heating element, "constructed of the highest quality nickel chrome wire wound on a high quality ceramic former." The actual wound heater wire uses up a depth of about $1\frac{1}{2}$ in.

The Nautilus is supplied fitted with a sturdy, two-core, black-coloured cable; and situated along the cable is the white control unit, a plastic item that's about 4 in. long by about $\frac{1}{2}$ in. in diameter. It's fitted with a plastic screw which, when turned, adjusts the temperature setting of the Nautilus. "An external control module provides adequate adjustment over the nominal temperature range of 20°C to 32°C and is so placed to enable the user to adjust the unit without fuss or bother," as the Manual states. A sticker on the control unit shows that a clockwise turn of the screw raises the temperature, while the converse is also the case.

Frequently I complain about short cables on aquarium heating equipment. How does the Nautilus fare? The total length of the lead is about 4 ft. 9 in.; it's about 1 ft. 3 in. from heater/stat bung to white control unit (I assume that there are four leads/wires in this length of cable from bung/thermostat to control unit; but the control unit, like the heater/stat itself, is sealed, so one cannot see what's inside it); the length of the black-covered cable leading from the control unit to the bare-ended brown and blue wires is around 3 ft. 2 in. In practice I found these lengths to be perfectly useful and sensible. This mains cable should be attached to a 13 amp plug fitted with a 3 amp fuse.

I decided to test the 150 watt Nautilus unit I received in a 30 in. \times 15 in. \times 15 in. fully-planted and stocked tank. I first removed the (much larger) conventional heater/stat that I normally use in the aquarium in question. I was easily able to wire in the Nautilus's lead into the cable tidy that serves the test tank and a 24 in. \times 12 in. \times 12 in. tank. I installed an accurate thermometer and kept a careful and regular check on the water temperature every hour for about six hours. The Nautilus was held in place using two heater/thermostat holders (a pair).



The installation instructions in the Owner's Manual state: "The Nautilus has been designed for total immersion and the tube should be positioned in the aquarium at an angle of approximately 45° and close to a source of water circulation, e.g. aeration block or under-gravel filter outlet, but not such that the tube is in contact with rocks, gravel etc., that will impede even heat distribution and could cause premature failure of the unit. If you wish to clamp the tube in position, suitable sucker clamps (not provided) are readily available from your stockist. We recommend the Algarde versions with adjustable locking tabs. . . ."

In a telephone conversation with Mr. Hunwick I enquired about the 45° angle and was told that it was entirely optional—"provided that the position or angle chosen allows the unit still to be close to a source of water circulation and is such (that) the control unit (or module) is still well away from the aquarium water." I disregarded the reference to the angle of 45° and just installed the Nautilus in a vertical position in my tank; it was situated close to the outlet from an external power filter. I checked the temperature regularly for several days and used two different types of accurate thermometer. The temperature remained at a steady 80°F. Then I made a slight adjustment to the screw on the control unit—after which the unit maintained a steady 82°F. No graduated scale is given on the Nautilus or its control unit; the unit is set to "a nominal temperature of 26°C before leaving the factory."

Obviously the control module must be kept well away from the aquarium water. The length of the cable is such that this should present no difficulty. When first I observed the size of the control module I thought it possibly rather large; however, when the Nautilus was in use the control module was well hidden behind the aquarium and its size became totally irrelevant; and in any case I was probably comparing the control 'switch' with a smaller one on a different unit that I had attempted to test some months earlier. The fact that the test sample of the earlier, different unit did not work obviously makes my comparison of control unit sizes irrelevant.

The heater/thermostat unit itself, in its sturdy glass tube, although not very big, has a good, heavy feel to it. Indeed its weight is such that it seems to be able to hang

vertically in an aquarium without the aid of plastic suckers or holders; however, I would recommend the use of a set of holders as it enables one to position the tube where one wants it.

By the way, I should point out that the manufacturers give the following directions to be followed after one has installed the unit in an aquarium and switched it on. "Allow a minimum 12 hours after initial setting then check temperature with an accurate thermometer and adjust as required. . . ." Obviously one should stabilise the temperature of the aquarium before introducing any fish. This is common sense.

The instructions remind one not to connect up the unit when it is not immersed in water; not to remove a hot unit from an aquarium; and not to attempt to "open, dismantle or interfere with the unit as this will invalidate the guarantee. We have sealed the heater, and the control unit for your own safety," state the manufacturer's instructions.

I was very satisfied with the Nautilus and was unable to unearth any problems during the short time which I had it on test prior to my writing this report; however, I did raise a couple of minor points with Mr. Hunwick. I knew that the test unit I was using was a 150 watt model but noted that this information did not appear on the unit. I was told that models sold in shops will have the wattage shown on the box (mine was a pre-box model) and, importantly, on a sleeve marker on the cable, or on the control unit. Obviously my brief test cannot tell much about long-term reliability; but Mr. Hunwick told me that prototype units on test for up to 18 months were still working perfectly well. Readers will be pleased to know that all parts are replaceable—including the heater assembly—although the unit *must* be returned to the manufacturer. The Nautilus carries the usual guarantee.

I was bold enough to point out to Mr. Hunwick the fact that many aquarists, myself included, have still not managed to pass through the transition stage from temperature readings in °F to °C. I was able to relax when he told me that future instruction leaflets would provide temperatures both in Fahrenheit and Celsius.

I'm pleased to be able to recommend this British unit that appears to be one of the first British combined heater-thermostats successfully to have made use of the silicon-chip in aquarium temperature control. It seems to be sturdy and has a solid feel—without being too big to conceal in an average aquarium. I'm not too sure how the unit works—and Mr. Hunwick was giving away no secrets! (I don't know how my television set works either). The fact that it works reliably and safely is of paramount importance; and a recommended retail price of £13.99, including V.A.T., does not put it beyond the reach of many aquarists. I would have been happy to leave the sample Nautilus in my large aquarium as its only source of heat; but the manufacturer's asked me to return the test sample towards the end of February, and I did so.

I understand that for a limited period these units will be available direct from the manufacturer.

B. WHITESIDE.



Commentary

by
ROY PINKS

WHEN THE PONDKEEPER has stocked his pool with fish and plants he is often somewhat at a loss as to what he should do next to improve the look of things. All too often he is persuaded to embark on the job of creating an area for so-called marginal plants without understanding fully what this is likely to yield by way of visual enjoyment, and the results prove to be very disappointing. This is because the general run of recommendations for waterside plants consists of a listing of plants which do well in wet places: this is, theoretically, fair enough, but deeper examination reveals that many of them do exceedingly well, but are objects of beauty for brief periods only. Furthermore, some of them are so happy in these conditions that they take hold unremittingly and are extremely difficult to keep within bounds. Last year, influenced largely by the unfair prices being asked for quite ordinary and easy to raise perennial plants, I experimented with a range of seeds of species likely to enhance the beauty of the poolside. The results, in terms of individual plants likely to succeed, were quite astonishing, and I am looking forward this season to what I know will be a succession of delights and surprises as the leaves grow and the flowers of unpredictable hues unfold for the first time.

Growing from seed

I hope that many readers will have a shot this year at

growing some of their own plants from seed. Many will quail at the idea, on the basis that they are poor gardeners, or that they don't know even the basics. I may reassure the most sceptical that the process is not difficult, and that, provided that they are prepared to keep the seed moist and reasonably protected for a few weeks, some really satisfying results can be counted upon. My own determination took root after a visit, last spring, to a local garden centre, where I saw a specimen of one of the most attractive plants I have ever seen. It was like a rather small flowered polyanthus, but the flowers were nearly black, with each petal carrying a yellow segment—so much like a tiny cartwheel in appearance. I was completely fascinated, but noting that orders taken then at 95p per plant would be honoured in the autumn, I heaved a sigh and recounted the sad episode to a friend whose enthusiasm for such wonders is much in step with my own. He nodded sagely, and that appeared to be that. To my utter astonishment and delight I found a pot of this very polyanthus on my desk several days later, and when I took the matter up with my confidant, he roared with laughter and confessed to having about fifty more in his garden, having grown them from seed the season previously. So this triggered off an order to the firm of Barnhaven, Beigstær, Kandal, for a number of packets of primula and polyanthus seed which, according to their fascinating and beautifully written catalogue, would bring nothing but joy to the surrounds of my water garden. Each packet averaged about 80p, said to contain 50 seeds or so. Since my colleague was regularly raising more plants per packet than this, either their arithmetic was strongly biased in the customer's favour, or their seeds were more virile than even they saw fit to claim.

Perennials

These and many other perennial seeds may be raised quite simply. An inverted 9 in. deep box, as large otherwise as you can make it, should be laid on a convenient part of the garden, in a light but not too sunny place. Get enough horticultural glass to cover the top. Then obtain a number of 2 in. deep burner or coleslaw tubs and pierce the bottoms with a skewer, making several holes for drainage. The sowing medium can be half peat and half silver

sand. Fill the tubs to half an inch below the top and gently firm the medium with the bottom of a flower pot. Spray the surface of the medium with clear water, using one of those cheap hand sprayers often used to dampen the ironing. Gently scatter the seeds on the surface of the medium, spray again, and place in the improvised cold frame described above. Scatter some slug pellets in the overall area of the frame and cover it with the glass. Keep an eye on the seed tubs from day to day, spraying regularly so that a nice moist (but not waterlogged) state of the soil is maintained. No heat whatever is needed, but ease the glass back on potentially warm days to give gentle ventilation.

Erratic Primulas

Germination of the primulas is often erratic—in fact most perennials act in odd ways, dependent on the weather. If the seed fails to appear, don't give up, as some species take a season or so even to break clear of the soil. I would say, however, that the primulas are not like this, even though some fail unaccountably. Within a few weeks the tiny plantlets begin to take shape, and it is essential during this time to keep them moist, as if they once dry out they are done for. Prepare some seed boxes now in anticipation of moving these plants to growing on quarters. If you wish, you can buy some John Innes compost No 2 for this, or make up your own mix of finely riddled garden soil (3 parts) sedge peat (2 parts) and silver sand (1 part). Almost fill the seed box and firm the surface well, following this with a swift watering from a watering can with a fine rose. With a fine skewer or a 2 in. nail, ease out the seedlings and plant them in the seed box at about 1½ in. distance each way. If you keep these nicely moist and water once a week with liquid plant fertilizer at a strength only just sufficient to colour the water, you will have plants ready for setting out into their final positions by the end of the summer. I will enlarge on some of the different types of primula in my next article, as they provide a variety of height, form and colouring of which most of us are woefully unaware. Further, the return for an initial outlay is extremely encouraging, and in good conditions some flowers can be achieved in a single season.

OSCAR



G. Robinson

News from Aquarists' Societies

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.

SOUTH EAST



THE Sudbury A.S. held their bi-annual general meeting recently, and the officers of this society are now: Chairman, A. P. Taylor; Secretary, John C. Mann, 58 Rayners Lane, Harrow HA1 0UQ (Tel 01-844 6095); show secretary, Barry Wainridge, treasurer, Laurie Brazier. Club meetings are held every Wednesday at St. John's Church Hall, Crawford Avenue, Wembley. New members and visitors are welcome.

THE a.g.m. of the Ichiban Rancho Society was held at the 4th Infield Scouts Group Hall in Gordon Road, Infield on 4th April, when it was decided that a permanent Chairman should be part of the committee again, and Mr. Brian Lumley was elected. Other positions which became open for re-election were: Show Secretary, which was taken over by Mr. Frank Hilton on the resignation of Mr. Gary Lewis half-way through the last year, has now been duly elected as Permanent Show Secretary for the next two years. Editor's position also became vacant. Because of pressure of work Mr. Frank Russell had to resign, and Peggy Hilton was elected, passing assistant secretary duties back to the General Secretary, Eileen Davidson. Two lay-members were elected, one being Mr. Keith Waters and the other Mr. John Burns, who has still to confirm acceptance of this position as he was unable to be present. Arrangements for this year's National Rancho Show on 24th October were discussed in a further attempt to develop a new and quicker judging system. This is not yet finalised but will be continued at future general meetings. Meeting dates for the rest of this year are: 15th August and 7th November, which will be held at the above hall from 2 p.m. until 6 p.m. Details of the National Rancho Show and entry forms can be obtained from Frank Hilton, 2 Holloway Crescent, Lenden Koding, Essex. (Tel: White Koding 553).

AT the April meeting of Mid-Sussex A.S. the annual Table Show, home leg. of the "Over the Downs" Competition was held with Brighton and Southern Aquarist. The first leg was at Brighton. Points were: 16 Bm. to 24 Mid-Sussex. The results at Ockley Lodge (judged by C. Farnell): X-Bm: 1, B. Sayers (Bm.); 2, T. Pidgey (M.S.); 3 and 4, W. Perrin (M.S.). Nov: 1, 2 and 3, B. and T. Tester (M.S.); 4, P. Bradley (Bm.); 5, 6 and 7, S. Sayers (Bm.); 8, P. Levene (M.S.); 9, E. and T. Tester (M.S.); O-P: 1 and 2, B. and T. Tester (M.S.); 3, P. Levene (M.S.); 4, E. Smith (Bm.); 5, R. P. Levene (M.S.); 6, E. Smith (M.S.); 7, R. Cozner (Bm.); 8, E. Smith (Bm.); 9, D. J. and S. W. Perrin (M.S.); 10, E. T. Tester (M.S.); 4, P. Bradley (Bm.). Points were Brighton 15; Mid-Sussex 45. Total Brighton 51; Mid-Sussex 66. Winners of the Shield, Mid-Sussex.

Mike Sandford gave a very interesting Slide Lecture of Aquarists in Holland Zoo's. This was at a very short notice and it went down very well with all the members. Thank you Mike. Monthly meetings 2nd Thursdays, Ockley Lodge, Ockley Lane, Keymer.

AFTER the a.g.m. of The Goldfish Society of Great Britain, on the 21st March, the officers for the year are: Chairman, A. Lewman; secretary, A. C. Law, "Brooker"; 4 Elgin Crescent, Camberley, Surrey; treasurer, J. Parker; show manager, H. Berger; P.R.O., L. P. Clemens. A number of films made by members were shown to a very interested audience.

FORTY TWO members were present at the April meeting of the East Kent Aquatic Study Group, when the society's show secretary, Mr. John Gilbert, gave a most interesting talk on the keeping and breeding of "Corydoras" cat fishes. He illustrated his talk with several specimens of the lesser known members of this interesting family of fishes. In a competition, to guess the number of fish in a tank, Mr. Bob Spoor won a prize for his estimate of eighty! In fact the tank contained 85 fish (five different species) all of which had been reared by the club secretary, Mr. C. Bridgman. The visiting judge for the evening, Mr. Keith Bradley, stated his appreciation for a well presented table show. There were 29 entries, all in class 'B' (Amateur). Results: 1, J. Edwards; 2, B. Marsh; 3 and 4, N. Amos. Mr. B. Marsh is to be congratulated as this was his first ever attempt at showing fish. East Kent A.S.G. would like to thank the members of Bredon Heath A.S. for their hospitality at the recent inter-club competition. East Kent may have lost by five points but all had an enjoyable evening. Meetings are held at St. Barns Church Hall, Harve Bay on the second Tuesday of each month, visitors are always welcome. For further details contact Bob Spoor (P.R.O.), 23 Godden Road, Canterbury. (Tel: Canterbury 52382).

SOUTH WEST



AT the Taunton & District A.S. open show The Aquarist gold pin went to an exhibitor of a Cardinal Tetra. Winners: B: C. Tompa (Reading); C: I. Hackett (Salisbury); Ca: R. Yerton (Plymouth); D: I. Egan (Port Talbot); Da: Mrs. Rowe (Forby); Dh: I. Egan; Dc: I. Hackett; E: R. Adams (Salisbury); F: R. Adams; G: D. Edmondson (Salisbury); H: R. Adams; J: I. Egan; K: Mrs. May (Reading); L: D. Lilly (Cleveland); M: K. Green (Swindon); Ma: P. Cox (Yeovil); Nb: C. Amey (Dorchester); Nc: P. Cooke (Plymouth); O: Mrs. May; P: C. Tompa; Q: D. Cox; R: R. Yerton; S: P. Andrews (Reading); T: D. Edmondson; U: J. Randle (Plymouth); V: J. Randle; W: J. Newman (Gloucester); X: m: R. Bond (Yeovil); X: v: D. Cox; X: w: J. Randle.

GRAHAM BELL and Lew Emery related some of their experiences when breeding Goldfish to members of Bristol A.S. Their Veiltails will stand much cooler conditions than is generally imagined was proved by Lew when he exhibited a group of last year's babies. He suggested that frequent partial water changes checked some of the ailments to which Veiltails are prone. Table show results: Goldfish: 1, C. Hays; 2, 3 and 4, I. Milson. Veiltails: 1, 2 and 3, S. Howells; 4, J. Day.

EAST



AT the recent a.g.m. of Spalding & District Aquarists Club the following committee were elected: Chairman, Mrs. J. Kirk; vice-chairman, Mr. Fowler; treasurer, Mr. W. Clark; secretary, Mrs. P. Piggott, 10, Aunondyke Road, Weston Hills, Spalding 4114; show secretary and F.B.A.S. delegate, Mrs. J. Kirk; P.R.O.'s Mrs. M. Crompton and Mr. Fowler. Meetings are held on the second Thursday of each month at the "White Lion" meeting room, High Street, Spalding at 7.30 p.m. New members are always welcome. At the March meeting members enjoyed a slide show with excellent photography by junior member Simon Ball of some of his Goldfish spawning and rearing their young.

MIDLANDS AND WALES



AT the a.g.m. of the Heylake A.S. held at their new venue, the Arrowbrook Sports and Social Club Maxton, the following committee was elected: chairman, Mr. G. Robinson; secretary, Mrs. M. Roberts, 2 Catherine Drive, Eddon, Deeside, Clwyd; treasurer, Mrs. S. Labing; show secretary, Mr. F. Edwards, 19 Heres Drive, Wallace; committee, Mr. G. Ekins, Mr. D. Kelly, Mrs. J. Murray, Mr. M. Roberts. All new members welcome at the meetings which start at 8 p.m. on alternate Wednesdays.

The East Leicester A.S. held their first meeting on 10th March when the following officers were elected. Chairman, M. Lock; secretary, I. Lamb; minutes sec, Mrs. J. Parriman; treasurer, B. MacKillop; show co-ordinator, J. Capwell; ex-officio, G. Stretton; junior member representative Miss O. Stretton. The Society meets every 2nd and 4th Tuesday of the month at the "Home-farm Neighbourhood Centre", Home Farm Close, Beaumont Leys, Leicester, at 7.30 pm. Any new members whether beginners or experienced, are welcome. All enquiries to the secretary, Mr. I. Lamb, 10, Leys Grove Close, B. Leys, Leicester. LE4 6UP. (Tel: 0533 356466). A a.s. from postal enquiries would be appreciated.

Stafford A.S. Change of meeting nights. Meetings now to be held on the first and third Mondays in the month. Further information from, L. F. Linton, Secretary, 280 Sandon Road, Stafford ST16 3LP.

Trethomas & District A.S. now have a change of venue and meeting day. They now meet every Tuesday (7.30) at the Roperta Social club, Trethomas for slide lectures, quizzes, table shows, tournaments, etc. New members set always welcome.

NORTH



THE Sandgrounders A.S. held their 10th a.g.m. during April at the "Mount Pleasant" Hotel, Manchester Road, Southport, during which more than 40 members heard the annual reports from the retiring officers. These were particularly well received, highlighting the past year's work and reporting a high standard in almost all aspects of the hobby. Society show team members had won the F.N.A.S. Show League for the 4th consecutive year, the society stand won first prize in the tubular section at the British Aquarists Festival, and the society's open show in July had also been very successful. This had all helped the treasurer to report a healthy bank balance. A presentation of replica trophies was made to more than 20 members of the show team to commemorate their showing achievements and also to Aquarists of the Year, Malcolm and Nigel Rimmer (Seniors) and Mark Allison (Juniors). Officers elected for the forthcoming year: President, K. Howard; vice-president, B. Calderer, E. Hardy, D. Sweda, T. Tasker; chairman, G. Waterhouse; vice-chairman, C. Evans; hon. secretary, S. Hooton, 61 Kadner Drive, Southport. (Tel 24143); hon. treasurer, R. Cuff; show secretary, B. Baldwin; inst. show secretary, J. Kenyon; P.R.O., R. Rowland; lay committee, A. Bibby, R. Iddon, C. Norton. Social and Catering Committee: Mrs. Baldwin, Mrs. Bibby, Mrs. Hancock, Mrs. Higham, Mrs. Iddon, Mrs. Kenyon. A vote of thanks to the Chairman for his efforts during the year was proposed by Mr. Kenyon, following which an auction of all-glass tanks took place.

MR. A. SMITH has resigned as show secretary from Sherwood A.S. Mr. M. Waite has succeeded him.

THE North West Group of the British Killifish Association meet on the second Wednesday of each month at Atherton village club, Atherton, Nr. Leigh. Forthcoming meetings: 10th June, slide show; 8th July, lecture how to judge fishes; 12th August, lecture David Smith, *Journey to Brazil*. Further details from David Ashbury (0942 729420) or Eddie Jones (0942 603973) non-BKA members always welcome but because of licensing laws they must be over 18 years of age.

AT their first meeting in the month Wyke Show Society had a table event, judged by Mr. J. Douglas, a Y.A.S. judge. Entries he had given an interesting talk on practical fishkeeping. Table Show results: Jur: 1, Ray Laverick; 2 and 3, T. Gould. Sen: 1, N. Metcalf; 2, T. Dudding; 3, R. Asham. F.O.W. Sharks and Fours: 1, T. Gould; 2, R. Laverick. At the next meeting table show results were: Jur: 1 and 2, R. Laverick; 3, T. Gould. Sen: 1, R. P. Laverick; 2, H. Bibby; 3, Mrs. C. Vellup. F.O.W. Goldwater: 1, 2 and 3, Mr. and Mrs. Bibby. Meetings are held at the "Rose" public house every 2nd and 4th Thursdays in the month at 7.30 p.m. New members welcome.

AT the a.g.m. of the Northern Goldfish and Pondkeepers Society the following officers were elected: President, W. Ramsden, vice-president, Les Baxter; hon. vice-president, Alice Baxter; chairman, P. Johnson; vice-chairman, W. Gregory; treasurer, Brian Rothwell; secretary, P. Hodgkinson; P.R.O., R. Hodgkinson. Meetings are held on the second Tuesday of each month at 8 p.m. at the Anglers Club, Riston Lane, Off Green Lane, Bolton, Lancashire. Anyone interested in keeping and breeding fancy goldfish should come along to

the meetings, they will be most welcome. This year's Aquarist open show will be held on August 15 at the Sports Centre, Silverwell Street, Bolton. Details and entry forms can be obtained from Mr. B. Rothwell, 4 Whally Road, Hale, Trafford WA15 9DP. The Aquarist show, now in its 5th year, is one of the largest fish shows held in the country. A show which is for the coldwater fish enthusiast, will attract people from all over the country. Here the hobbyist can see the best fancy goldfish in the country.

NELSON A.S. open show was held on 12th April. Results: Section A—Livebearers—Guppies: 1, Mr. Hands (Accrington); 2, Mrs. and Mrs. Waterhouse (Merseyside); 3, Mr. and Mrs. Iddon (Sandgrounders). Swordtails: 1, S. Waterhouse (Merseyside); 2, A. Bibby (Sandgrounders); 3, E. and B. Calow (Bridgewater). Mollies: 1, G. Fothergill (Nelson); 2, Mr. and Mrs. Iddon; 3, Mrs. Cook (Blackpool). Platies: 1, J. Bellamy (Lytham); 2, K. A. Johnson (Preston); 3, P. Newbold (Independent). A.O.V.: 1, M. and N. Rimmer (Sandgrounders), section winner; 2, R. Ball (Sandgrounders); 3, M. and N. Rimmer. Section B—Anabantids—Fighting: 1, H. R. Walker (Merseyside); 2, K. Corbett (Merseyside); 3, Mrs. Hands (Accrington). 7.5 cms: 1, K. Buckley (Bridgewater); 2, Mr. and Mrs. Underwood (Bridgewater); 3, M. and N. Rimmer. Over 8 cms: 1, Underwood (Bridgewater), section winner; 2, Underwood; 3, Mr. Bibby. Section C—Characins—Inc. 7.5 cms: 1, J. Corbett (Merseyside); 2, M. and N. Rimmer; 3, Mr. and Mrs. Baldwin (Sandgrounders). Over 7.5 cms: 1, Mr. and Mrs. Underwood, section winners; 2, K. Buckley (Bridgewater); 3, Miss L. Roberts (Nelson). Section D—Corydoras and Brochis: 1, Mr. and Mrs. Kenyon (Sandgrounders); 2, K. Corbett; 3, Mr. and Mrs. Waterhouse (Merseyside). A.O.V. Catfish: 1, Mr. and Mrs. Hulla (Merseyside) section winners; 2, Mr. and Mrs. Baldwin; 3, Mr. and Mrs. Underwood. Section E—Loaches and Bettas: 1, Mr. and Mrs. Underwood, section winners; 2, Mr. and Mrs. Underwood; 3, Mr. and Mrs. Hulla (Oldham). Sharks and Foxes: 1, Mr. and Mrs. Underwood; 2, Mr. and Mrs. Iddon; 3, P. and R. Rawley (Independent). Section F—Rainbow: 1, J. Corbett, section winner; 2, Mr. and Mrs. Kenyon; 3, Mr. and Mrs. Hulla (Merseyside). Danos and Minnows: 1, Mr. and Mrs. Baldwin; 2, K. Corbett; 3, Miss L. Roberts (Nelson). Section G—Toothcarps: Top Spawners: 1, 2 and 3, K. Buckley. Toothcarp Bottom Spawners: 1, K. Buckley, section winner; 2, M. Buckley (Bridgewater); 3, J. Roberts (Nelson). Section H—Barbs: inc. 7.5 cms: 1 and 2, Mr. and Mrs. Baldwin; 3, R. and A. Johnson (Preston). Over 7.5 cms: 1, Mr. and Mrs. Baldwin, section winners; 2, E. H. Walker; 3, J. Robert. Section I—Cichlids—Angels: 1, Mr. and Mrs. Stevenson (Oldham); 2, A. J. Slater (Blackpool); 3, Mr. Bibby. To 10 cms: 1, Mr. and Mrs. Underwood; 2, J. Corbett; 3, A. Ball (Sandgrounders). Rift Valley: 1, Mr. and Mrs. Waterhouse; 2, Mr. and Mrs. Underwood; 3, Mr. and Mrs. Iddon. Over 10 cms: 1, Mr. and Mrs. Iddon, section winners; 2, Mr. and Mrs. Waterhouse; 3, Mr. and Mrs. Slater (Blackpool). Section J—Tropical: 1, Mr. and Mrs. Baldwin, section winners; 2, Mr. and Mrs. Snorr (Oldham); 3, G. Barlow (Accrington). Section K—Goldwater—Common Goldfish: 1, Mr. Walsh (Accrington); 2, Mr. and Mrs. Colley (Oldham); 3, Mr. and Mrs. Underwood. Single Tail Fancy: 1, S. Walsh; 2, Mr. Berry (Bridgewater); 3, Mr. and Mrs. Underwood. Twin Tail Fancy: 1, C. Wallbank (Accrington) section winner; 2, S. Walsh; 3, Mr. and Mrs. Underwood. A.O.V. Goldwater: 1, Mr. and Mrs. Underwood; 2, Mr. A. and E. Berry (Bridgewater); 3, Mr. and Mrs. Colley (Oldham). Section L—Pairs—Livebearer: 1, Mr. and Mrs. Waterhouse; 2, J. Corbett; 3, M. and N. Rimmer. Egglayer: 1, E. and B. Calow (Bridgewater) section winners; 2, Mr. and Mrs. Underwood; 3, A. and J. Slater (Blackpool). Section M—Breeder—Livebearer A.B.: 1, D. Stevenson (Merseyside), Livebearer G.D.: 1, A. and E. Berry (Bridgewater); 2, K. Siskinn (Oldham); 3, K. Buckley. Egglayer A.B.: 1 and 2, K. Buckley, section winner. Egglayer C.D.: 1, Mr. and Mrs. Snorr (Oldham); 2, E. and B. Calow (Bridgewater); 3, K. Buckley. Section N—Junior U/15—Livebearer: 1, D. Stevenson (Merseyside); 2, P. Slater (Blackpool); 3, C. Drake (Skem). Egglayer: 1, K. Buckley, section winner; 2, Miss Baldwin (Sandgrounders); 3, Maister Eathough (Sandgrounders). Goldwater: 1, M. and I. Crowther (Nelson); 2, I. Whitaker (Bridgewater); 3, Slater. Section O—Ladies—Livebearer: 1, Mrs. E. Corbett (Merseyside); 2 and 3, J. Slater (Blackpool). Egglayer: 1, Mrs. S. Underwood (Bridgewater) section winner; 2, Mrs. Kenyon (Sandgrounders); 3, J. Slater. There were 409 entries from 14 societies. The Judges: Messrs. Moorhouse, Wad. Cooper and Waterhouse awarded "The Best Fish in the Show" to a Bavia Subdomus owned by Mr. and Mrs. Underwood from Bridgewater. Major Trophy

winners were as follows: Nelson A.S. Trophy for the Best Fish in Show, Mr. and Mrs. Underwood; Nelson A.S. Trophy for Breeders, Mrs. K. Buckley; Nelson A.S. Goldwater Shield, Mr. C. Wallbank; The "John Reynolds" Cup for Livebearers, M. and N. Rimmer; The "James Moorhouse Cup" for Characins, Mr. and Mrs. Underwood; The "Mary Barrows Cup" for Anabantids, Mr. and Mrs. Underwood; The "Heaton Cup" for Pairs, E. Calow; The "Ran J. Dicken" Cup for Barbs, B. Baldwin; The "Crick Trophy" for Scavengers, Mr. and Mrs. Underwood; The "John Sniker Trophy" for Cichlids, Mr. and Mrs. Iddon; The "KB Award" for Highest Pointed Nelson member, M. and I. Crowther.

Change of Secretary

Mr. R. Maudsley, 102 Meadow Street, Preston (Tel: Preston 21813) is the new secretary of the British Discus Association.

Washington A.S. held their a.g.m. on 21st March. As from this date the secretary is A. Rose; treasurer, K. Foster; chairman, I. White. The club hold their meetings every two weeks. The next meeting is on 11th May on Wednesday night from 7.30 on, beginners and 'old hands' welcome.

Leigh A.S. have had to change their venue owing to the School being double-booked. Although the date remains the same, Sunday 7th June, the new venue is the Tot. H. Centre, Mather Lane, Leigh.

SCOTLAND



AS a result of the recent a.g.m. of Dumfries & District A.S. all correspondence should be sent to the Hon. secretary, Mrs. J. Hay, Lochtergus Farm, Kirkcubright, or to Mr. J. Carmichael, 11 Barkland Avenue, Larchfield, Dumfries who is show secretary.

AT the a.g.m. of the Inverness and District A.S. the following were elected to office: President, C. Ross; vice-president, H. Anderson; secretary, Eric Hillier, 30 Mansart Terrace, Inverness (Tel: 222966); treasurer, J. McRitchie. The club meet on the last Monday of each month at the Central School, Kenneth Street (Planefield Road entrance) where all new members are made most welcome, be they expert or beginner.

Solution to Crossword on page 36

Answers Across	Answers Down
5. Salt	1. Pool
8. Opercularis	2. Hemigrammus
10. Stands	3. Bars
11. Leucocassis	4. Fins
13. Loaches	6. Tench
15. Micralestes	7. Neits
18. Stripe	9. Cichlasoma
20. Formosa	10. Sjoestedti
21. Giant	12. Ice
22. Macropodus	14. Carassius
24. Festae	16. Tiger Barb
26. Ich	17. Swamp
28. Awani	19. Perch
32. Lemon Tetra	20. Fox
33. Espei	23. Aeneus
34. Bronze	25. Tangs
35. Bahias	27. Fly
36. Liria	29. Warm
	30. Nana
	31. Lima
	33. Eel

Dates for the diary

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

JUNE

3rd June: (change of date): South Leeds A.S. bring and buy sale.
3rd June: South Leeds A.S. bring and buy sale of fish, equipment and plants. Leeds Girl Guides Headquarters, Cookridge Street, (Nr. Town Hall & art gallery), Leeds 1 (8-9.30).
7th June: Loughborough & District A.S. open show at Burnigh Community College, Thorpe Hill, Loughborough. Schedules (available March-April) from C. Taylor, 35 Shakespeare Street, Loughborough.
7th June: Whitley & District A.S. open show at the Spa Pavilion, Whitley. Details from Mrs. A. Forbes (Secretary), 12 Lockton Road, Whitley.
7th June: Accrington & District A.S. open show at New Jerusalem School, Harrogate Street, Accrington (opposite Police Station). Further information from: J. Harding, 146 Dewey Street, Accrington, Lancs. (Tel: Acc'n. 34204).
7th June: Otley A.S. 1st open show at Kirklands Menston. Batching 12 p.m. to 2 p.m. Auction, raffle, tombola, side-shows, refreshments. Schedules from 56 West Bank Lane, Otley, West Yorkshire.
7th June: Leigh A.S. open show. Secretary: B. N. Lawless, 8 Spruce Close, Lawless, Warrington, WA3 2DG. (Tel: 0942) 604077. Mr. Lawless is also the new secretary of the F.N.A.S.
7th June: Arbroath A.S. open show at the Arbroath Community Centre.
7th June: Sudbury A.S. open show at St Margaret Catherine School, Quinton Street, Neasden N.W.10. Show Secretary E. Wrenside, 150a Preston Road, Wembley, Middx. (Tel: 01-894 0818).
13th June: Llantrisant Major A.S. open show at the Lower School Hall, Leisure Centre, Ham Lane Hill, Llantrisant Major, South Glamorgan. Schedules and postal entry forms from Show Secretary R. Newton, 3 The Glen, Bryncoch, Bridgend, Glamorgan.
14th June: Ot. Donmow A.S. Open Show at Peasler Hall, Ot. Donmow, Essex. Details from Mrs. P. Poiry, 5 Rindall Close, Ot. Donmow, Essex.
14th June: Northwich & District A.S. open show at Hartford High School, Greenbank Lane, Chester Road, Northwich, Cheshire. Details from Show Secretary, D. Velezovic, 43 Hartford Road, Drentham, Northwich, Cheshire. (Tel: Northwich 6214).
20th June: Naltes and District A.S. eighth open show at Cleveland Community Centre. Show secretary: P. Fishart, 2 Woodland Road, Naltes, Bristol (Tel: Naltes 833094).
20th June: South Park Aquatics (Study) Society Coldwater Fish, Tropical and Coldwater Plant open show at Windham Community Centre, St. George's Road, Wimbledon, S.W.19. Schedules from show sec: E. A. Franklin, 105 Hansocks Road, London, S.W.16 (Tel: 01-679 2660).
21st June: Lytham A.S. open show at Lytham Baths, Dicconson Terrace, Lytham. Schedules from the Show Secretary, Peter Ham, 1 Woodend Grove, Freckleton, Preston PR4 1DE. (Tel: Freckleton 633183 or 63221). Batching 12.30-2.15 p.m.
28th June: Sherwood A.S. open show at Lady Margaret's Hall, Holbeck, Nr. Worsnop. Schedules from M. Wain, 25 Brestowe Drive, Mansfield, Notts.
28th June: South Shields A.S. open show at Biddingsbrook Hall. Batching 11-1 p.m. Judging 1.30 p.m. Schedules from G. M. Darby, 109 Mustard Square, Houghton-le-Spring, Tyne & Wear.

JULY

5th July: Association of Midland Goldfish Keepers. Sunday afternoon visit to a goldfish breeding establishment. Details of membership from Hon. Secretary, Miss G. Keage, 6 Derangate, Houghton-on-the-Hill, Leicester-shire.
5th July: Chard & District A.S. 7th annual open show at Furzeham School, Chard, Somerset. Details from B. R. Gray, 65 Henson Park, Chard, Somerset. (Tel: Chard 4272).
5th July: South East London A.S. open show at 141 Greenwich High Road, SE10. For information ring 859 6344 or 692 0283.
5th July: Kings Lynn A.S. open show at the Corn Exchange, Tuesday Market Place, Kings Lynn, Norfolk. Schedules from M. Laws, Sun-Ray, West Worch Road, Kings Lynn (Tel: K.L. 63743).
5th July: Leamington & District A.S. open show at Lillington Community Centre, Crown Way, Lillington, Royal Leamington, Warwickshire. Batching 11.30-1.30 pm.
11th & 12th July: Roodford & Becontree A.S. open show at Dagenham Town Show, Central Park, Dagenham. Schedules from Garry Steptoe, 35 Coniston Way, Elm Park, Hounslow, Essex RM12 5RH (Tel: Hounslow 44057).
12th July: Scarborough & District A.S. open show at Gladstone Road Junior School, Wooler Street, Scarborough. Schedules from R. Stone, 9 Clifton Street, Scarborough, N. Yorkshire (Tel: 0723) 66088.
18th July: Goldfish Society of Great Britain general meeting, 2 p.m., Conway Hall, Red Lion Square, Holborn, London.
19th July: Mid-Sussex A.S. exhibition, at the Sidney West Sports Centre, Leylands Road, Burgess Hill, W. Sussex.
19th July: Sandrombers A.S. annual open show to be held in Meads Cop School, Meads Cop Road, Southampton. Further details from Mr. B. Baldwin, 10 Olive Grove, Southampton, Merseyside (Tel: 0704 43384).
28th July: I & E A.S. open show at Monks Dyke High School, Monks Dyke Road, Louth, Lincs.

AUGUST

2nd August: Ashby Fishkeepers Society first open show. Show Secretary: E. J. Leach, 25 Bottesford Avenue, Ashby, Leicestershire, South Humberside DN16 5BN (Tel: 42780).
2nd August: Leicester A.S. first open show at the St. Matthew's Community Centre, Malabar Road, Leicester. Details and schedules from Show Secretary D. Sewell, 32 Parkdale Road, Thurmaston, Leicester. (Tel: 693305).
8th August: Oldham & District A.S. open show at Warnock Park, Oldham. Information and schedules from A. Chadwick, 9 Brookside Close, Chadderton, Oldham (Tel: 061-692 6207).
8th August: Grimby & Cleethorpes A.S. Open Show at the Memorial Hall, Cleethorpes. Batching 12-2 p.m.

15th August: Northern Goldfish and Pondkeepers Society 5th open show at the Sports Centre, Silverwell Street, Bolton. Details and entry forms from D. Lord, 40 Hospital Road, Bromley Cross, Bolton.
15th-16th August: Yorkshire Aquarist Festival at Doncaster Racecourse. Details from R. Singleton, 13 Schofield Drive, Darfield Barnsley, Yorks.
16th August: Midland Koi Association and the United Kingdom Chapter of the Japanese Koi Society joint national open Koi show at Taverham Zoo, Leicester-shire. Details from U.K. Chapter, Zen-Nippon Aikikai, P.O. Box 30, Windsor Street, Uxbridge, Middx.
22nd August: Trehomas & District A.S. show at the St. John Ambulance Hall, Pandy Road, Redwas, near Caerphilly. Batching 9-12.30 p.m. Trophies and plaques for all classes. For further information please contact A. Phillips, 28 Llanthob Drive, Trehomas, Gwent, or phone 0222-884391.
22nd August: Nuneaton A.S. open show at Nuneaton Arts Centre, Pool Bank Street, Nuneaton. Information from Show Secretary, G. Hemmings, 182 Tomkinson Road, Nuneaton, Warwickshire (Tel: 0982) 325271.
29th August: Open show of fancy goldfish in Dunsfermline. Organized by the Scottish Goldfish Group. Details and schedules from Tommy McLean, 36, Cotton Park, Craigshill, Livingston, West Lothian, Scotland.
30th August: Cardleford A.S. open show at the Woodhouse Hill Working Men's Club, Normanton. Schedules from Miss B. Stevens, secretary, 4 Miles Green, Alresford, Goodwood. (Tel: Goodwood 599615).
30th August: Fleetwood and District A.S. open show.
30th August: Long Eaton A.S. ninth open show at the Gregory's Rose Gardens, Toton, Nottingham. Enquiries to R. West, Show Secretary. (Tel: Long Eaton 48232).
31st August: (August Bank Holiday Monday), Y.K.S. Annual Koi Festival and Open Show, at Harwood House, near Leeds.

SEPTEMBER

6th September: Salisbury & D.A.S. annual open show to F.B.A.S. rules, at the Activity Centre, Wilton Road, Salisbury. Schedules from show Sec., D. Edlestein, 33 Semeser Road, Salisbury, Wilt. (Tel: 0722-26219) S.A.E. please.
6th September: Barnsley & District A.S. open show. Details from R. H. Hancock, 97 Lemsar Gardens, Barnsley, Open.
6th September: Huddersfield Tropical Fish Society open show at Slatkwaite Civic Hall, Slatkwaite. Details from Mrs. P. Town, 187 Abbey Road, Shepley, Nr. Huddersfield. (Tel: Kirkburton 7940).
6th September: Wellingborough & District A.S. open show at Westfield School for Boys, Bristol Road, Wellingborough, Northants. For schedules write to M. Cox, 20 Salisbury Street, Kettering, Northants (Tel: 521600).
12th September: Hounslow & District A.S. open show at the Hounslow Youth Center, Cecil Road, Hounslow. Information from Show Secretary, T. Solingbrooke, 7 Hollowood Close, Addlestone, Surrey (Tel: Weybridge 8716).
12th September: Bristol A.S. coldwater fish show at St. Andrew Church Hall, Stevedore Road, Whitehall, Bristol, 3-5.30 p.m. Details from I. Milden, 87 St. John's Lane, Bristol BS3 5AB (Tel: 0272 712383).
13th September: Buxton & District A.S. open show at the Paxton Suite, Pavilion Gardens, Buxton.
13th September: Barnsley Tropical Fish Society 17th open show at the Hall Bank School, Huddersfield Road, Barnsley. Further information contact G. Wall, Barnsley 47210.
13th September: Cheltenham Tropical Fish Club open show at St Marks Community Centre, Heaters Way, Cheltenham, Glouc. Schedules (just onwards) from M. Jenkins, 3 Marlborough Place, Princes Street, Cheltenham, Glouc. S.a.e. please.
20th September: North Wilt A.S. open show. Details from Show Secretary P. Taylor, 7 Ridgeway Road, Stratton, Swindon. (Tel: 824114).
20th September: Tolleridge & District A.S. open show at Hadlow Community Centre, Hadlow. Schedules from A. Peart, 5 Pollards Wood Road, Nr. Otford, Surrey RH8 0JN.
20th September: Dias open show at the Youth Centre, Shellinger Road, Dias, Norfolk. Schedules from Neil Hume, 10 Blossfield Road, Dias, Norfolk IP22 3NL. (Tel: Dias 0379) 4541).
20th September: Cranorfield A.S. open show at Westfield upper School, Marlborough. Batching 12-1.45 p.m. Judging 2 p.m. Schedules from L. Waller, 79 West Street, Eickington, Nr. Sheffield S31 9GA. (Tel: Eickington 425331).
27th September: Wolverhampton A.S. open show at the Odey Community Centre, Marsh Lane, Wolverhampton. Details from Show Secretary, Pete Winmill, 16 Essington Way, Wolverhampton (Tel: Wolverhampton 53019).
27th September: Harlow A.S. open show at Moor Hall, The Show, Harlow, Essex. Show Secretary, Peter Moorhead, 11 Woodfield Terrace, Thornwood Common, Epping, Essex. (Tel: Epping 72214).
27th September: Wyke show Society, Hull, open show.

OCTOBER

3rd October: Goldfish Society of Great Britain open show and convention. Particulars from H. Berger, 74 Baron Gardens, Barkingside, Ilford Essex.
4th October: Newbury and District A.S. open show at the Corn Exchange, Market Place, Newbury, Berks. For more information contact the Show Manager, Robin Canning, 6 Southend, Cold Ash, Newbury, Berks. (Tel: Thatcham 64254).
4th October: A & D Fishkeepers first open show at the Sutton in Ashfield Social Service Centre, Hillsdale School, Sutton.
11th October: British Cichlid Association convention at the Meeting Rooms, Zoological Society of London, Regent Park, 2.0 p.m.
11th October: Darwen A.S. open show in the Library Theatre Darwen. Details from Secretary Derek Gow, 85 Greenway Street, Darwen.
11th October: South Leeds A.S. open show at Hummer Boys Club, Hillside Road, Leeds 10. Batching 12-2 p.m. Schedules from R. Day, 3 British Mount Woodhouse, Leeds LS6 2JZ.
17th October: East London Aquarists and Pondkeepers Association open show at Central, Cecil Road, Chadwell Heath, Essex.

NOVEMBER

1st November: Halifax A.S. open show. Batching 12-2 p.m. Schedules (s.a.e. please) from David Shields, Cobblestones, Gannet, King Cross, Halifax.
7th 8th November: British Aquarist Festival at Belle Vue, Manchester. Details and schedules from John Hall, 54a Carr Road, Colverley, Pudsey LS28 3RL.
8th November: Bradford and District A.S. open show at Textile Hall, Westgate, Bradford. Details and schedules can be obtained from the show secretary, Mr. A. D. Fisher, 2 Sherbourne Road, 14th, Bradford (Tel: Bradford 614160).
21st November: Goldfish Society of Great Britain general meeting, 2 p.m., Conway Hall, Red Lion Square, Holborn, London.