

AQUARIST

AND PONDKEEPER

The Magazine for Fishkeepers



Breeding **CICHLIDS** by Dr. R. Goldstein
SPOTLIGHT ON A Charming Glass Fish



COVER STORY Photo: A. van den Nieuwenhuizen

The beautiful, if somewhat aggressive, Jewel Cichlid, *Hemichromis bimaculatus*, Gill, 1862, has been popular in the aquarium hobby for many years. Part of the attraction lies, of course, in the brilliant colours which these fish adopt during spawning. A second feature is the intense brooding behaviour exhibited by a spawning pair, coupled with their gentleness towards their fry which contrasts sharply with the aggression exhibited towards other tank occupants. Although Jewel Cichlids can grow up to about 6 inches (c. 15 cm) in length, they will colour up and breed at less than half this size. They are not too fussy about the composition of the water, but prefer temperatures in the high 70's°F. The diet should consist of livefoods, frozen animal-based foods or a good-quality Carnivore Flake. According to Paul Loisele in a paper in the Musée Royal D'Afrique Centrale Annales (Series IN-8, No. 228), the majority of the Jewel Cichlids found in the hobby today do not belong to the species *Hemichromis bimaculatus*, but to a very similar one, *H. guttatus*. The true *H. bimaculatus* is actually thought to be quite rare in aquaria. Correct identification of aquarium specimens is further hampered by yet other closely related species, such as *H. lyfalloi* and *H. paynei*.

CONTENTS

18

King of the Killifishes

Aphyosemion sjoestedti by Jaroslav Kadlec

20

BAF Results

22

Commentary

Roy Pinks comments on various aspects of the aquatic world

23

A-Z of the Aquarium

The first quartet of entries for 1985 are Quarantine, Quiver Files, Rasboras and Rhodinae

26

Obituary

An appreciation of a dedicated hobbyist

28

Breeding Cichlids

Dr. Robert Goldstein reviews the Cichlid scene of today

30

From a Naturalist's Notebook

The wider canvas of flora and fauna as seen by Eric Hardy

34

Basis of Fish Health

Fungus Diseases

38

What is Your Opinion?

Opinions expressed by readers on all aspects of the hobby, with comments by the author

40

Spotlight

Chanda ranga, an Indian Glass Fish, is described by Jack Hems

43

Company Profile

A & P visits Norwood Aquarium Ltd., a major wholesaler based in Warmingham, Surrey

44

Your Questions Answered

Queries received from readers are answered by our experts

48

Helping Hand

Nick Lushchan writes for the disabled aquarist

49

Tomorrow's Aquarist

Start the year with a challenge by entering our exciting Find-the-Fish Competition sponsored by King British Aquarium Accessories Co. Ltd.

50

Fan Fish

Jaroslav Kadlec describes *Cynolebias adloffi*

53

An Interesting Catfish

Tim Hinitz recommends *Fariowella acus* to control algae

54

Book Review

Ian Sellick discusses a revision of the cichlid genus: *Cichlasoma*

55

Meet the Societies

"Born" in 1983, and still going strong, our popular series starts 1985 with features on two more societies: Gateshead Aquarist Society and Newton Aycliffe and District Aquarist Society

AQUARIST



Founded 1924
as "The Amateur Aquarist"

Editor: Laurence E. Perkins

Consultant Editor: John A. Dawes

Advertisement Manager:
J. E. Young

Vol. XLVIV No. 10, 1985

Subscriptions:

Renewable 31st December
annually. (Surface mail)
February to December £12.75.
Airmail quoted on request.

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

The Editor accepts no
responsibility for views expressed
by contributors

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

KING OF THE KILLIFISHES

by Joroslav Kadlec

THIS species belongs to the large group of killifishes which were discovered as early as the last century and brought to Europe. The person who discovered it was the Swedish professor Y. Sjöstedt and this killifish received its specific name from him. Along with *Aphyosemion brattium* (Lönnberg, 1895) it was included by him in the fauna of West Africa and first caught in the years 1891-92. It comes from the area of the N'dian river and the neighbourhood of Bonge in the west of the Cameroons. But at the end of the last century and at the beginning of the present one aquarists breed the different forms and populations of the present-day species *Aphyosemion gularis* (Boulenger, 1901), *A. batesii* (Boulenger, 1911), the above *A. sjostedti* (Callopanchax) *occidentale* (Clausen 1966) and also probably *A. deltaense* (Radda, 1976) under the name "Fundulus sjostedti" (the genus APHYOSEMION was established by Myers in 1924). During the long period of time from 1915 to 1966 zoologists and aquarists referred to *Aphyosemion sjostedti* as *A. (Fundulus) coeruleum* (Boulenger, 1915).

According to accounts which have been collected for almost a hundred years *A. sjostedti* is found in a number of populations which differ in the shape of the fins and markings. They live in the Cameroons and in the eastern part of Nigeria as far west as the Lagos area. Their habitat consists of the streams and swamps in the tropical rain-forests along the coast.

At the present time *A. sjostedti* is included in the subgenus FUNDULOPANCHAX (Myers, 1924), together with *A. kribianum* (Myers, 1924) which is the only other species.

A. sjostedti is certainly one of the

largest and most attractive of the African killifishes. The males, including the powerful dorsal fin, grow to 11-12 cm, the females only to 7-8.5 cm.

The body shape of both sexes can be seen in the photograph. It is important to note, however, that they show a young pair and that the lyre-shaped caudal fin of the male is as yet only a hint of things to come. In older males this fin is really impressive, with the rays at the top and bottom and centre of the fin extending beyond the rest of the fin by as much as a centimetre.

The coloration of the males is very variable and depends on the lighting, the locality where the particular strain of the species originates, the mood and age of the fish. The variation is of course much more marked in the males than in the females.

The ground colour of the male is blue-green on the flanks and the gill covers. On the back the coloration merges into brown and into a yellowish colour on the underside. A large number of rusty-brown flecks decorate the sides of the male and in most populations the rear part of the body can be seen to have seven to nine stripes, again rusty-brown in colour. The impressive eye has a green iris. The pectoral fins of the male are dimly transparent, blue-green, with a red stripe. The ventral fins are also blue-green with red speckles. The dorsal fin is a uniform green speckled with red. The anal fin is rusty-brown near the body and gradually runs into blue-green. Near the lower edge of the fin is a red stripe and the edge itself is often bluish. The caudal fin and its shape has already been mentioned. It has two distinct halves. In the upper

half are a number of rusty-coloured bands set in a radial fashion and tinged in between with green. The lower half has a ground colour ranging from yellow to orange, near the bottom edge of the fin is an eye-catching reddish-brown stripe, under this is a line of speckles of the same colour and the lower edge of the dorsal fin is often bluish in colour in the male fish.

The female has a body colour ranging from yellow to brownish-red to violet. On the front part of the body only, there are a few unobtrusive red flecks. Her rounded-off fins are transparent throughout with a blue-green tinge.

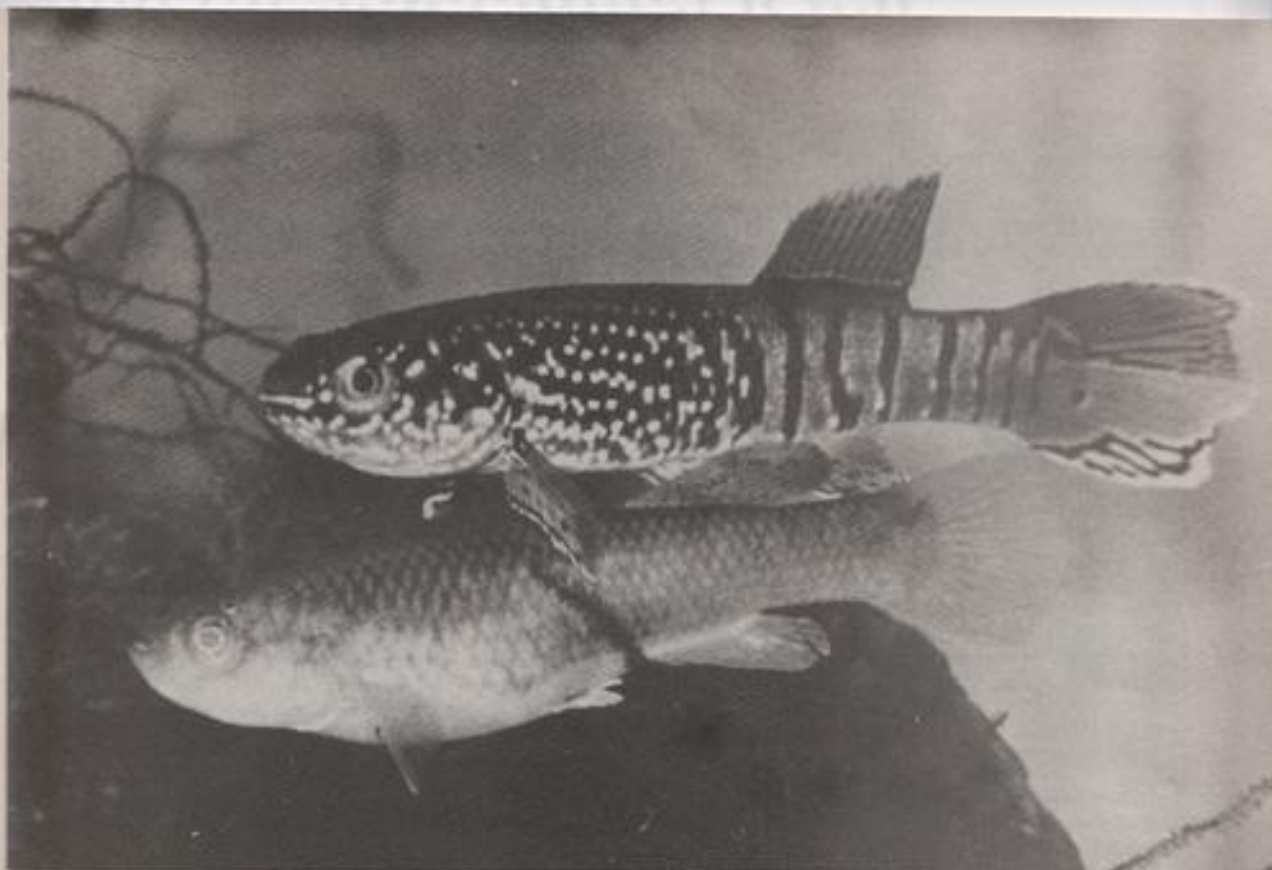
There is a population bred in the U.S.A. and England particularly, probably improved by aquarium breeding, which has been given the name *A. sjostedti* "DWARF-RED". In addition to the smaller size attained by both sexes the fish differs in the more intensive red coloration of the male's body and also the underside of the dorsal fin is not yellow but red.

In spite of the fact that *A. sjostedti* is a killifish which has been bred in aquaria for a very long time now there is, in my opinion, no clear guidance on how this aquarium fish should be bred and reproduced. Especially the latter. In the following part of my article I will be so bold as to offer a few observations from my own experience.

As far as breeding is concerned there are two preconditions which I consider to be essential in ensuring the healthy development of the fish and providing one with the opportunity of producing good quality breeding material.

The Food

A. sjostedti needs without question live foodstuff, suited to the size of the



fish. The staple food during the year will probably consist of worms as far as the majority of breeders are concerned and which these killifish continue to accept over an extended period of time with a remarkably good appetite. The fish also like, however, all kinds of mosquito larvae, which can usually be caught during the months of summer and autumn, together with the larvae of other water insects. Perhaps the favourite food consists of Chaoborus larvae. In addition large water-fleas (*Daphnia*) are accepted readily, on the whole. It was a great surprise to me that this variety caught small banana flies (*Drosophila melanogaster*) in a half-hearted fashion and seemed to accept them reluctantly, although I had offered them on several occasions to *A. gjoestedti* in the past. Conversely, they will greedily catch different kinds of fry, especially if they are offered young fish which are struggling to survive and swimming in a jerky fashion.

Given its sufficiently large mouth, the mature fish is quite capable of

swallowing Neon Tetras (*Paracheirodon innes*). Cyclops make for a small mouthful. *A. gjoestedti* will take them, but only after they have been allowed to grow very hungry and after they have been fed only with this small-sized live food over a longish time. The fish will certainly vegetate, however, since the species lives on smaller fish and water insects in the wild state.

The Water Temperature

A. gjoestedti is a species which likes a low temperature. The liveliness of the fish, the eagerness with which they accept food, the aggression shown towards either members of its own species or other members of the community tank and last but not least spawning frequency—all these are greatly dependent on the temperature of the water.

I consider a temperature of 18 to 21°C. to be the best. At such a temperature—regardless of the water quality, as long as matters do not get out of hand of course—the coloration of the males is at its most intensive.

The lightest markings are on the body, the stripe in the caudal fin is a deep orange, the fish are visibly 'on top form', they spawn freely.

In water the temperature of which has risen above the higher level given above the fish skull at the bottom of the tank, they are debilitated, they take little food and the markings on the flanks of the males become less impressive.

I would point out that they need this relatively low temperature from being young right up to the time when the males begin to develop their coloration. If they are reared in water at a higher temperature they will never attain the size and coloration achieved in cooler water.

Breeding at a low temperature is dangerous, however, in cases where *A. gjoestedti* is not kept in a species tank. At the lower than average temperature the majority of species of aquarium fish, in contrast to *A. gjoestedti*, become less active. One must, therefore, be careful during the period of late summer and autumn

when the temperature in aquaria sinks. This is a time which is favourable to *A. gjoestedti* but unfavourable to other species. I personally have witnessed a mishap arising from this situation where a mature male caught and swallowed a male of about 5 cm of the killifish *A. australe*.

The males of *Aphyosemion* are relatively aggressive towards each other, especially when they are kept in the same tank as the females before breeding. The worst state of affairs arises when one has two males in the tank. Then the stronger fish will certainly damage the fins of his weaker rival, at the very least. A much more acceptable situation results if one breeds with several males in a tank with a lot of vegetation. In this case the occasional disputes come to nothing. In my experience the males of this species do not form territories. For the above reasons, however, I would recommend breeding with a single male.

I will not go on to give a wealth of information on reproducing *A. gjoestedti* for the simple reason that I do not possess it. I will, however, add some simple advice about caring for the eggs.

When breeding the fish I put the pair in a spawning tank with a capacity of ten litres. I have used water the hardness of which has ranged from

1 to 10° DH and have not noticed any significant difference in the results. Spawning periods usually lasted for fourteen days. Then I poured all the water through a net, squeezed out the peat containing the eggs and partially dried it in newspaper. Finally, I placed the peat and eggs in a plastic bag which was kept closed throughout the whole of the time the eggs were developing in order to keep the peat damp. The plastic bag and contents were left undisturbed for two months at normal room temperature, that is 19-22°C.

After this period of time I poured water over the spawning substrate for the first time. I have used different water types for moistening the eggs, from distilled to old water from the breeding tank, but I got the impression that here too, the water hardness was not critical and I began, therefore to use tepid tap water.

The eggs normally hatch very sporadically, unfortunately. In the first instance only a small number or no young at all hatch out. I catch and remove the young which have hatched, then dry the peat again in the same manner as previously. After another month has elapsed I immerse the peat again. The process is repeated five or six times—always after about a

month. If ten young hatch at any one time I consider this to be a success. Unfortunately, I am unable to understand or explain why the development and hatching of the spawn of this fish is so irregular.

Because of the difficulty in controlling the development of the eggs in peat I tried putting the eggs amongst roots of *Microsorium pteropus* and leaving them to develop in an air-tight plastic bag containing moisture. This experiment ended in failure, however. Over the fourteen days all the fifty eggs I used gradually turned white.

A. gjoestedti has already been for decades the uncrowned but widely recognized "king of the killifishes". Perhaps it is also the emblem of the oldest society of killifish breeders—A.K.A. (American Killifish Association).

I am sure that every killifish lover who succeeds in raising a few healthy pairs from breeding *A. gjoestedti* personally will derive a great deal of satisfaction.

Literature:

1. Radda, A. C., 1979: The Cyprinodontids of Cameroon, publ. by the A.K.A., Inc., Cranston, Rhode Island.
2. Scheel, J. J., 1975: Rivulins of the Old World—T.F.H. Publications, Inc., Neptune City, N.J.

British Aquarists Festival

Champion of Champions

Competition Results



1st
Mr & Mrs K. Hooley
Botia sidhimunki
Workshop A.S.

2nd
T. Cruickshank
Pimelodus blochii
South East A.S.

3rd
K. Brunt
Corydoras leopardus
P.T.F.C.

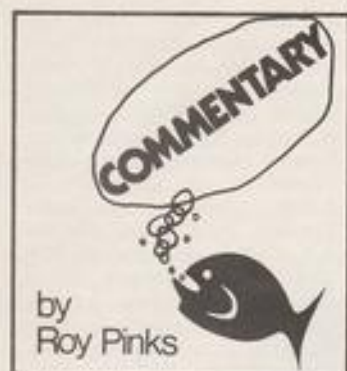
RESULTS OF OTHER B.A.F. COMPETITIONS

Highest Pointed Tableaux (Harry Penhall Memorial Trophy): Bridgewater. **Best Fish in Show:** B. Wilson, St. Helens. **Highest Pointed Society Furnished Aquarium:** Halifax.

Highest Pointed Independent Furnished Aquarium: P. Gibbons, Halifax. **Best Pair Fish** (Bill Kelly Memorial Trophy): A. Buckley, Bury. **Highest Pointed Aquascape:** D. T. Milner, Darwen. **Highest Pointed Novelty Aquascape:** Mr. and Mrs. Walsh, Darwen. **Highest Pointed Breeders Team:** K. Buckley, Bridgewater. **Best Tropical Fish** (Withy Grove Press Trophy): B. Wilson, St. Helens. **Best Coldwater Fish** (Belle Vue Challenge Trophy): J. Turner, Accrington. **Exhibitor Most Awards** (John East Memorial Challenge Trophy): K. Buckley, Bridgewater. **Champion of Champions:** Mr. and Mrs. K. Hooley. **Tropical Furnished Aquarium (Society)** (Cussons Silver Challenge Trophy): Halifax. **Coldwater Furnished Aquarium (Society)** (Cussons Silver Challenge Trophy): Halifax. **Tropical Furnished Aquarium (Individual)** (Walter Smith Coronation Shield): P. Gibbons, Halifax. **Coldwater Furnished Aquarium (Individual)** (Edgar Chapman Memorial Trophy): Mr. and Mrs. B. Walsh, Darwen. **Aquascape (Furnished)** (Aquarist and Pondkeeper Challenge Cup): D. T. Milner, Darwen. **Novelty Aquascape** (James Kelly Trophy): Mr. and Mrs. Walsh, Darwen. **Plants** (FNAS Shield): D. Shields, Halifax. **Common Goldfish and Comets** (FNAS Goldfish and Comets Trophy): Mr. and Mrs. Colley, Oldham. **Shubunkins (Bristol/London)** (GSGB Silver Cup): R. and D. Parr, Oldham. **Moors and Veiltails** (Walter Smith Challenge Trophy): W. Fynney, Macclesfield. **Fancy Goldfish (Fantails, Oran- ders, Lionheads, New Var.)** (The Chester Cup): J. Turner, Accrington. **A.O.V. Coldwater** (not listed

above) (The Derby Cup): C. J. Sykes, CAGB. **A.V. Coldwater (Pairs)** (The Nottingham Challenge Shield): Mr. and Mrs. Silk, SJS. **Coldwater Breeders A.V. (Single Tail)** (The Hammond Trophy): A. E. Berry, Bridgewater. **Coldwater Breeders A.V. (Twintail):** (The Hammond Trophy): Mr. and Mrs. Silk, SJS. **Guppy** (Lewis Trophy): T. D. Milner, Darwen. **Molly** (Lewis Trophy): Mr. and Mrs. Robinson, Scorpion. **Platy** (Lewis Trophy): B. and S. Parr, Pisceen. **Swordtail** (Lewis Trophy): Mr. and Mrs. Muff, Huddersfield. **A.O.V. Livebearer** (Lewis Trophy): J. and K. Corbet, Merseyside. **A.V. Livebearer (Pairs)** (Frazer Brunner Silver Cup): Mr. and Mrs. Marshall, Merseyside. **Rift Valley and Lake Cichlids** (FNAS Trophy): B. Wilson, St. Helens. **Dwarf Cichlids A.V.** (FNAS Trophy): D. Parkinson, St. Helens. **Large Cichlids A.V.** (FNAS Trophy): T. Stansfield, Darfield. **A.V. Cichlids (Pairs)** (National Aquarist Society Cup): D. and J. Wright, Cichlid. **Siamese Fighters** (East Lancashire Society Trustees Trophy): R. Norris, Bracknell. **Small Anabantids** (East Lancashire Society Trustees Trophy): Mr. and Mrs. Daniels, Blackpool. **Large Anabantids** (East Lancashire Society Trustees Trophy): M. and D. Hartley, Sandgrounders. **A.V. Anabantids (Pairs)** (FNAS Trophy): R. J. Payne, Merseyside. **Small Barbs** (FNAS Trophy): Mrs. Cruickshank, CAGB. **Large Barbs** (FNAS Trophy) Mr. and Mrs. Whittaker, Sandgrounders. **A.V. Barbs (Pairs)** (Aquarist and Pondkeeper Silver Cup) Mrs. Cruickshank, CAGB. **Small Characins** (FNAS Trophy): E. and B. Calow, Bridgewater. **Large Characins** (FNAS Trophy): K. Buckley, Bridgewater. **A.V. Characins (Pairs)** (East Lancashire Society Silver Cup): A. Buckley, Bury. **Sharks and Foxes** (FNAS Trophy): C. Beasley, Bracknell. **Rasboras** (FNAS Trophy): Mr.

and Mrs. Marshall, Merseyside. **Danio and Minnows** (FNAS Trophy): Mr. and Mrs. Robinson, Scorpion. **A.V. Carp and Minnow (Pairs)** (The Warwick Shield): A. Buckley, Bury. **Corydoras and Brochis Catfish** (Stan Taylor Trophy): C. J. Sykes, CAGB. **A.O.V. Catfish** (Stan Taylor Trophy): M. Kirkham, Cichlids. **A.V. Catfish (Pairs)** (The York Shield): J. T. Morris, Sandgrounders. **Egg-laying Tooth Carps** (FNAS Trophy): E. Jones, St. Helens. **A.V. Egg-laying Tooth Carps (Pairs)** (FNAS Silver Challenge Trophy): W. Drake, Bury. **Loach** (FNAS Trophy): C. J. Sykes, CAGB. **A.V. Loach (Pairs)** (The Durham Silver Cup): Mr. and Mrs. Marshall, Merseyside. **A.O.V. Tropical Fish** not listed above (FNAS Trophy): K. Buckley, Bridgewater. **A.O.V. Tropical Fish** not listed above (Pairs) (Leeds and District A.S. Rose Bowl): Mr. and Mrs. Silk, SJS. **Breeders (Egg-layers) Grp 1** (FNAS Breeders Trophy): K. Buckley, Bridgewater. **Breeders (Egg-layers) Grp 2** (FNAS Breeders Trophy): K. Buckley, Bridgewater. **Breeders (Egg-layers) Grp 3** (FNAS Breeders Trophy): K. Buckley, Bridgewater. **Breeders (Egg-layers) Grp 4** (FNAS Breeders Trophy): M. Cadd, Oldham. **Breeders (Livebearers) Grps 1 and 2** (FNAS Trophy): Mr. and Mrs. Baldwin, Sandgrounders. **Breeders (Livebearers) Grps 3 and 4** (FNAS Trophy): D. T. Milner, Darwen. **Reptiles (Non-dangerous)** (Bob Tomlinson Trophy): R. Quinlan, Zoological. **Amphibians (Non-dangerous)** (Bob Tomlinson Trophy): Mr. and Mrs. Hodges, Bury. **Aquatic Paintings (5-7 yrs):** A. Walsh, Darwen. **Aquatic Paintings (8-11 yrs):** L. Holden, Darwen. **Aquatic Paintings (12-16 yrs):** T. Jones, Zoological. **Aquatic Paintings (over 16 yrs):** A. Steadman, St. Helens. **Photographs of Fish:** T. Morris, Sandgrounders. **Photographs of Furnished Aquarium:** T. Morris, Sandgrounders. **Aquatic Handicraft (up to 16 yrs):** L. Holden, Darwen.



Hemigrammus armstrongi, commonly termed the Golden or Platinum Tetra, is not only an attractive small tetra suitable for mixed collections, but has some folklore attaching to it which is well worth probing. The TFH EXOTIC TROPICAL FISHES states that these fish do not lose their colour in captivity, breed readily, but throw offspring which do lack the normal colour. The first attribute is true enough, the second is highly questionable and the third is especially interesting. It is, of course, quite common for captive fish to produce fry which grow up duller than one would expect, but in this case I think the writer is claiming that the fish revert to a basic silvery background, as compared with the bright silver or golden mirror-like characteristic which we see in wild caught specimens. The very odd fable about Armstrong's Tetra is that the platinum or golden colour, more metallic than occurs in any other fish I can think of, is a form of symbiotic disease, and not a true coloration at all. I have seen no authority for this, despite much searching. The story is, in all probability, incorrect, as simple microscopic examination should settle the matter once and for all. However, there could be some purely physical derangement in this species which affects the angling of the scales on a permanent basis, which accounts for the distinctive highlights.

Taken alone, these bits of gossip would not stir me greatly, but when

seen against a recent local experience of mine, I remain intrigued. I am always on the lookout for "accidentals" in dealers' tanks—odd fish which have strayed into consignments from overseas by chance. These are often difficult to identify, and in some cases prove long term mysteries. What most of them have in common is a passing similarity in appearance to the principal occupants of the tank, for whom they are sometimes sold in error. It so happens that the Director of the Golden Vale Aquatic Centre at Brockworth is also an "accidental" collector, and drew my attention to a most becoming small tetra in his large display tank. This fish had all the characteristics of the Black Neon, but it was very much slimmer and more



Hemigrammus armstrongi, the Golden or Platinum Tetra

silvery. Of course, my appetite was whetted, but it was thought that he had creamed off all the available specimens, which were obviously not for sale. He did mention that they had come into the country with some wild caught Armstrongs, some of which I already had bought, and which were in quarantine. So I took a chance look at the tank in which the balance were still being displayed, and was astonished to note that, in a certain light, it seemed that there was another of these oddments still remaining. A prolonged look revealed that there were more than half a dozen, and of course I laid claim to them and bore them home with great satisfaction.

Once in quarantine they could not possibly be confused with Armstrong's Tetra as the metallic overtones were just not there, yet in conditions of harsher lighting they were so very

alike in general size, markings and behaviour. The nearest we could get in the numerous references consulted was *H. stegemanni*, a comparatively rare tetra which came from the same part of the world, and could legitimately have been included in a consignment from Columbia, whence hailed the wild caught Armstrongs. Yet there was a very strong inclination not to look for a separate species so long as only differences of lighting continued to reveal the differences.

So we continued puzzled by it all until I recalled the myth of the Platinum Tetra and its mysterious "disease". Here could, in fact, have been the normal, infected form, and the other form, unaffected. It was most interesting to note that behaviour in the tank, once the two types were allowed to run together, was as though they were one, in that they shoaled together and took up possession of much the same area of tank. The latter aspect was perhaps the more interesting. The one big difference was that the wild caught Armstrongs progressed from good to even better, and have become excellent specimen fish. On the other hand the "stegemanni", or whatever they are, have run into all sorts of health trouble, and only two of the six are left. These are none too impressive, and will certainly be outlasted by the Armstrongs. This just gives an edge to the old tale that the "diseased" version is the only one which survives, since the malady in itself is a form of protection.

It would be interesting to hear from any aquarists who have had any experience of these species or types—indeed, to hear from any reader who can throw light on the subject of this mysterious state of affairs. I must record that it was some 20 years ago when I first heard the story, and there has now grown a long silence, similar to that surrounding the (authenticated!) case of the Livebearing Harlequin! By contrast, we do happen to have some live specimens here to examine, and I live in hope that fact may in this case prove to be stronger than fiction.



A-Z of the Aquarium

Quarantine

QUARANTINE is the term used to refer to the period of isolation to which all new fish should be subjected prior to introduction into an established aquarium. Failure to follow correct quarantine procedures often results in outbreaks of disease among previously healthy fish. At best, this causes distress—at worst, it causes death.

A quarantine tank does not need to have the same requirements as a normal, show tank. Natural plants can be dispensed with since they may need sterilisation between 'treatments' and may suffer in the process. Artificial plants can look realistic, will provide cover for the fish and are easily sterilised.

Aeration needs to be provided in the usual way but illumination can be kept down if artificial plants are used.

Undergravel filtration is unnecessary. This is because any treatment designed to cure the fish of a bacterial infection will also kill off the 'good' bacteria on which an undergravel filter depends.

Caves and rock shelters will provide retreats and are easy to clean and sterilise, but bogwood or cork can prove awkward.

Gravel, if used, should be of the same size as in normal aquaria, i.e. 3-6mm. No organic sandwiches or other media which will absorb water (and, therefore, chemicals and bacteria) should be used.

No heating is required in a coldwater quarantine tank, although a standby heater/stat can come in useful in treating certain ailments. Normal heating provision is, obviously, necessary with tropicals.

The technique of taking fish through a period of quarantine is simplicity itself. The quarantine tank should be

set up previously with all systems running as if it were a normal aquarium. The water should receive a dose of 'conditioner' and all new fish should be introduced following proper introduction procedures.

Once they have settled down, they should be fed and cleaned in the normal way for a period of approximately two weeks. If no obvious signs of disease develop during this time, then it is relatively safe to transfer them to the main tank, again following correct introduction procedures.

However, should a disease develop, then it can be treated in the knowledge that the fish in the community tank are safe.



Natural plants are not ideal for the quarantine tank

Rasboras

ALTHOUGH numerous species of *Rasbora* (probably in excess of 50) have been imported over the years, relatively few have achieved widespread popularity. A notable exception is *R. heteromorpha*, the Harlequin, which is among the best-known of all tropical aquarium fishes.

Yet, in at least one respect, *R. heteromorpha* is an atypical *Rasbora* in that it is deep rather than slim-bodied. Easily confused with this species is *R. hengeli* which does not appear to have a widely-accepted common name despite its Harlequin-like qualities. Of the two species, *R. heteromorpha* is generally more colourful, larger and deeper-bodied.

Other species regularly available in shops include *R. kalochroma*, the Two-spot or Clown *Rasbora*, *R. pauciperforata*, the Red-striped *Rasbora*, *R. maculata*, the Dwarf, Pigmy or Spotted *Rasbora*, *R. elegans*, the Elegant *Ras-*

bora, *R. dorsicellata*, the Eye-spot *Rasbora* and the very popular *R. trilineata*, known as the Three-line *Rasbora* or (more often) the Scissortail.

The genus *Rasbora* itself was adopted by Bleeker for some species which he had originally described in 1859-60 under the generic name of *Leuciscus*. Today, the name *Leuciscus* is restricted to fish such as the Orfe, *L. idus*, and the Chub, *L. cephalus*.

Although *Rasboras* share a number of fundamental characteristics with Orfes, Chubs and about another 1,600 species of fish which, together, constitute the largest Family of all, the



Rasbora kalochroma, the Clown *Rasbora*

Cyprinidae, they do, nevertheless, have sufficiently different features to warrant them Sub-family status according to some ichthyologists. The *Rasborinae* have oblique, upwardly-directed mouths, medium to large scales on the body, may possess barbs and, most significantly, have a lateral line which dips downwards along its anterior section. Even in those species where the lateral line is incomplete, as in Harlequins, this downward deviation remains apparent.

On a broader basis, *Rasboras* share the following characteristics with other Cyprinids like Carp, Goldfish, Minnows, Bitterlings, Orfes and Gudgeons:

They all possess a single dorsal fin, scale-less heads and toothless mouths. They do have teeth, however, but these are on the pharyngeal bones located in the throat/gullet region. In addition, Cyprinids lack a stomach, the alimentary canal being histologically similar throughout. Finally, all possess a sophisticated, sound-receiving, bone and swimbladder arrangement known as the Weberian Apparatus (See *Rhodocinae—A-Z*, January '85).

Quiver Flies



A case-carrying Quiver or Caddis Fly larva

QUIVER FLIES are better known (at least in U.K.) as Caddis Flies. They are insects belonging to the Order Trichoptera of the Sub-class Pterygota, the winged insects.

The Trichoptera are distinguished by a combination of features which include the possession of two 'hairy' membranous wings and poorly developed mouthparts in adults. The larvae have fully functional mouths in keeping

with their predominantly predatory habits. Quiver/Caddis Flies also exhibit complete metamorphosis. This means that the marked morphological differences between the larval and adult stages are all accomplished in a single, major step. There is, therefore, no series of intermediate stages between the caterpillar-like aquatic larvae and the fully-winged, almost butterfly-like adults.

There are numerous species of Trichoptera, probably in excess of 200, distributed over about 13 Families. However, since many species have not yet been fully described, it is not possible to give accurate designations for all of them. A further complication in Caddis Fly classification is that a larva may exhibit characteristics of one particular Family while the adult may show affinities with another.

Be that as it may, Caddis Flies are fascinating insects, particularly during the aquatic larval stages when many species construct distinctive cases which they carry around with them until they metamorphose.

With few exceptions, those species that do not construct cases (mostly out of sand/gravel grains or plant fragments) generally burrow and spin a mucus web with which they catch suspended food matter from the water. The outstanding exceptions to the above are four species of the genus *Rhyacophila* (Family Rhyacophilidae) which lead a free-living predatory life in well-oxygenated streams.

All Caddis Fly larvae are further characterised by the possession of two hooks at the 'tail end' of the body with which they attach themselves to their cases, tunnels or, simply, to the bottom of the stream. All species are usually less than 3 cm. long.

Aquarists tend to come into contact with Quiver/Caddis Flies when they collect or buy native plants for cold-water tanks. Although a few species are suspected of being able of transmitting some Thread Worm (Nematode) infections to fish, the risk is, generally, low. Fish will eat both larval and adult Caddis Flies, given the opportunity.

Rhodeinae

THE Rhodeinae constitute a Sub-family of the Family Cyprinidae, thus being of equal status as the Rasboras (Rasborinae—A-Z, January '85), the Barbs (Barbinae) and the Orfes and Chubs (Leuciscinae), (Nelson, 1976). Among the Cyprinid characteristics which they share with all other members of the Family is the remarkable Weberian Apparatus. This forms an elaborate system of connections between the ear and the swimbladder by means of complicated modifications of the first four vertebrae (back bones) which lie immediately behind the skull. However, the Rhodeinae can be distinguished from all other Cyprinids by their exceptionally long breeding tubes and their remarkable association with freshwater mussels during spawning.

The most popular member of the Rhodeinae among aquarists is, without doubt, the European Bitterling, *Rhodeus sericeus* (variously referred to as *R. amarus* and *R. sericeus amarus*). This is not the only Bitterling species,

though. The Silver Tanago, *Tanakia tanago*, which has gained popularity in recent times also belongs to this Sub-family. So do *Rhodeus ocellatus*, *Achelognathus longipinnis*, *A. rhombea*, *A. lanceolata* and *Pseudoperilampus typus*.

All these species have a great deal to offer. Most are quite rare in the hobby and have not been observed spawning in the wild to any extent, therefore, affording excellent opportunities for original contributions to be made by aquarists.

In addition to *R. sericeus*, at least two other species have been bred in aquaria, *R. ocellatus* and *Tanakia tanago*. However, even here, there is scope for new data since detailed accounts are apparently not available on the exact mechanism whereby eggs and sperm are introduced into the host water mussel.

Although *R. sericeus* can be found in some slow-moving, densely vegetated rivers and backwaters in lowland areas in England, the species is not native to these waters. Its true, natural range extends throughout Europe with

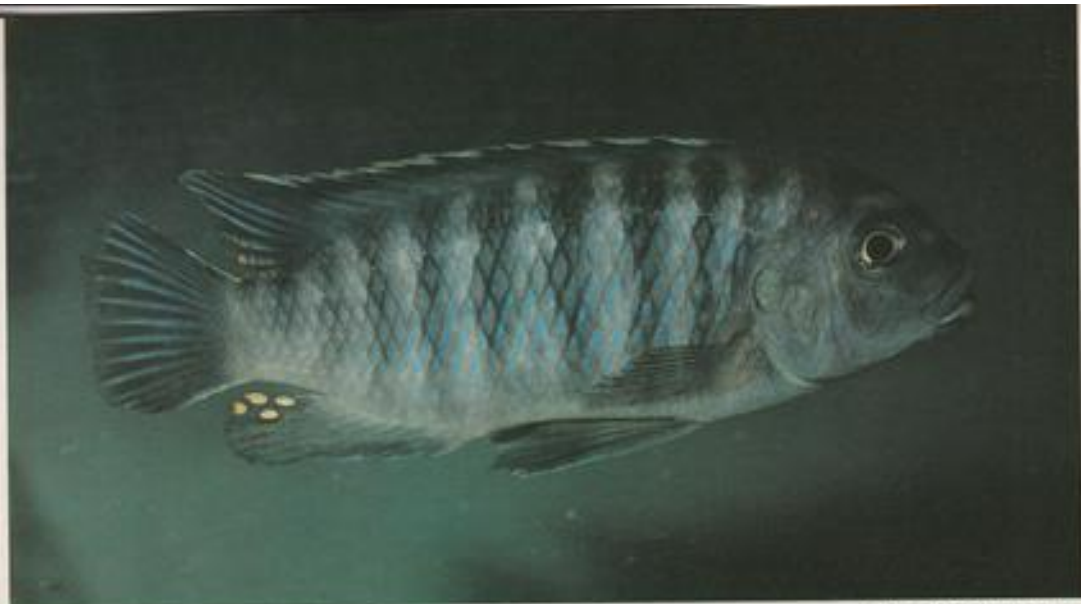
the exception of Spain, Portugal, Southern France, Italy, the Balkans, Sweden, Northern Finland, Scotland and Ireland.

Breeding takes place between April and June and shows considerable overlap with the season during which Swan Mussels release their larvae which, themselves, parasitise Bitterlings for a time.

In aquaria, Bitterlings require a period of low temperatures for successful spawning to occur.



Male Bitterling, *Rhodeus sericeus*



Petrotilapia tridentiger

BREEDING CICHLIDS

by
Dr. Robert
Goldstein

WHEN I first got into the hobby, the number of cichlids known to aquarists could be counted on your fingers. We only had a few kinds and everybody knew every species. For example, all shops carried little oscars and Jack Dempseys, to be sold, grown and subsequently returned when they began eating the other fish in the community tank. Firemouths were brilliantly coloured with vermilion patches that we compared for size, seldom colour, not like the washed out substitutes we see today. We were envious of big breeding pairs of *Geophagus jurupari* (only writers called them eartheaters), which were usually the pride of the shopowner and seldom for sale. The shop also had too many "ports," or *Aequidens portalegrensis*, for whoever was breeding them (usually the shopowner himself), could never sell them fast enough. Spawns of close to a thousand were usual, and even at 19 cents nobody could get rid of them.

Although we had angelfish and a few discus, there were no fancy

strains and breeding these fishes was the mark of the real expert. Our African fishes were represented by Jewel Fish not nearly as fine as today's beauties. And we had Egyptian mouthbrooders (we called them "mouthbreeders" in those days). When the giant mouthbrooding *Tilapia mossambica* was publicised in *National Geographic Magazine* stories about the New York Aquarium, everybody wanted the fish. And the fish obliged until we were all sick of them. Now every shop had too many *Tilapia* in addition to too many ports.

We had other highly regarded species in those days, among them *Nanochromis nudiceps* from the Congo and dwarf *Apistogramma*, *Nannacara* and *Crenicara* from Central and South America. Every aquarist knew of all the exporters in the Guyanas and elsewhere, for William T. Innes and his writers for the *Aquarium* magazine were not merely the authorities in the hobby, but its journalists.

Some of the old favourites are

still with us, others are rarely seen today, and the number of new fish from Africa and America is simply staggering. We have learned to handle, understand and propagate most of these fishes in large numbers, efficiently producing myriad progeny and causing prices to drop steadily.

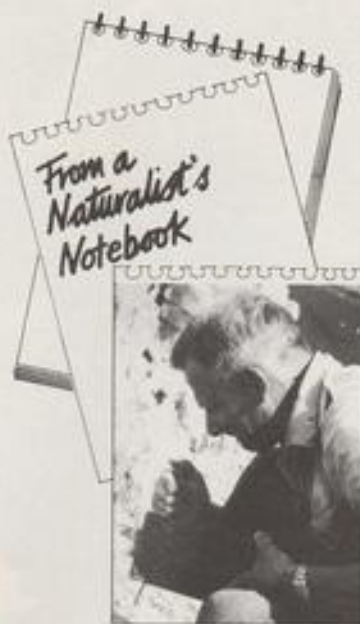
Breeding cichlids has lost some of its romance today with the substitution of mass methods of production. Group spawning, mouthbrooder stripping, the removal of egg-laden substrates for artificial incubation and hatching and other techniques were originally designed to save spawns from skittish and unreliable parents. Today, they are used to increase production so that what once was necessary for success has now become the rule rather than the last resort. Many of today's aquarists routinely use mass production methods, unaware that there is more enjoyment to be had by producing less.

Continued on page 31

"I'm not bothered whether it was a plaice or a flounder" said the editor of a local weekly paper after catching a flatfish weighing over 2 lb, miles up the polluted River Douglas in industrial Lancashire. This river has improved its quality, and fish, even near Wigan; but it is essential for anglers to record their specimens correctly. It was assumed this must be a 'plaice' because of its weight; but the plaice requires much more saline conditions than above the tidal reaches of a river, whereas the flounder normally ascends there in spring, up this particular river.

Even though honest anglers never exaggerate more than 25%, hook and line records are no criterion of a fish's maximum weight, e.g. a record 5 lb 11½ oz flounder caught in the Fowey, compared with 7 lb 15½ oz for a plaice in Salcombe Harbour. The identification of fish isn't always easy, requiring in this case comparing the lateral line which rises over the pectoral fins in the flounder, and scale-counts which avoid confusing big trout and small salmon.

Few will read the new Anglo-German Journal of Ichthyology, starting from Hamburg in 1985 and ranging through fish health and pathology to aquaculture and the use of fish as test animals in scientific research. But all aquarists should be concerned that at the time of writing, years of efforts by the Nature Conservancy to set up Britain's first marine nature-reserve under the Countryside Act have not yet come to fruition because, states the conservancy, certain interests effectively have the power of veto. It has proved to be a much more complex problem than establishing a land-based national nature-reserve which includes freshwater haunts, like Rostherne Mere in Cheshire, Deeping Lakes in Lincolnshire, or the Bure Marshes in Norfolk. Ireland already has one at Lough Hyne. When I visit Anglesey's Church Island in Menai Straits at low water, a short walk from the suspension bridge, I usually find groups of students and amateur aquarists collecting or examining specimens of rock-pool life. But there is no marine seashore equivalent to an SSSI in areas where subaqua diving by collectors may harm its fauna.



by Eric Hardy

Burnt Island, St. Agnes, on Scilly for instance, is rich in uncommon rock-pool haunts of sea-anemones. The Conservancy recently granted £2,025 to the Marine Conservation Society's seawatch programme.

The Nature Conservancy grants financial aid to many aquatic projects, recently giving £520 to construct ponds at Stockton in Worcestershire and Cwmlwyd Wood, Glamorgan; £390 to make a pond to maintain water-levels at Plas Iolyn Bog in Clwyd, £248 to clear ponds at Edenbridge in Kent and Lordshill near Southampton, and £1,717 to brief schools on freshwater habitats and amphibians. £2,000 was granted to Manchester University to study marine honeycomb worms (Sabellaria), £2,000 to Exeter University to study population dynamics of edible sea-urchins, and nearly £3,000 to study the inshore life of Mull and the Firth of Lorne in Scotland and Skomer off South Wales. £14,700 went to Swansea University for 2 years' studying the nutrients of Bosherston Lake at Stackpole and £6,298 to Leicester Polytechnic to study the

status and ecology of the warty newt.

A £9,180 grant to Sussex University was to study reproductive success in the natterjack toad. I was surprised to read in *Saving Green*, a recent paperback by the new director of Friends of the Earth, Jonathon Porritt (Basil Blackwell, £3.15), largely promoting the Ecology Party, the statement that natterjacks survive in Britain because their only known site in the south is owned by the Ministry of Defence. These toads have 4 sites in the south, 4 in the East and 7 in the Northwest and Scotland, depending for survival on their greatest colony—on Southport dunes.

By far the best book I've ever read, and the most readable, on serpents is the lavishly-illustrated new English edition of Engelmann and Obst's German book, *Snakes*, published by Croom Helm at £13.95 for 222 large pages. It is not a monotonous tabulation of species, but a thoroughly informative, up-to-date biology of the way they live, court and feed, from true freshwater snakes to sea-snakes, burrowers and tree-climbers, colouring for camouflage or bluff, snakes in captivity and even the tricks of snake-charming and snakes in modern medical research. It could do with an index of more than species, but you will find snakes most interesting after reading this well-recommended work. Snakes seem unique in some having a double penis.

Zoologists at the University of Western Australia have been researching the nasal salt-glands of desert-lizards. The replacement of tails by lizards is well known as a survival factor in escaping from predators, and the replacement of limbs has been shown in newts. In Canada, a long term study has been made of the tooth-replacement phenomenon in the young green iguana. Finally, in conservation, the Mississippi alligator is returning to Louisiana rivers after a management policy success and a sanctuary exists for the Indian flying lizard at Mundanthurai. The survival of Britain's last sand-lizards depends upon the survival of acid lowland heaths and sand-dunes. Between 1830 and 1980 such lowland heaths declined from 143,250 to 39,450 hectares.

BREEDING CICHLIDS

Continued from page 28

Rift Lake mouthbrooders

The Rift Lake mouthbrooders fall into the categories of easy mass producers of small eggs (mbuna of Lake Malawi such as *Pseudotropheus* species) and difficult producers of small numbers of large eggs (*Tropheus*, for example). You will read of different genera being erected for maternal vs. paternal or biparental mouthbrooders, and for delayed mouthbrooding or even a lack of mouthbrooding. What once was the simple genus *Tilapia* is now a plethora of names as distinguished ichthyologists and not-so-distinguished behaviourists (they call themselves behavioural biologists but they are really animal psychologists) rush to erect new names without any real understanding of the rules of zoological nomenclature or the consequences of their actions. Perhaps you don't care about tilapias, but if this continues we may see the same thing happen in *Haplochromis*. What these fishes all have in common is the relative ease of group spawning.

Group spawning East African lake mouthbrooders is simplicity itself. While the lakes vary considerably in chemistry, you can keep the fish in almost any strongly hardened or mineralised water. Many aquarists use sea salt mixes or their own concoctions of epsom salts and plaster of paris to turn the water into a real knucklebuster that retards the growth of decay bacteria. The bottom is provided with coarse river gravel for the fish to push around and piles of rocks which they can't. We used to worry about dissolved minerals in rocks leaching out and killing our fishes, but I've never seen a case of that in all my 40 years in the hobby. Since we all change water at least as often as I do (and I'm

embarrassed to tell you how infrequently I do it), chemical leaching is a bogeyman we can live without.

Water and food quality are the keys to breeding East African lake cichlids. The dry and freeze dried foods of today are superior to anything previously available (although that doesn't say much), and for the first time exceed even the nutritious content of fresh and frozen foods. We have preparations based on liver, on arctic krill, on halogenated seaweeds, supplemented with vitamins and minerals in concentrations based on scientific aquacultural research rather than armchair evaluations. Our filtration systems are capable of pulling out the finest particles before they rot, and removing noxious gases and chemicals already released by decay or overfeeding. And they keep improving.

Technically, we're in terrific shape. Where aquarists err is in mixing too many species in too few aquariums. Because of the propensity of Rift Lake cichlids to interbreed and the frequency of unintentional hybridisation when sperm and eggs mix from two or more simultaneous spawnings of different species, the identity of many hobby populations is doubtful. If the problem was vexing with Lake Malawi species, it is becoming intolerable with the introduction of Lake Victoria and minor lake cichlids, many of which can only be distinguished with accurate locality data.

If you want to community breed the right way, then limit the species in any one tank to one lake (and try to match the water conditions) and no more than four or five species, all of different shape and, as much as possible, of widely separate evolutionary lines. Keep them uncrowded (and here I know I'm hitting my head against a stone wall) and be prepared to retrieve the brooding parent from the mass of rocks.

Stripping the eggs of mouthbrooders has become commonplace. But why people persist in doing it is beyond me. It is the rare cichlid that will spit out or eat

its eggs if handled with tender loving care. Remove it to a large, well planted and rockworked aquarium where it can brood in peace and release its fry in security. In many cases, the failure of a fish to carry embryos to term was due to too much annoying attention by the aquarist (often armed with a flashlight) or cold water that prolonged incubation or killed the embryos.

Once the fry are released, they should be raised alone, not combined with a spawn of a second species. That often results in the complete wipeout of one of them. It always amazes me that somebody will risk a spawn worth a hundred dollars in order to avoid buying a tank that costs just ten.

African substrate brooders

Many East African Rift Lake cichlids are substrate spawners that breed in caves, on open rock surfaces, or even in snail shells. Mostly, they are aggressive territorial fishes that do best in single species aquaria. Although most will spawn in community tanks, they vary in their success at raising the fry under crowded and multi-species conditions. There is only one reason why aquarists breed them in community tanks, and that is because they want more kinds of fish than they can separately house. That is a shame, for there are few pleasures in this hobby as great as raising fry with their parents. There is yet another reason to use single species tanks, and that is to observe the unique behavioural characteristics of a species that doesn't spend all its time in defence of its fry. Intraspecific behaviour can be quite different from that elicited to dispel non-related fishes. But you won't notice it unless the tank is set up to allow that behaviour to appear.

That is also true for the fishes of Central and West Africa. The Congo (Zaire) River fishes that breed in the quiet deep backwaters or within shallow rapids do best in single species aquaria where they can be trusted to raise their



Red Oscar (*Astronotus ocellatus*)

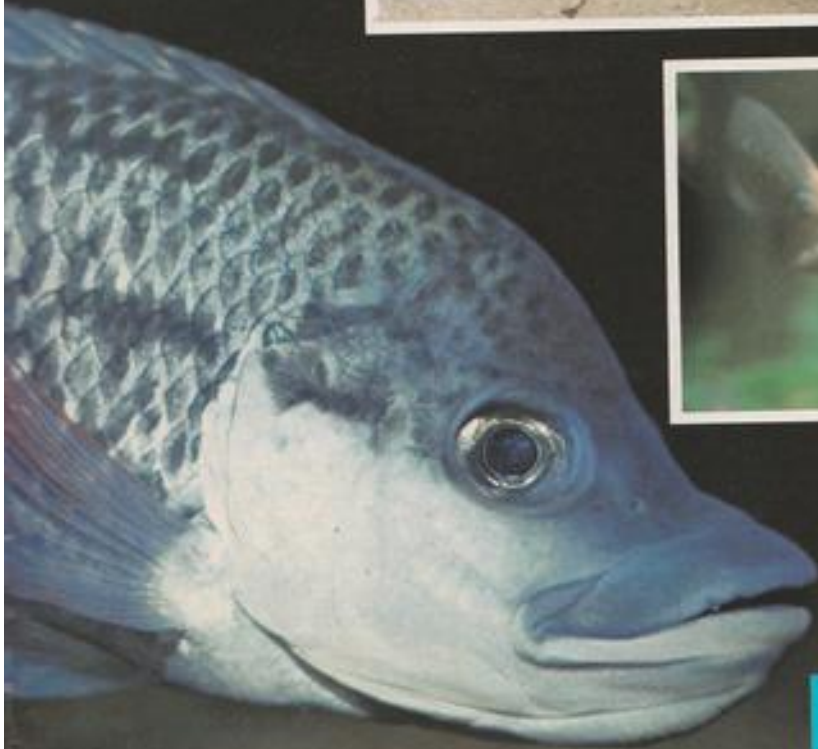




Julidochromis marlieri



Geophagus hondae



Oreochromis mossambicus, formerly *Tilapia mossambica*

Neomatochromis wagsleyae

own fry. If the fish habitually eat their eggs or fry, try to give them more privacy first, and only remove the eggs when all else fails.

It is essential to know the natural habitat of your fish. Failures with, for example, *Nanochromis nudiceps* and related species in recent years were often due to a misunderstanding of the waters in which they lived. A recent article on a new species of *Nanochromis* described the habitat as a swampy, blackwater area, more like the habitat of pygmy American sunfishes than our traditional view of

a darter-like fish in a hard-water, fast flowing river. Perhaps the failure of the hobby to establish *Nanochromis dimidiatus* was for just this reason. It is only in a single species tank that improvements or declines in the health and deportment of a fish can be monitored and the ideal conditions determined.

Neotropical cichlids

All the behaviours of African cichlids can be found in Central and South American species, from mouthbrooding in *Geophagus* and some *Aequidens* to substrate brooding in caves or out in the open on rocks or in pits. And we have leaf spawning as well, a substrate spawning behaviour adapted to deep water and mud bottoms and so far not noted in any of the Africans. We probably just haven't looked hard enough.

The sensitivity of American cichlids to sharp raps or rapid movements has taught us to give them tender loving care and single species aquaria. Their accommodation to planted tanks, low monetary value and slow growth have also increased the enjoyment inherent in keeping Neotropicals in family groups. With the understanding of the role of mucus in discus, commercial production has brought the price way down. You can still breed them for the money, but the enjoyment of a family tank is more important than the dollars resulting from increased production by artificial incubation.

Dwarf cichlids are a special case. The price of ten gallon tanks is now so low that the only limitation is space in which to keep them, and basement racks can go far in eliminating that problem. With good light, good food, some rockwork, gentle filtration and heavy plantings, there is probably no Neotropical dwarf cichlid that cannot be propagated by anyone with a modicum of patience.

Standard conditions

We have already remarked on

using appropriate water chemistry that stimulates the natural habitat. Water changes are equally essential. Rockwork, caves, shells, hiding places, rooted plants (if possible) and floating plants should be included in the single species family tank and the multispecies community tank. Warm temperatures are generally not essential for many cichlids, but improve developmental rates and breeding success, and can be essential for normal mucus and antibody production in some fishes. The role of light is often overlooked. A twelve to sixteen hour period of light is minimal for most cichlids, while an eight to twelve hour dark period is also important for eye health and perhaps other physiological reasons. Heavy feedings grow fish fast, but only when combined with massive water changes. Doing one without the other will either starve, stunt or kill them with pollutants.

Artificial incubation

When removing adhesive eggs on a substrate from a breeding tank, replace the substrate with a substitute to minimise frustration, which might result in interruption of the spawning cycle. Fish that have had their eggs removed, but which are otherwise undisturbed, frequently spawn again in a short while. The egg-laden substrate should be placed in an empty aquarium where a gentle stream of air can be played adjacent to, but never directly on, the eggs. If a tank is used rather than a jar, the fry will not have to be moved at a sensitive age, and water quality can be maintained even in the presence of decaying, infertile eggs.

Mouthbrooder eggs can be removed by gently prising open the mouth of the fish while pressing on the expanded buccal cavity beneath the throat. These eggs, and non-adhesive eggs removed from spawning pits, can be suspended in a small segment of nylon netting adjacent to, but again not directly within, an air stream.

Many aquarists use dyes, and frequently do it all wrong. Methy-

lene blue dye is an effective antibacterial agent only in very high concentrations, and won't affect invasive *Saprolegnia* and *Achlya* fungi. The only effective fungicide widely used is malachite green, at the rate of 1 drop of a 0.75% solution per gallon. Recent studies have shown that malachite green is only safe during early development, and should be discontinued later. If used late in development (when it is totally unnecessary), it can cause massive birth defects.

Raising the fry

Whether in family tanks or in fry tanks, juvenile cichlids should be raised as one species of one age per aquarium. Fry should be started on live *Artemia* nauplii as soon as possible, supplemented with micro-worms or vinegar eels for at the first week. Subsequently, the diet's variety can be increased to include live or frozen adult *Artemia*, flake foods and fresh meats, but do not eliminate some form of shrimp. You can wean the fish from frozen adult brine shrimp on a diet of whole food shrimp made into a paste in a food processor and frozen.

Water changes should be started slowly, but then increased as the fry grow. Snails, the only animals that will eat fungal-invaded food, help keep the bottom clean, but are a supplement and not a substitute for manual housecleaning.

And finally . . .

If the number and variety of cichlids has been getting you down, and the factory methods dealing with breeding habits has jaded you on cichlids, try handling the fish the old fashioned way. Keeping cichlids family style rather in a George Orwell Brave New Cichlid Tank can be as much fun as it was when we were kids. And since we're a lot more knowledgeable about water, food and chemicals, we can enjoy successes with new fishes and old, and get back to the reasons we got into this hobby in the first place.

THE BASIS OF FISH HEALTH

by 'Mayfly'

FUNGUS DISEASES OF FISH



FUNGI are strange organisms. We call them plants but they lack the most characteristic feature of plants—the ability to make food from simple chemicals in the light. Fungi come in a variety of colours including red, bright yellow—but never green. All fungi must obtain nourishment from other plants or animals—either living or dead. That is why they live either as PARASITES on living things, including fish, or as SAPROPHYTES, that is, living on dead material such as fallen leaves, fish carcasses, dead eggs etc. Fungi come in a wide range of sizes, from large brackets on trees, mushrooms and toadstools etc, to sub-microscopic. Hundreds of different kinds exist in soil and water, not causing disease but doing the very important job of decomposing dead remains of plants and animals. There are many types of fungus that cause disease—one of the commonest is ring worm, a parasitic fungus of the skin.

Every fungus consists of threads called HYPHAE which may branch and rejoin to form a network called a MYCELIUM. Many fungi have no distinct body shape but are mat-like and spread over or through the substrate absorbing nourishment over their entire surface. It is the matted hyphae which give the name 'cotton wool' disease to the best known of the parasitic fungi of fish. Cotton wool disease is usually, but not always, due

to the group of fungi of the genus *Saprolegnia*, one group of water moulds. These are found very commonly in natural waters and soils, particularly at fairly low temperatures. There is a ready exchange of spores of this group of fungi between soil and ponds and lakes as the spores are washed in from the surroundings. These spores will readily begin to grow on dead animal tissues and sometimes on dead plant tissue too. They will rapidly infect dead fish eggs and can spread onto live eggs. They also infect fish. In other words these saprophytes can turn into parasites—biologists sometimes refer to them as opportunist parasites—they are able to attack fish when the opportunity presents itself. The question which interests fish keepers is 'what factors predispose fish to fungal attack?' The species of fish makes little difference. *Saprolegnia* has been recorded from many species of fresh-water fish—of all ages and sizes—but it has been noticed that spawning fish are particularly prone to attack. As far as is known this fungus cannot gain entrance through an intact, healthy fish skin with its mucus cover, only when this is damaged in some way can the fungus penetrate. The most frequent cause of damage to the outer surfaces of fish is handling—net marks and abrasions often reveal the cause of the physical damage that is the forerunner of fungal disease. *Sapro-*

legnia can also gain a hold in tissues damaged by other disease organisms, for example *Argulus*, the fish louse or the gill fluke *Gyrodactylus* (see our previous articles).

One thing is clear—and that is that *Saprolegnia* is a fungus that attacks from the outside of the fish. It cannot infect by way of the gut and symptoms are nearly always obvious when examining the outside of the fish. Other fungi hide away inside the fish and only reveal themselves when the fish is dissected.

Once the fungal hyphae of *Saprolegnia* have got a hold they travel and penetrate into the underlying tissues of the body. They frequently affect the gills causing the disintegration of the soft tissues of the filaments leaving only the spiky gill cartilages.

Sometimes fungal attack occurs without any obvious physical damage being apparent. Often the fish have been stressed by transport, temperature shock, spawning or some other factor, and we assume that the flow of mucus becomes insufficient or that some weakening of the fish's defences have occurred prior to successful invasion by fungal spores. All in all, some mystery surrounds cotton wool fungus. Why should a harmless—indeed valuable decomposer living in the soil or water suddenly change into an aggressive parasite?

The symptoms are well known.

White or creamy coloured patches—the mycelium—occur on the body and gills. These patches may have a cotton wool appearance or may stream out from the body. Usually the patches are small, but in later stages they may cover large areas. When the water is rich in algae or detritus, masses of bacteria, debris or algal cells may become trapped among the filaments of the fungus so that the affected areas become grey or brownish in colour. When the infection is restricted to superficial layers of the skin the salt balance of the fish is damaged and this can lead to the death of the fish. If no treatment is undertaken most fish do succumb and spontaneous recovery is unusual. When the fungus penetrates the underlying tissue the cells are killed and areas of dead cells (ulcers) are formed. Secondary infections of various bacteria very frequently take place which add to the problem and death will eventually follow.

By far the commonest and best known of the fungal diseases is *Saprolegnia* but there are others affecting freshwater fish e.g. *Achylya hoferi*, a fungus very similar to *Saprolegnia* which has been reported affecting carp in Europe and *Aphanomyces*, one species of which is the causative organism of crayfish plague—the devastating disease which has wiped out the crayfish from most of Europe. The same species or a nearly related one, has been reported recently from Japanese goldfish in which it caused granuloma (growths). Another fungus *Branchiomyces* causes the disease 'gill

rot', which is characterised by a yellow-brown discoloration of the gills followed by an eventual disorganisation of the tissues. *Branchiomyces* is considered to be a major problem in Eastern European fish farms and has been recorded several times recently in imported cyprinid fish in the UK.

In addition to the types mentioned above, one or two other species are occasionally recorded from fish. Most of these are species which are part of the normal flora of the soil and water. These are again opportunist pathogens usually living as saprophytes and only occasionally invading living tissues to become parasitic. *Fusarium* which readily grows on stale bread has been found in lobsters and other Crustacea causing 'burn spot' disease and in one report was associated with the deaths of large numbers of carp.

In the sea there are, as far as we know, few fungal threats to fish. The most important is *Ichthyophonus hoferi*, sometimes referred to as internal fungus. This species was previously known as *Ichthyosporidium*—but this name is now used for a protozoan. *Ichthyophonus*—a group of closely related species is notorious as a periodic killer of vast numbers of herring in the North Atlantic, as well as mackerel and some other species of fish. It also occurs in brackish water and freshwater fish species, and recently we found it, or a very closely related species in goldfish. It has been recorded from more than 80 species of fish and is known from most parts of the world.

Its common name 'internal fungus', gives a clue to its main difference cotton wool fungus—it attacks from the inside, invading principally those organs richly supplied with blood, namely kidney, heart, spleen and liver. Eventually it spreads to other organs and the body wall. In the affected organs it forms nodules or cysts. In the herring and probably in other fish species two states of the disease have been described. In the acute state there is massive tissue invasion, necrosis and death within 30 days. In the chronic state there is slow invasion of the cells, the fish darken, there is often curvature of the spine associated, in some species with behavioural changes which have earned the name 'swinging disease'. In this state mortality occurs within 6 months. Infected fish fail to grow, become emaciated and gradually go downhill.

As with many fungus diseases in man and domesticated animals internal fungus is difficult to treat and no certain cure exists although some success has been achieved with some antibiotics. Disease avoidance is always better than cure. *Saprolegnia*, on the other hand is quite easily controlled if caught in time before massive invasion of the cells has occurred. Salt baths and dips can be useful and copper sulphate, formalin, potassium permanganate have been used. However malachite green is the preferred treatment as it has been used successfully against cotton wool disease for 50 years and details will be given in a later article.

OSCAR

G. Robinson



WHAT IS YOUR OPINION?



by B. Whiteside.

B.A., A.C.P.

'Photographs by the Author'

HAPPY NEW YEAR! I hope it brings you health, wealth and happiness. I hope it brings peace and food to those parts of the world where such essentials are missing.

Miss Carol Ann Pilkonis wrote from P.O. Box 11, Gagnon, Québec, Canada, G0G 1K0. She wrote: "... I find *The Aquarist & Pondkeeper* very interesting as you often cover species we rarely see here in Canada. I am also amazed by the very active participation you seem to have at fish shows in your country. Presumably aquariums are quite a popular hobby in your part of the world. Hopefully through your magazine I will find a pen-pal in order further to explore the differences and similarities in fish-keeping between our countries and further discuss fish species available to us.

"Right now in our Montreal-based club the African cichlids are very popular although I personally don't keep any. One of my friends was green with envy when he spotted the quetzal cichlid on the cover of your September issue and now he is trying, without much success, to find a pair.

"Next year I hope to visit friends in Portugal and I'm sorely tempted to make a detour to Brentford especially to check out the fish scene. We'll see what can be arranged, and I'll certainly let you know well in advance if I'm able to visit. In the meantime I wish

you all good fish keeping and I look forward to receiving my copies of *The Aquarist & Pondkeeper*." (Miss Pilkonis sent her letter to Mr John Young, our Advertisement Manager, and she ordered 17 issues of the magazine, at a total cost of £24.10. Perhaps I should make the point that during the past 21 years I visited the offices of *The Aquarist*, at Brentford, only once, and I don't think I saw any fish there.

Mr N. Froment wrote to me from 97 Vectis Road, East Cowes, I.O.W., and said: "Thank you for printing my previous letter. I have received a reply from Mr. Holden who is going to open a shop on the island. I am writing again to say that I have just started a fish club and, hoping for information, I sent letters to several major fish societies. The letters were sent on 17th September 1984. I received 10 replies out of 16. All letters were sent with a s.a.e. so I do not understand why I have received no replies to some. I will not name any names as the secretaries involved probably know who they are.

"I should be grateful if you could accommodate this on your letters page so that anyone else thinking of starting a club of their own does not waste their money on postage as I have done."

I received Mr Froment's letter on 23rd October 1984, so secretaries had had at least a month to reply; however, some may just have been too busy to reply. I ask readers not to enclose a s.a.e. and not to expect personal replies from me because I no longer have time to respond to individual letters—but some people do enclose a s.a.e., including a minority who do not ask any questions. I hope that readers will forgive my not replying. My full-time job keeps me very busy and, to be honest, I hardly have time to write W.Y.O. now. Numbers of my colleagues make their living from the fish-keeping hobby and some of them answer readers' queries free of charge. Drop them a line, care of this magazine, and please enclose a s.a.e.

Incidentally, Mr Froment's club is called the Vectis Aquatic Study Society. Please write direct to him, if you wish.

Photograph 1 shows a *Colisa chama*,

the honey gourami. Miss Sarah Shepherd lives at 19 Redmoss Road, Nigg, Aberdeen, Scotland, and her subject is the honey gourami. She writes: "My story is quite amazing in a way. I have been keeping tropical fish for three-and-a-half years, and I am 16 years old. I have a 36 in. x 12 in. x 12 in. tank in which I keep a variety of tropical fish. I also have a 24 in. x 15 in. x 12 in. tank in which I keep coldwater fish. I have the water at a steady 72°F. In my 36 in. tank I have: one red-tailed black shark (in excellent condition with a jet-black body and a blood-red tail), one blue platy, one pineapple platy, one pearl gourami, two opaline gouramis, two bleeding-heart tetras, four black widows, one rosy barb, one chequer barb, two normal goldfish that appreciate the warm water, one albino catfish, one peppered catfish, one leopard catfish, one bronze catfish and . . . one honey gourami. Well since I started fishkeeping I was led to believe by books and helpful pet shop assistants that the honey gourami is a shy and timid little fish. Well, this is not the case with my specimen. He is fearless and forward. Whenever I drop food into the tank you may be sure he will be first to the top of the tank to feed; and whenever any of the other fish go over to his side of the tank he chases them off aggressively; and if a fish is chasing another about the tank, he just ignores them; although he sometimes chases them too. Is this fish a one-in-a-million honey gourami?"

Some time ago I promised to print a photograph of my pair of stainless steel worm shredders. Photograph 2 shows the items in question. Notice that one plate is marked L for left, and the other R for right. Do you have a pair of these uncommon mincers? If so, please drop me a line. I have yet to get a second pair made.

Mr Jeremy Grover is 19 years old and he writes from 81 Peel Road, South Woodford, London, E.18. He wrote: "In reply to your request for information about feeding Oscars I should like to tell you about my experiences. I had been keeping a community fish tank for about one



Honey Gourami

year. One day I paid a visit to my local fish shop and bought two red Oscars of about 3 cm. in length. My troubles had just begun!

"The Oscars were placed in my 36 in. community fish tank and were fed on pond pellets I crushed into small pieces. My Oscars were doing so well I bought two tiger Oscars. The result: my fish tank had become a boxing ring. I was amazed at their rate of growth. My tiger Oscars became more and more aggressive and started to kill off my community collection. I have one survivor to date: an upside down catfish. One of my red Oscars was also killed as his rate of growth had not kept up with that of my other three Oscars. On the subject of diet, I began to feed my Oscars on *Tubifex* worms—which lasted a matter of seconds. A good supply of earthworms from the bottom of my garden was taken eagerly.

"Eventually I purchased a 48 in. tank and a power filter—and Eheim 2008. The amount of waste that was accumulating was just too much: trying to keep my fish tank clean had become a nightmare. I then tried to give them a diet of Gammon (*sic.*) foods; but after a few months they totally disliked this source of food. An Eheim 2009 was my next purchase. Four years onwards my 11 in. Oscars, still in my 48 in. tank, being maintained by an Eheim 2013 filter, recently purchased,

are now with a number of other, smaller cichlids. Their diet consists of about 15-20 pellets a day, which are taken whole. During summer large earthworms are fed frequently with the occasional feeding of a guppy or two. Incidentally, my guppy tank is self-supporting, with no heater or pump."

Mr. Philip Robinson's address is 32 Canterbury Road, Newtown Hall, Durham, and he writes: "... My collection first started with a pair of firemouths and a pair of angelfish, both of which I wanted to breed. I made the tank look very attractive by planting it solely with Amazon swords, to give the impression of a leafy jungle. There were two fortresses of rock on either side of the 48 in. tank to provide unlimited spawning sites. Unfortunately all the effort was to be in vain for neither pair seemed to wish to spawn.

"My next move was to buy a pair of *Nectrophis nematopus*, for I was told that these fish are easy to breed. Much to my great displeasure, after two days these fish attacked the angelfish, ripping their fins and knocking scales off their bodies. I quickly removed the angels to another tank. The *Nectrophis* had formed a territory at one end of the tank. The firemouths were not tolerated at all and a common event in everyday life was the fighting of the pairs, with the male firemouth at 4 in. being the only match for the two-and-a-half inch male *Nectrophis*. The female firemouth, smaller as she is, is no match for the much smaller, even more aggressive, female *Nectrophis*...."

Twelve-years-old Gavin Meek appeared in my classroom very excited recently and asked if I had any books about the breeding of convict cichlids because his had just spawned. I brought him a couple of suitable books and now Gavin has a growing collection of baby convicts. I hope to photograph him and them sometime soon.

I look forward to receiving lots of interesting letters for next month's issue. For how long have you been reading *W.Y.O.*?

My congratulations go to Mr. Robert Robinson, a former pupil who has just reached the age of 18 and is now an adult. I'm pleased to see that he still keeps a number of indoor tanks as well as his garden pond.

For my 21st anniversary issue please send me your opinion on *The Aquarist & Pondkeeper* magazine; cultivating Indian fern; garden ponds and cold-water fish in winter; and breeding livebearers.

Goodbye until the February issue.



Stainless steel worm-shredders



SPOTLIGHT

A CHARMING GLASS FISH

By Jack Hems

Illustrated by M. Gilroy

CERTAINLY there are more strongly coloured fishes suited to a decorative tropical community tank than *Chanda ranga*. Nonetheless the fish—about 2 in. at full size—has a charm peculiarly its own and, viewed against a background of plants or dark rockwork under a bright top light, is a joy to behold.

The most characteristic features of this, and other, member fishes of the family *Centropomidae* (aptly called Glass Fishes) are a diaphanous body relatively deep between back and belly and strongly compressed sides.

The transparent quality of this species gives the viewer a clear picture of its skeletal structure and the opaque sac enclosing the internal organs and air bladder. Other conspicuous features, not too common among the general run of aquarium fishes, are two dorsal fins united at the base but separated towards the rear half of the body by a deep notch. These fins have hard rays anteriorly and soft rays posteriorly.

The anal fin begins at a point in line with the bottom of the dorsal notch and terminates, as does the posterior dorsal, near the root of the tail. It has three anterior hard rays or spines and about 15 soft rays. Ordinarily, the forked caudal fin is held spread wide.

In both sexes the outer margins of the anal and posterior dorsal fin are edged with blue, vibrantly glowing in the male, paler in the female. In general, the fins are

amberish to golden in hue, like a piece of Lalique glass, as is the body, though some of the spaces between the rays are cloudy, and some of the rays themselves, dense black.

C. ranga is widespread across most of India, Burma and Thailand and, generally speaking, congregates in the shallows of fresh and brackish waters, lakes, rice paddies and irrigation ditches. In some areas it is so abundant that, after netting (in their scores of thousands) in a fine-meshed seine they are, without any special preparation, dried in the sun and used as food by the local population. The residue of a catch, surplus to dietary needs, is spread over the land as a crop-fertiliser: a practical purpose which did not appeal to the aesthetic sensibilities of the late William T. Innes. Speaking for aquarists in general, he called it 'Shocking'.

On the whole *Chanda ranga* is well-suited to life in captivity, that is, given the right conditions. Let's mention one or two. First, it flourishes best in old, hard and clear water giving a neutral to alkaline reaction (ascertained by a simple pH test) rather than an acid one. A level teaspoonful of seasalt (minus additives) to every gallon of water may be stirred into the aquarium but is not really necessary. It is mentioned here because according to the late Braz Walker, an American hobbyist of more than average erudition, and observational powers, the amber or golden

colours of the body seem (his word) to assume a more striking quality in a slightly saline environment. Reference to seasalt minus additives refers, of course, to certain rough-textured salts sold for culinary purposes but some do have chemicals added to prevent them from clogging. Not surprisingly, the bags of prepared salts sold for the marine aquarium are better suited to creating brackish water conditions.

Returning to the subject of old water for a moment, there is some explaining to do. It goes without saying that old water does not mean water contaminated by airborne pollutants such as bonfire smoke, the fumes of petrol or oil, creosote, cooking fumes and the rest. No. Old water as interpreted by the old-timer in the hobby meant tapwater drawn straight from the mains and left to stand for several days, even weeks, glassed over, to exclude atmospheric settlings before being used to fill a tank for fish. Second, temperature. A temperature in the middle to upper seventies (°F) is perfectly satisfactory.

Fishes that make up the family *Centropomidae* have sharp, though diminutive teeth in their jaws. They use them to great advantage in catching their living prey. In brief, then, Glass Fishes are carnivorous in their feeding habits. So *C. ranga*, though no danger to its tank companions, requires easily swallowed live food such as white worms

SPOTLIGHT



(*Enchytraeus*), gnat larvae (found through summer to early autumn in pans or old tins of water stood outdoors), the small pink worms found on lawns after dark and sometimes after a heavy rainfall in humid weather. It is interesting to note that these worms can be brought or enticed to the surface by watering a square patch of lawn with two gallons of water to which half an ounce of permanganate of potash has been dissolved. Alternatively, a mixture of mustard and water will sometimes do the trick.

If the worms are too lengthy to be swallowed by the fish, then the aquarist must divide them into smaller but still wriggling portions with the aid of a razor blade. *Daphnia* is taken avidly. *Tubifex* is a good food provided it is fresh, well-washed to rid it of slush and the worms' own excrement and, even then, introduced into the aquarium in small blobs a few times a day to preclude any of the uneaten worms burrowing into the compost or potted plants. But back again to lawn worms. Always bear in mind that worms for feeding to fish must be taken from lawns free from chemical fertilisers or chemical weed inhibitors.

It must be stressed before leaving the important subject of feeding that some *Chanda ranga* can be persuaded to accept flake foods or freeze-dried fish foods such as Pacific shrimps and the rest (it is recommended that over a trial period, these foods should be soaked for a while in water before introducing them into the aquarium). As *C. ranga* has quite a small mouth, it might be necessary to snip the shrimps down the middle to make

half a shrimp easier to take into the snapping jaws. But be this as it may, some experiments with various prepared foods may be found necessary before acceptance or non-acceptance of the foods offered can be assessed.

C. ranga has been bred in the well-managed tank time and time again. The size of the tank set aside for spawning need not exceed a length of 16 in. The readiness of a couple to spawn may be ascertained by the enhanced colours of the fins and, in the female, a noticeably distended abdomen. The fish should be placed in the breeding tank with a goodly addition of some of the water taken from their home tank. Too great a change in the chemistry of the water is inimical to the health of *C. ranga* and, it follows, the breeding procedure. The temperature of the breeding tank should be identical with that of the species' normal environment, then gradually, very gradually it should be raised to about 80°F (26°C). Top light, natural or electric, should be bright. Sunlight playing over the tank for about a couple of hours daily is beneficial. Plants used to furnish the tank and provide a tangle of greenery to receive the eggs should be picked from those having needle-fine or lacey foliage.

Spawning is usually carried out among the plants before the morning hours are much advanced. There is a typical drive, the male chasing the female all over the aquarium until the excitement engendered in both the pursued and the pursuer culminates in the release of eggs and sperm. There may be subsequent chases and spawnings.

The parent fish seem not to bother about their eggs or newly hatched young, that is if sufficient food is introduced into the tank to prevent their growing hungry to the point of indulging in cannibalism. All the same, to stay on the safe side, it is advisable to remove the parent fish from their eggs or, a few days' later, their fry (incubation of the eggs takes place before a day is out).

A copious supply of freshly hatched brine shrimp is one way to avoid the risk of starving the fry. The hatched shrimp should be dripped via a siphon tube into the aquarium. A screw-down clamp is necessary to regulate the flow of living shrimps. Then again, cyclops or mixed infusorians strained through a fine-woven nylon or cotton fabric bag may be given with confidence. As the fry increase in size, other live foods may be offered such as tiny *Daphnia*, micro-worms, Grindal worms and so on. The fry do not normally chase after food; but wait until the miniscule prey swim or drift within striking distance. Gentle aeration applied at this stage of the breeding programme will keep live food on the move in all levels of the water.

It is important to keep the floor of the tank free of settlements likely to produce water-fouling moulds. So a siphon tube should be moved over the bottom of the tank fairly frequently. Make sure, however, that no fry are sucked up during siphoning operations. The age-limit of *C. ranga* appears to be about three years. It was described and named by Hamilton-Buchanan in 1822. Dr. Francis Buchanan (he later took the name of Hamilton) was a most interesting man who, in 1794, was appointed an Assistant Surgeon in the Hon. East India Company's service on the Bengal establishment. He employed his leisure time in collecting botanical, and other natural history specimens, around his station as far afield as Burma. A few years on, he became attracted not only to botanical specimens, among the other items of interest to museum people, but to fishes too. His *Fishes of the Ganges* is a classic work.

In conclusion, few aquarists could fail to be stirred by the beauty of *C. ranga* when its body, drenched in light, reflects satiny or metallic tints of green, fleeting glimpses of blue or silver or gold or warm reddish amber: it is indeed, to reiterate a statement lifted from the first paragraph of this article, 'a joy to behold'.

Company Profile

Norwood Aquarium Ltd.



Tony Street, co-founder of Norwood Aquarium Ltd., outside the new premises

If you are among the many thousands of aquarists who regularly patronise the hundreds of aquatic retailers in the area stretching from Cambridge down to Southampton and eastwards as far as Kent, then you will almost certainly be buying aquarium equipment and accessories supplied, to a greater or lesser extent, by Norwood Aquarium Ltd. This, roughly, is the extent of Norwood's "patch" which is broadly demarcated by retail outlets that can be efficiently serviced within the course of a day's travel from Warlingham in Surrey by any one of the Company's seven delivery vehicles.

Efficiency plays a vital role in Norwood Aquarium's operation. A system of ordering by telephone backed up by computerised invoicing and stock checking (up-dated on an order-by-order basis), allows clients to add late items to their orders often up to the day preceding delivery. This high degree of flexibility is clearly appreciated by retailers who can, as a result take late orders from their own customers. In spite of the high-speed processing that computerisation affords, there is no risk of the "personal touch" being lost. This is achieved by making two members of the staff,

Don Dingle and Frank Huggins, responsible for handling all the telephone orders generated by individual clients. In this way, they become intimately involved with each retailer's requirements and method of operation, can offer personal advice as and when the situation dictates and tailor each order accordingly.

Computerisation also allows Tony and Mary Street (the Co-founders of Norwood Aquarium Ltd.) and their staff to carry over 3,000 separate lines at any one time and check on stocks of any item, from the largest pack of pond liner to the smallest accessories, such as power filter rubber seals, at the touch of a button. In this way, they provide a streamlined back-up service, being able to supply spare parts for any major item, sometimes within a day of receipt of a request.

Many of the lines carried by the Company are the well-known, tried and tested ones, such as fish foods, filters, pumps, aquaria, heaters, etc. However, there is also a strong forward-looking element apparent in a small but expanding range of "new" products. A good example of this is the Sander Carbon Dioxide Diffuser.

As many aquarists who visit the

Continent will tell you, the European hobby is very different to its UK counterpart. Among these differences, perhaps the most immediately apparent is the greater emphasis placed on the growth of aquarium plants in Europe. One piece of equipment regularly employed by European aquarists to help them achieve healthy plant growth is the Carbon Dioxide Diffuser. Although this is not yet reflected in the UK hobby, there are signs that the number of aquarists adopting the use of Diffusers is increasing.

Not surprisingly, Tony Street is well aware of this and already holds adequate stocks to handle any increase in demand with the minimum of delay.

Walking round the new, purpose-built, £350,000 warehouse is enough to make any aquarist's mouth water from both the range and quantity of stocks held by Norwood. There can be few places around where a retailer can buy anything from the complete range of sophisticated Tunze Aquariertechnik filter systems (plus spares) or the Wisa range of pumps, to the humble, but essential, heater/stat sucker, plus everything in between. There is even a stock of publications which will put virtually any library to shame, consisting, as it does, of over 200 titles.

If you require further details on either products or services available from Norwood Aquarium Ltd, contact Tony Street or Ken Mayger (the Manager) at 631 Limpsfield Road, Warlingham, Surrey, CR3 9DY. Telephone: Upper Warlingham (08832) 5454.



Computerisation, plus personal telephone handling of orders from this room, are the keys to Norwood's efficiency

Your questions answered...

Having problems? Send your queries to our panel of experts who will be pleased to be of service. Every query receives a personal answer and, in addition, we will publish a selection of the most interesting questions and responses each month. Please indicate clearly on the top left hand corner of your envelope which department you wish your query to go to. All letters must be accompanied by a S.A.E. and addressed to:

Your Questions Answered, The Aquarist & Pondkeeper,
The Butts, Brentford, Middlesex TW8 8BN.

TROPICAL



Dr. C. Andrews

Tropical



books on ichthyology...

Can you recommend some books which deal with the scientific aspects of fish and the way they live?

A few books spring to mind, but do check their prices before you order a copy from a book shop:

'How Fishes Live' by P. Whitehead (Elsevier, 1975).

'Ichthyology' by K. F. Lagler *et al.* (John Wiley, 1977).

'Fishes: An Introduction to Ichthyology' by P. B. Moyle and J. J. Cech (Prentice Hall, 1982).

'The Life of Vertebrates' by J. Z. Young (Oxford University Press, 1962).

Out of print books, should, of course, be available from most libraries.

clown loach...

What are the best tank conditions for clown loach?

Clown loach (*Botia macracantha*) prefer a well planted tank with plenty of rock or root hiding places. However, this loach is less shy than some related species, and is quite



Botia macracantha

active around the tank during daylight hours. It is best kept in a small shoal and clown loach will shoal-up with other bottom dwelling fish. Soft, slightly acid water, a temperature around 25-30°C, and a varied diet of tablet foods and 'wormy' live foods are recommended.

Somewhat susceptible to white-spot (*Ichthyophthirius*) and some of the chemicals employed to combat the problem. Treatment with a remedy such as *Contra-Ick* or raising the tank temperature to at least 30°C for several days, are both safe and effective. Note that 30°C may be too warm for some fish!

Clown loach are ideal tank-mates for discus.

four-eyed fish...

Can you give me some help caring for my four-eyed fish?

The four-eyed fish (*Anableps*) comes from central America and northern South America. It may grow to 15 or 20 cm and, since it is a good jumper, it requires a tank with a tight-fitting lid. A temperature around 24°C and the addition of 4 or 5 teaspoons of marine salts to each 10 litres of water, is recommended along with shallow water and a diet of live insects and perhaps, small fish. It is really only suitable for a 'species tank'; *Anableps* is a livebearer with the female producing a small number of 3 or 4 cm young.

crocodile fish...

Can you give me some information on the crocodile fish?

The crocodile fish is, I believe, *Luciocephalus pulcher* from South East Asia. It is also known as the pike-

head. As its names and appearance suggests, it is a predatory fish that will do well on a diet of other small fish. It may reach 15-18 cm in length and is best kept in a tank on its own, containing soft, acid water, that is well aerated and kept at around 27°C.

showing fish...

Can you give me some information on showing my fish?

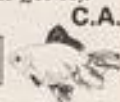
The best thing to do, is to contact your local aquarium shop and ask the proprietor for details of your nearest fish club. This is, I think, the best introduction to the fascinating world of showing fish. In addition, details of your local club may be obtained by contacting organisations like:

1. Federation of British Aquatic Societies, 46 Airthrie Road, Goodmayer, Ilford IG3 9QU.

2. Association of Aquarists, 7 Wheeler Court, Plough Road, London SW11.

Many of the books available from your local aquatic shop also have details on showing fish and one such book is "The Practical Encyclopedia of Freshwater Tropical Aquatic Fishes" by D. Mills and G. Vevers (Salamander Books, about £10.00).

Coldwater



whirligigs and damselfish...

Last summer my fantail goldfish bred in the pond and I saw a lot of young ones in the autumn. However, when I cleaned out the pond they had all disappeared. I found a number of larva which,

COLDWATER

Arthur Boarder

PLANTS

Vivian De Thabrew

KOI

Hilda Allen

MARINE

Graham Cox

DISCUS

Eberhard Schulze

according to my book, were those of the Whirligig beetle. Would they have eaten the young fishes? Also I found a number of larvae with three tails, whereas the beetle larva only had two. What were the latter?

I do not think that the larvae would have been strong enough to kill the young fishes if they were as large as you state by the autumn. The larvae with the three 'tails' were those of the Damselfly. These Dragonflies are small and much more delicate than the large Dragonfly. The 'tails' as you describe are actually the breathing apparatus which is pushed to the top of the water.



Damselflies mating on a lily pad

It is probable that your young fishes died through the cold during the winter. Unless youngsters are of a good size by the autumn, when they stop feeding, they may not go through the winter in the pond. This is especially so if there is a prolonged icy spell. To be successful at breeding fantails in a pond it is necessary to take the youngsters out of the pond and into a warmer place. Late hatched fry are unable to build up a good

reserve of fat, etc. before feeding is reduced. Pond fishes bred in the south of the country have a better chance of surviving than those bred in the north.

fin rot...

I have a goldfish which has suffered from fin rot and the tail is now very ragged. Can I cut the tail tidy or will it do harm?

You can trim the tail with a pair of sharp scissors. Then wipe the tail with a disinfectant, such as T.C.P. or Dettol. Watch the fish to see that no more fungus forms and treat it at once if it does. The tail will grow again after a few weeks but there is likely to be a thickened part where the fresh growth is made.

green algae...

Please can you tell me how to keep Green Algae under control in my indoor tank? It is 18 x 12 x 18 inches and contains: an Oranda, a Shubunkin, an ordinary goldfish, a Stone loach and eighteen 3 spined Sticklebacks.

I do not know the sizes of your fishes but it seems that the tank is probably over-stocked. It should only hold nine inches of length of fish, excluding the tail. Green Algae will only thrive if it gets plenty of light. The cure is to cut down the light and see that there are plenty of oxygenating plants in the tank. Shade out the light from the back and ends of the tank; aluminium foil is a good substance to use. Over-stocking with fishes means that it is very probable that plenty of food is given which can affect the state of the water. Weekly servicing will help to keep the water in good condition.

water lilies...

When is the best time of the year to plant water lilies in the pond?

The recommended time is in April, but you can plant them any time once the leaves have died down unless the pond is frozen over. As long as the root stock is not allowed to dry out, the plants can be moved with no danger of losses. It is not advisable to try to move an established lily when it has many leaves on the surface, as it is very difficult to get the leaves to lie flat on the surface once they have been disturbed. Do not add any manure to the basket when planting so that the plant will have to send out its roots beyond the confines of the basket. It will then be that the roots can use up much of the waste matter in the pond to help keep the water in good condition. You could plant a lily in an established pond by putting the root stock in a plastic bag as used for vegetables or fruit. No soil need be added but place a brick or lump of concrete in the base of the bag and just throw the bag in the pond where it is needed. The brick is to make sure that the whole root system will not float to the surface when a number of leaves are on the surface, which would otherwise happen. **A.B.**

Plants**undergravel filters...**

Could you please explain whether an under-gravel filter stunts plant growth? I am returning to the hobby after some years and am

utterly confused by different people's opinions. I note the majority of aquarium dealers seem to use them.

Controversy continues to rage over the advantages and disadvantages of undergravel filters, particularly in connection with plant growth. In my own experience over many years and after experiments with this type of filtration, I have found that, provided adequate depth of planting medium is given (i.e., at least 3½ in. to 4 in.) over the filter-plates, plants will grow well and flourish.

Some people maintain that undergravel filters can become clogged up by using material such as peat, clay and leaf-mould. However, this problem can be easily overcome by covering the surface of the filter-plates with a fine gauze of about ¼ in. mesh. Furthermore, I have discovered that plants actually develop root-growth in such a manner that the water circulatory passages to the filter-plates have not been impeded, due to their very fibrous nature. The root-hairs flocculate the large particles around them, thus enabling free water filtration. I have seen many flourishing plants growing in tanks using this system. I repeat, the important point is to have a good depth of planting medium over the filter-plates.

V.T.

Koi



fact not fiction...

I would love to have a pond full of large Koi although I could never afford the luxury of owning any of the super specimens seen at shows recently, but have to be content with buying small ones in the hope they will grow-on. Not having had a great deal of success in the survival of imported Koi, I intended to buy some home-bred fish but was told by a friend that they would not grow more than 14 to 16 inches at most; is this true?

The first part of your letter typifies the hopes of the vast majority of existing or potential Koi-keepers, although if you did have a pond full of large Koi you could well have some

real problems. You may rest assured there is only a very small minority of owners in the league of possessing the "ready-made" super prize Koi now being imported.

I have only ever bought small Koi in the 5 to 6 inches range, apart from two which were 10 to 11 inches, and they were all purchased more than nine years ago. Most are now between 18 to 22 inches and the largest is a good 28 inches 15 year old; a home-bred 12 years old Koi is a bulky 24 inches. Elsewhere there are home-bred Koi in the 28 inches size.



Good-quality, colourful, 12-inch home-reared Koi

I hope this will dispel any stories or doubts about the growth of home-bred Koi in relation to imported stock, but it is true to say that fish with our variable climate do not grow as rapidly as in the warmer and more equable conditions of the Far East.

Also, no matter how well they are fed and cosseted, all Koi do not grow at the same rate and some will never become large fish, except in girth if females.

I do not know of any small imported Koi that have been grown and developed here into the super prize bracket, mainly because after reaching maturity at four or five years at most, some varieties tend to deteriorate or may have been overtaken by the constantly changing trends of fashion and popularity in Japan. Many healthy, home-bred Koi are available, and it is very encouraging to learn that more and more of these Koi are winning awards at shows in direct competition with imported fish, one recently taking "Best in Class" that was bred and reared in Essex. Such facts speak volumes for the perseverance of reputable British breeders who have already disposed of some of the myths surrounding the breeding of beautiful Koi.

adding stock...

I would like to introduce some Koi into my collection of pond fish, but wonder if they would pose any threat to smaller fish?

Absolutely not. Koi, as carp, are peaceable, friendly fish that are not in the least aggressive or territorial; they live amicably with all other varieties of pond fish.

However, you could pose a threat by overstocking whatever size pond you have, and you sent no details of pond-size or numbers of fish. Overcrowding is never a good idea, and allowance must be made for the growth potential of Koi compared to other coldwater fish.

Even more importantly, I trust you will not be guilty of carelessly introducing any parasites or latent exotic diseases to your existing stock. These dangers are very real, and I constantly advise a lengthy period of isolation for imported fish in order to protect established fish that have no immunity to strange diseases.

Prevention is better than cure, and I have been on the receiving end of far too many tales of woe to be anything but cautious about mixing new fish with old.

H.A.

Marine



fear response...

I have been keeping marines for about three months. I set up the 3 ft. aquarium exactly by your book. The rocks are 'living' rock.

I started off with two damsels, followed by a flame fish then added a banana wrasse and red tailed wrasse. The problem is with the latter.

It continually swims up and down the front of the aquarium and along the water surface—not gasping for air may I add. It has not eaten so far although I have tempted it with several types of food. All other fish look healthy and normal. The seawater pH is constant at 8.2 to 8.3 and nitrite is clear.

Could you please explain this strange behaviour?

The behaviour exhibited by your Redtail Wrasse is a typical *fear response*. This is exhibited by all aquarium fishes, seawater or freshwater, tropical or seawater, where the affected fish feels physically threatened by another fish or fishes.

It is very important not to confuse this fear response with a gill-infection or gill-infestation. If a fish is suffering from a gill infection (usually oodiniasis), the fish will initially behave in an agitated fashion and the respiratory rate will quickly climb from the normal 80-90 gill beats per minute up to around 120-150 gill beats per minute. The correct medications to use are 'Cuprazin' or 'Myxazin' or a similar product.

When a fish is suffering from a gill-infestation, normally caused by *Dactylogyrus* flukes, the usual response is for the fish to hover head-upwards near the surface of the water, often near one of the airlifts. In this case, i.e. an infestation of gill-flukes, the respiratory rate will be a normal 80-90 gill beats per minute and the correct medication to use is 'Sterazin' or similar product.

If, having read the above, you are still certain that your fish is not suffering from a gill infection or gill infestation, then I recommend that you either get rid of the Redtail Wrasse or get rid of whichever of the damselfishes is causing the problem.

G.C.

Discus



species tank...

I have been keeping fish for three years now and wish to set up a Discus Species Tank.

I intend purchasing a 39 in. x 15 in. x 22 in. Sea-bray Aquarium (39 gallons). I will run an under-gravel filter from a Hoffman 350 and will use polymer filter wool and activated carbon in my Fluval 52 internal filter.

Please would you advise me if the above filtration will be adequate

or would you suggest something better. What about the set up of the aquarium? I have read different books but each one is different. What plants can I keep as I want a luxurious plant growth? How many fish can I keep (what size)?

Feeding: Would you tell me a substitute (if any) for Oxheart because this cannot be brought into my house for religious reasons, as it comes from the Sacred Cow. Will other hearts do?

I have been told the fish will be nervous and hide.

Lighting, arrangements and duration please. Do only adult Discus have the colours I have seen in books, or do young ones as well?

I suggest that you work out the actual amount of water you will have in the aquarium and make a note somewhere since you will sometimes have to use certain medications. Even if the aquarium is 22 inches high it will never contain water right up to the brim and also aquaria are usually measured from the outside. Although this might make only a difference of a few litres, it could mean the difference between life and death with some types of remedies.

Readers of this magazine will know that I do not like the use of U/G filters, especially in Discus set-ups and since you have a power filter, why bother with the U/G? Instead of activated carbon I would either filter through aquarium peat or Optima. If you still want to improve your system exchange your internal power filter for an external one.

If you dream of having a really luxurious plant growth in your aquarium as well as keeping Discus, I am sure you will be disappointed. Although there are quite a number of plants which will take the high temperature of the water needed for the fish, the lushness often seen in books can only be achieved with a somewhat more sophisticated set-up. I would use any of the bottom additives which are either iron based or collected like Dupla's Laterite from Sri Lanka, two mercury vapour lamps of 125 watts each or a HQI high performance



Hygrophila difformis, water wisteria

reflector lamp which will light to a depth of about 70 cm, as well as a CO2 system. Only then will you be able to achieve a 'picture-book' set-up with Discus fish. Plants most often used in Discus fish aquaria are various *Cryptocorynes*, Amazon Sword plants, Water Wisteria, *Crimson thalassium* and some of the more common *Aponogetons*. These plants usually do very well if one looks after them.

Your aquarium will easily take 10 baby Discus (they are always better in a small shoal) and with good feeding and maintenance will reach adult size in approx. one year. However, you ought to aim to have no more than about five or six fish after about six to seven months, otherwise your tank will be overloaded. Most aquarium shops would be quite willing to purchase from you the four or five surplus fish.

As you cannot bring into your house Oxheart, I suggest that you use Lamb's heart; and with all the other types of frozen foods available you should have no problems at all of providing your fish with a healthy variety of foods.

Discus are often very nervous and take time to settle in their new surroundings; only adult fish have the colours you have seen in publications, it doesn't matter whether they are Blues, Greens or Browns, youngsters often look the same.

E.S.



Helping Hand



by Nick Lushchan

I would like to thank all the people who 'phoned me relating to my first 'Helping Hand' article. A personal "Thank you" to Mr. Chris Moore from the West Midlands for circulating my paperwork to so many disabled clubs. This has given a wider coverage to this project, plus saving me a lot of hard work.

One of the 'phone calls, from Mr. & Mrs. Frank Richardson from Scarborough, resulted in a meeting. As they were holidaying in the Cotswolds, we arranged to meet at a Fish Shop, Swinbrook Road Nurseries in Carterton, Oxon. This was the most convenient place to meet as the proprietors (Barry and Pauline) have gone out of their way to make things more accessible for users of wheelchairs. The old premises have been replaced by new, and they have been designed with the disabled in mind. As the new shop was under construction, plans were made to locate the ramp in the best possible position, making it part of the landscape feature, and, at the same time, making things more comfortable for the disabled person. As the work was still in progress at the time I wrote this month's article, I will keep you informed on the completion date. In the meantime, you are made most welcome if you arrive before that day as Frank and Vena Richardson found.

We spent a good three hours browsing and talking. Frank and Vena are very keen on fishkeeping as it has helped them to come to terms with his disability. Frank went down with Polio just after they got married, 29 years ago. During this time, they have become active members of The Yorkshire Association of Aquarist Societies, manning their stand at most of the shows. Although this is a time-

consuming job, they still also manage to exhibit their own fish at these shows.

Fishkeeping has become a way of life for them, and as all disabled folk know, it has to be a joint concern because of the limitations encountered with life, let alone having fishkeeping as a hobby!! This puts extra pressures on the family to start with until some of the difficulties have been overcome. It is then that the pleasures of the hobby can really be appreciated, giving you hours of enjoyment. It is at this point, when you are occupied with your fish, that the family have a break, knowing full well that, if you are working, things are not bad after all—until the dreaded day when you awaken and are unable to do a thing.

For no apparent reason, one gets days like this and there is nothing you are able to do about it, but we all get over such days one way or another.

Fishkeeping has, therefore, become a way of life to most of us—an interesting and rewarding hobby, with the added bonus of being able to show your fish. By showing fish, you get to meet other aquarists and exchange views on fishkeeping. There is always some extra advice going and the possibility of winning an award (if you are lucky . . . !). Do not be put off because you are in a wheelchair as there is always a good following of club members who are only too willing to lend a hand. If you are in any doubt about the venue, 'phone the Show Secretary and enquire about the facilities at the Show—it may surprise you! Most of the venues are on ground level and some Shows (like Nailsea) have toilet facilities for the disabled, plus adequate room for your wheelchairs. So have a GO! You have nothing to lose and everything to gain . . . Good Luck!

NOTE TO TRADERS

I am working on a booklet with the names and addresses of Fish Shops and Fish Farms that cater for the disabled. It would be available to Disabled Clubs and to individuals, enabling them to have a record of premises that they are able to visit.

This publication would be particularly helpful to the disabled when they are out of their locality, i.e. on holiday, or as I find when visiting Fish Show venues.

If you would like to be included in the booklet, please write to me. If possible, could you include the wheelchair logo when advertising in local papers or with the fishkeeping magazines?

Please let me know so that I can make disabled aquarists aware of your facilities. We both stand to gain a great deal.

My home address for queries and replies is as follows:

27 Hungerford Road,
Rugby House,
Calne,
Wilts. SN11 9BH.
Tel. No.: 0249-812828.

Please enclose a S.A.E.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

NOTE TO DISABLED AQUARISTS

Please don't forget to write to me with your thoughts, hints and views on all aspects of fishkeeping for the disabled. This way, we shall get to know one another and help each other with queries, hints and general fishkeeping problems that are encountered in our every-day life.

GOOD HEALTH AND HAPPY FISHKEEPING.

Tomorrow's AQUARIST



FIND-THE-FISH COMPETITION

Sponsored by

KING BRITISH AQUARIUM ACCESSORIES CO. LTD.



Happy New Year!

What better way to get 1985 off to a flying start than by taking part in a brand new, fun-to-enter competition? So far, you have risen admirably to all our previous challenges proving beyond doubt that, not only do you know your fish, but you also have a tremendous sense of humour!

Therefore, keeping the same light-hearted approach very much in mind, we have a new challenge for you. This one comes in two parts:—

Part 1: Hidden somewhere in the following sequence of letters is the name of a well-known fish. However, to make things just a little bit more difficult for you, the letters making up the name appear in reverse order. For example, if the fish were a Guppy, it would appear as YPPUG, a Neon would be NOEN, and so on. Your first job is to identify the fish.

TABUHSIFNWOLCCATNOEBO

Here's a clue: If this fish were human, it would make you laugh.

Part 2: Once you have identified the fish, we would like you to draw it, using your imagination to produce the most humorous drawing you can think of.

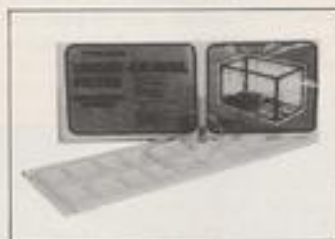
How to enter

The competition is divided into two age groups:

- (i) Under 16 years of age on 1st January 1985.
- (ii) 16 years of age, or over, on 1st January 1985.



Just two of the exciting prizes



1. Write out the name of the fish along the top edge of your entry.
2. Draw your 'cartoon-fish' on a plain sheet of paper measuring not less than 8 in. x 6 in. You may label and/or colour your drawing.
3. Print your name, full address and age on the back of your entry in BLOCK CAPITALS.
4. Print 'FIND-THE-FISH' clearly along the top edge of the envelope.

5. Post your entry to reach us not later than 14th February at the following address:

**AQUARIST AND PONDKEEPER,
BUCKLEY PRESS,
THE BUTTS,
HALF ACRE,
BRENTFORD,
MIDDX.
TW8 8BN.**

The Prizes

The following fantastic prizes have been kindly donated by King British Aquarium Accessories Co. Ltd.

First Prize in each age group will be a 'Good Environment Pack' consisting of a King British Overhead Trickle Purifier, a 24 in. King British Under-gravel Filter and a 1 lb. tub of King British Tropical Flake.

Retail Value: £25.00

Second Prize in each age group will be a 'Good Food Pack' consisting of a 1 lb. tub of King British Tropical Flake, a 25 gm. tub of King British Colour Food, a 25 gm. tub of King British Vegetable Food, a 45 gm. tub of King British Krill (Freeze-dried), a 10 gm. tub of King British Freeze-dried Bloodworm and a 10 gm. tub of King British Freeze-dried River Shrimp.

Retail Value: £16.00

Third Prize in each age group will be a 'Good Health Pack' consisting of the following King British Remedies: WS3 (White Spot), Safeguard (Water Stabiliser), General Medication, pH Test Kit, Acidity Adjuster, Alkalinity Adjuster.

Retail Value: £11.00

FAN-FISH

Distribution and conditions in the natural habitat of the species

The South American state of Uruguay is the home of a number of fan-fishes, the distribution of which is made up of two areas, the first being on the Atlantic coast east of a line drawn between the cities Rocha and Velazquez, the second the swamps along the Uruguay river to the north of Río de la Plata. Adloff's fan-fish comes from the first of these two localities, in the swamps between La Coronilla and Chuy, about 10 to 15 kilometres from the border between Uruguay and Brazil. Specimens bred in aquarium conditions, which bore the same name, were the descendants of this original genetic material in the wild state.

Ahl's description of the species in 1922 was based on specimens obtained in the region of Puerto Alegre, that is, near the Atlantic coast in the south-east tip of Brazil.

The coastal swamps of this part of the South American continent are subject to marked decreases in their water level during the dry periods of the year, but they do not normally dry up completely. Consequently, one may catch two generations of fan-fish which live here—young specimens and also adult ones from before the last rainy period.

Along with *C. adloffii* other species were caught in the same swamps. These were the fan-fishes *Cynolebias heterostriatus* (Vaz-Ferreira, Sierrade-Soriano and Scaglia-de-Paulete, 1964), *Cynolebia wolterstorffi* (AHL, 1924) and other kinds of fish such as *Callichthys callichthys*, *Gnetherodon decamaculatus* and *Jenynsia* species.

The close proximity of the Atlantic Ocean has a great influence on the climatic conditions of the region. Summer temperatures vary between 21 and 24°C, winter temperatures between 10 and 16°C. The annual

Cynolebias adloffii

AHL, 1922

Written and illustrated by
Jaroslav Kadlec

rainfall is about 1 100 mm, which corresponds to meteorological records in Central Europe. Most rain falls in April and May, then in autumn and winter, with the remaining months having much drier weather.

The majority of young fan-fish in Uruguay are born at the beginning of the rainy period in autumn at a temperature of 10 to 16°C. Eggs which hatch out during the short rainy period in the spring do not manage to survive usually and are therefore not capable of reproducing.

C. adloffii belongs to the killifishes, which have been known to aquarists for a relatively long time (more than 50 years). However, in my opinion the species cannot be described as one which is bred widely. The reason for this is not, I think, that the "shape and coloration of the fish is commonplace" but the fact that keeping and breeding this species does entail a number of difficulties.

C. adloffii (male)



Description of the fish

Both sexes have a body shape resembling members of the carp family, being laterally compressed quite markedly. In the wild state both male and female attain a length of 5 to 5.5 cm, whereas specimens reared in the aquarium attain a length of 4.5 to 5 cm. Both sexes growing to the same size is not characteristic of the genus *Cynolebias*.

The ground colour of the male's body is bluish-green, running into brown in the dorsal area. The same coloration as the sides of the body is shared by the non-paired and ventral fins and the gill covers. The pectoral fins are transparent. The dorsal and anal fins in the male have a few light-coloured marks, near to the body. An attractive feature is formed by vertical dark bands along the male's sides, the first of which runs through the eye. The number of these bands varies between 10 and 14, some are incomplete and others are broken up.

The ground colour of the female is yellowish-brown to violet, with a faint, bluish-green hue just visible on the gill covers, dorsal and anal fins. All the female's fins are transparent.

Vertical, dark bands are present in the rear half of the female's body. The abdominal region is tinged with a pale pink.

Conditions for successful breeding

Adloff's fan-fish does not need extensive living accommodation. An aquarium with a capacity of 20-50 litres will suffice for a breeding trio (a male and two females). Should the species be kept in a smaller tank it will not attain the size given earlier, even when fed with top quality food. Male specimens of *C. adloffii* will not tolerate each other, so they must be bred in isolation from any rivals.

For breeding and rearing the following readings denote that the water quality is suitable: 2-15°DH and 5.2-7.0 pH. The wide range of water hardness and acidity that these killifishes will tolerate is a consequence of the fact that in the natural state the water quality is modified greatly and the fish are used to such marked variation. Like practically all fan-fishes *C. adloffii* copes well with a high level of nitrates and nitrites in the water. However, for the sake of maintaining the health and vitality of the fish I would recommend that 50% of the aquarium contents should be replaced with fresh water every 10-20 days.

The following two factors are particularly important in ensuring healthy breeding:

1. Temperature

In general Adloff's fan-fish will tolerate a temperature range of 10-30°C. The average temperature for keeping and breeding the fish should be about 20°C. However, I do not recommend that a constant temperature should be maintained over a long period, by using thermostatic control, for example. In the natural state temperatures vary with night and day and even sink to as low as 10°C for an extended period. These temperature changes are a natural feature which can be easily replicated and which make a positive contribution to keeping the fish healthy and vigorous.

2. Food

C. adloffii needs a constant and varied

supply of live food and the amount of it, especially while the fish are maturing, is quite large. *Tubifex*, small or chopped earthworms, the larvae of water insects, Cyclops and *Daphnia* are suitable. Egg production will be markedly increased if *Tubifex* or earthworms predominate in the diet. In my experience this fan-fish will not accept dried or artificial foods.

The breeding tank is set up with a dark substrate, preferably consisting of peat, and plants introduced, the roots of which should not be anchored. I have found *Microsorium pteropus* the best species for this purpose, as it flourishes in the water which is rendered acid by the peat. As a decorative background stems of dried, yellow reeds are very effective (they were used in the photographs), as they contrast nicely with the coloration of the fish.

My experience with the species

For the spawning substrate I always used peat. As *C. adloffii*, after both partners have "bored down" into the peat, then spawns on the top of it, the substrate must not be too deep. 4-6 cm is sufficient. The water quality and arrangement of the tank should be suitable for breeding. If one wants the fish to engage in intensive spawning, a temperature of 22-25°C is suitable. Outside this temperature range—according to my observations—the level of spawning activity falls sharply. During spawning one must provide ample food, of course.

Prior to the spawning act the male, with non-paired fins spread wide, puts on a short display, which lasts a few seconds. After this the female takes up a position parallel to the male and both partners disappear into the peat. As I have already mentioned spawning sometimes takes place at the surface of the peat, so that the backs of both fish are clearly visible. After the spawning act the female is the first to emerge, with the male following her after 5-30 seconds. A short rest period follows and then spawning is recommenced.

Adloff's fan-fish is one of the relatively productive members of the genus *Cynolebias*. A healthy female is capable of producing up to 100 eggs in a week, but I would rather cite 40 eggs per week as a normal average.

At the end of the spawning period (10 to 30 days) I separate the sexes so that the female especially is allowed sufficient rest. The peat containing the eggs is partially dried out and placed in a plastic bag.

The author of publication (1) states that the development period for the eggs of this species is three months. However, no mention is made of the temperature at which they were kept. After two years experience with *C. adloffii* I have concluded that the development of the embryos of eggs kept in "the dry" is greatly influenced by the average temperature. If we call the development time of the embryos 'D' and the average temperature at which they are kept 'T' then my results give us the following:

$$T \times D = 2,600$$

Therefore, if the eggs are kept at an average temperature of 20°C I poured water on the eggs for the first time after about 130 days. At an average temperature of 26°C (for example in the summer months) the embryos are already to hatch out after only 100 days. It does not matter if the development of the embryos is lengthened by 10-20%.

When pouring water over the eggs I use medium-hard water which has a neutral reaction, at a temperature of 15-16°C. I then introduce aeration, so that the peat and eggs are agitated and add fine food. Cyclops nauplii, for preference.

However, my success in hatching out *C. adloffii* fry was never particularly great. If I managed to hatch out 20% of the eggs I considered I had done well. Why some fan-fishes, such as *Cynolebias whitei*, *Cynolebias constanciae*, for example, hatch very well and others, among them *C. adloffii* unfortunately, have great difficulty, I am at a loss to explain.

Initially, the eggs measure 5.5 mm and are light brown. In relation to the genus *Cynolebias* as a whole I would describe their growth as moderate. After the first week the young measure 8 mm. At the age of 14 days their length is 10 mm. In order to ensure optimum growth it is necessary to provide an almost constant supply of food. That is to say, one should not feed the young once or twice daily, but add food continually. Initially one can

FAN-FISH

give them Cyclops nauplii or Artemia nauplii, going over to small Cyclops and Grindal worms as soon as a few days have gone by.

It is possible to differentiate the sexes by their coloration at an age of about six weeks. The first attempts at spawning I observed at the age of two months. I experienced no problems in my breeding as far as the ratio of males to females was concerned. The ratio of the two sexes was 1:1. Adloff's fan-fish attains its maximum size at 15-18 weeks and has a life-span of about a year.

Resume

The fan-fish *Cynolebias adloffii* is one of the South American killifishes commonly bred by aquarists. Although the hatching out of the eggs is problematic, caring for the young and subsequent breeding with them when they have matured would pose problems only for the absolute beginner.

Literature:

- (1) Hoetmer, J. W., 1980: Le Genre *Cynolebias*, K.F.N.—Journal, février 1980.
- (2) Grant, N. G., 1981: An Encounter with *Cynolebias adloffii* (Ahl, 1922), B.K.A.—Killi News, No. 191, p. 135-137.

- (3) Sainthouse, I., 1983: *Cynolebias*, Steindachner 1876. Indigenous to the Coastal Area of Uruguay—Parts, I, II, III. B.K.A.—Killi News, No. 216, p. 189-193; No. 217, p. 1-9; No. 218, p. 21-27.
- (4) Susena, E., 1983: Recent Collections of *Cynolebias*, Steindachner 1876, in Uruguay. B.K.A.—Killi News, No. 220, p. 62-64.

C. adloffii (female)



An interesting CATFISH

Farlowella acus

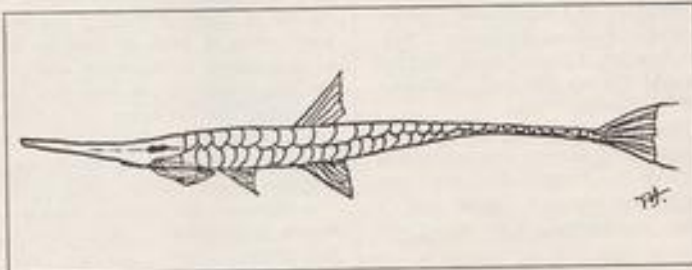
by Tim Hinitt

THE Catfish, *Farlowella acus*, is one that is rarely seen in aquarist shops. Certainly this applies to the provinces.

It is a strange yet somehow attractive fish in that it is of an extraordinarily slender build, resembling almost exactly a twig. Basic coloration is of a pale brown with a darker band stretching from the pointed snout to the ventral fins. It is a heavily armoured creature in that both top and undersurfaces are covered with bony plates. The whole fish being totally encased appears to make swimming somewhat of a problem and the two in my tank prefer to use their mouths to pull themselves along; rather in the manner of a *Plecostomus*. Swimming is only undertaken as a final resort and then in a very jerky fashion.

When introduced to my aquarium there was a fair growth of algae on both plants and side panes. The catfish have systematically cleaned this away and appear, especially to enjoy clearing the algal growths off the Amazon Swords and Aponogetons, their slim build enabling them to cling to the leaves easily. Unlike *Plecostomus*, their cleaning activities do not destroy the plant tissues. This is a most useful attribute as, although *Plecostomus* spp. are very attractive, their rather abrasive cleaning activities do definitely harm the plants after a period of time.

Farlowella acus does not appear to have a common name, although I have seen it referred to as the Spiny



Plecostomus, really a totally misleading name. It comes from Southern Brazil and Venezuela and, like all members of the family Loricariidae, is a peaceful bottom living fish that requires algae to keep it in good condition. In its native habitat it is to be found in very small fast flowing streams, rather similar to those found in the more Northern parts of Gt. Britain. These streams are nearly always very rich in oxygen and it is important to remember this when setting up an aquarium for this or similar species. pH of the water does not appear to be critical but most catfish of this type are happiest in water of a soft, slightly acid nature that is easily produced by filtering through a layer of fibrous peat.

To my mind the above conditions make them the ideal tank companions for the many attractive small tetras that hail from the Amazon region.

Farlowella acus does not confine its activities to the hours of darkness, as do so many catfish. Once settled

into the aquarium it will spend most of its time cleaning algae from the plants. Should there not be any algae available for it to graze on, I imagine that feeding could be a problem as I have yet to observe my two eating anything else. Possibly, as with *Plecostomus* spp., a piece of raw potato would be accepted but I doubt that this would contain the necessary nutrients to keep the fish in good condition. Nearly all the 'sucker mouth' cats require large quantities of vegetation and perhaps the new vegetarian flake foods now coming on to the market will provide a satisfactory answer.

It would be interesting to attempt a spawning of this species but, as far as I can ascertain, it has never been achieved in captivity. In fact it should be possible as the related *Loricaria* (*Plecostomus*, *Xenocara* and *Otocinclus*) have all been reared successfully.

Altogether *Farlowella acus* is a welcome addition to any tank containing small fish and especially one that is overrun with algal growth.



BOOK REVIEW

A revision of the South American Cichlid genus *Cichlasoma* (Teleostei: Cichlidae) by Sven Kullander. 296pp. 50 Swedish Crowns from Swedish Natural History Museum, Stockholm 10405, Sweden (1983).

Hold on to your hats—at last that group which no-one seemed to dare work on has been studied, with very much the expected result and, it must be admitted, some unexpected ones.

In this long, closely written, small print monograph, Kullander has examined material of all the 'brown acara' group of cichlids, along with the material of the similar *Cichlasoma bimaculatum* type fish. The conclusions he draws, briefly, are as follows:

- Cichlasoma bimaculatum* and the 'brown acaras' are congeneric. The *Cichlasoma* was described first and so takes precedence. All of the 'brown acaras' including *bimaculatum* are therefore now included in *Cichlasoma*.
- The other species that were in *Cichlasoma* revert variously to their previous generic names, group names, or in a few cases are left without names at all pending further study and description.
- With the removal of a number of species from *Aequidens*, this genus also is reworked to include a limited number of species. The others are also reassigned to various as yet un-named species groups awaiting further description.
- Several new species within the old 'brown acara' assemblage are des-

cribed, which should give names to many that are floating around in the hobby at present.

This monograph will cause considerable debate among workers in the field of cichlid taxonomy. Aside from the justification for the creation of many new species, which will really have to be judged on field studies, there will be arguments about some of the nomenclatural points—not least of which will be Kullander's rejection of the old name *Cichlasoma* for the remaining 'unplaced' *Cichlasoma sensu lato*. The situation as left at present, if one accepts Kullander's thesis, is uncomfortable, with so many fish, as it were, wallowing around in some sort of nomenclatural limbo. Now I am one of those, as many of you will know, who is keen to observe the latest opinions in taxonomy and call my fish accordingly, so long as I am sure that the describer or revisor knows what he is talking about (this inevitably means I am more than sceptical about species descriptions that appear in, for instance, American hobby publications). Now, I have the greatest respect for the work Kullander has put in, and his judgment—his work on *Apistogramma* is masterly for such a difficult genus—and so I will gladly follow this latest judgment on all my favourites from the neotropical stable. However, before wholesale scribbling out of names happens in books and in my notes, I would like to see that bouillabaisse of unplaced fish sorted out from the stew.

What is new, and what has gone where . . . ?

New species are: *Cichlasoma orinocoense*; *C. amazonarum*; *C. boliviense*; *C. orientale*; *C. punillum*; *C. sancti-franciscense*; *C. paranaense*; *C. araguaiense*.

Removed from synonymy are: *Cichlasoma taenia* (from *bimaculatum*); *Cichlasoma dimerus* (from *portalegrensis*).

These 10, together with *bimaculatum* and *portalegrensis* make up the 12 species now included in *Cichlasoma sensu Kullander*.

Of the others . . .

The remaining South American cichlasomines are reassigned as follows:—*Mesonauta festiva* for the festive cichlid (this name has already been

widely used, particularly on the continent for what was all too obviously a rather aberrant form).

—*Caquetaia* for *kraussi*, *myersi* and *spectabile*. Only the latter is moderately common as an aquarium fish. These are the so-called "basket-mouths".

—*Heros* for the severum, which becomes *Heros severus*.

—*Hoplarchus* with the parrot cichlid, *psittacus*.

This leaves several species without homes, notably *facinum* and *coryphaenoides* among aquarium species.

The Central American cichlids go as follows:

—*Nandopsis* (sounding too much like a nandid for comfort!) has the two Caribbean cichlids, *tetracanthus* from Cuba and *haitiensis* (?). From keeping these in aquaria, they seem perfectly good guapotes to me, so these need looking at.

—*Theraps* contains such popular deep bodied species as *maculicauda* and *sympilum*.

—*Archocentrus*, the ever popular aquarium group, containing the convict, *nigrofasciatus*, blue-eyed cichlid, *spilurus*, and many others—*sajica*, *spinosissimus*, etc.

—*Thorichthys* for the pointed snout species like the firemouth, *meeki*.

—*Amphilophus* for the medium sized species such as the red devils and trimacs (*labiano*, *citrinellus* and *trimaculatus*, etc.).

—*Herichthys* for the Texas cichlid group (again!).

This still leaves plenty without convenient niches to be put into, and most of these names above pulled from the literature are woefully inadequately described. *Tomocichla* will probably make a reappearance as will *Parapetenia* for the big guapotes.

The remaining acaras are assigned to groups such as the 'blue acara' group, 'dwarf flag' group, etc., with the keyhole left out on its own pending further study.

There is plenty to think about in Kullander's work. It is cheap, less than £5, very heavy going to read, but a very useful reference work if the foundations which have been laid in it are built upon.

Ian C. Sellick

Meet the Societies



GATESHEAD AQUARIST SOCIETY



The G.A.S. publicity emblem



Nannostomus anomalus

In 1982, several ex-members of the now (sadly) defunct Gateshead Foresters' Aquarist Society got together and formed a new Society to act as a focal point for aquarists in the area. Membership of the Gateshead Aquarist Society expanded quickly in pace with the Society's reputation, soon reaching the highly respectable figure of 40.

Since the founder members were all experienced fish-keepers, little time was wasted in getting things going. In fact, the first Open Show was held in the same year and proved to be sufficiently successful to make it an annual feature. 1984, therefore, saw the third of these Shows which attracted 400 entries in 35 Classes. In addition, there was an excellent photographic competition, plus approximately 100 drawings and paintings from local schools. These are statistics to be truly proud of, particularly since they have been achieved in such a remarkably short time. Therefore, at least in this area of activities, Gateshead's future looks promising.

As can be seen, G.A.S. is very active in the competitive arena. Further proof of this can be found in yet other outstanding statistics: over 100 Firsts have been achieved in Open Shows in just three years by G.A.S. members and the Society as a whole holds the Inter-Club B.U.G.S. League Title (B.U.G.S. stands for the Bimbi, Usworth, Gateshead and Sunderland Societies).

Even if you are not particularly Show-orientated, G.A.S. can offer you a great deal. There are quizzes, bench shows, talks, discussions, 'slide' lectures, mini-auctions of surplus stocks and numerous other activities. Excursions have also been organised to all the major 'National' Shows and this is expected to continue on a regular basis.

Meetings of the Society (which is affiliated to the F.B.A.S.) take place twice monthly, every other Thursday, at the Gloucester Public House, High Street, West Gateshead (near to both the bus and the metro). Starting time: 7.30 p.m.

Subscription rates: Adults, £1.00; Juniors, 50p; O.A.P.'s, Free. Meeting fees: Adults, 60p; Juniors and O.A.P.'s, 30p.

Apply to: Paul Barrow (Secretary), 18 Woodgate Gardens, Bill Quay, Gateshead. Tel: Gateshead 691809.

NEWTON AYCLIFFE & DISTRICT AQUARIST SOCIETY



The N.A.D.A.S. badge



Golden Angel

The Newton Aycliffe & District Aquarist Society was formed in 1978. Its first meeting took place on 17 October in a factory Social Club. However, in order to remain at this venue, N.A.D.A.S. would have had to join the Social Club. Since it was feared that this might lead to a loss of independence, the Society moved out to a new venue. In 1983, there was a further move—this time, away from the pub scene to the Beveridge Hall.

Despite this, membership has continued to rise overall and currently stands at around 70—a most respectable figure by any standards.

No doubt, this is largely the result of the activities organised by the committee. There is, of course, the normal range of activities without which no Society would be complete, i.e. quizzes, Table Shows, lectures, trips to the major Festivals, and so on.

However, there is also at least one additional activity which gets members deeply involved in mounting exhibition tanks at local Shows and Fêtes. The tanks for these exhibitions are housed in one of the tents erected on the show-fields (courtesy of the N.A.D.A.S. ex-Treasurer) and these always attract large numbers of visitors. They may not all join N.A.D.A.S. but, at least, they can see what fishkeeping is about, and hopefully, take up the hobby.

N.A.D.A.S. also has its own library of books which members can borrow for a small fee and a Society shop where they can buy food and equipment at discount prices. The first Open Show, which was a great success, took place in 1983.

The N.A.D.A.S. membership is distributed throughout the fields of tropical, coldwater and marine fishkeeping and the Society's activities reflect this so that no-one feels left out. With interests in so many aspects of the hobby, N.A.D.A.S. has members in most of the National 'Specialist' Societies.

Meetings take place every other Tuesday at 7.30 p.m. at the Beveridge Hall, Finchale Road, Newton Aycliffe, Co. Durham.

Subscription rates: Adult, £1.50; Junior (under 16), 75p; Joint, £2.00; Family, £3.00; plus 30p per meeting for Adults and 15p for Juniors.

Apply to: Dave Curran (Secretary), 45 Phoenix Place, Newton Aycliffe, Co. Durham. Tel: N.A. 316134.