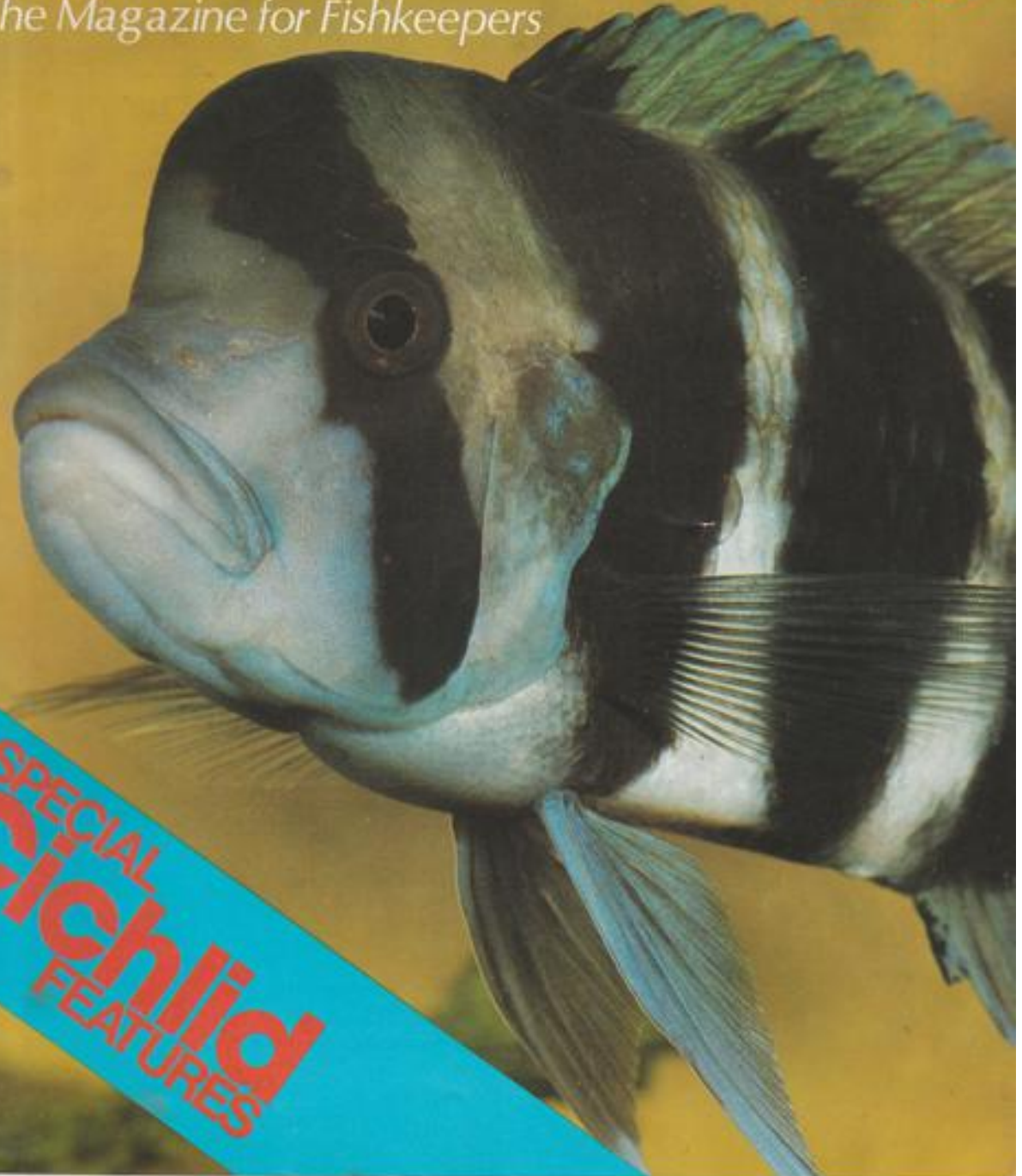


AUGUST 1983 75p

AQUARIST

AND PONDKEEPER

The Magazine for Fishkeepers



SPECIAL
Cichlid
FEATURES



COVER STORY Photo: A. van den Nieuwenhuizen

Cyphotilapia frontosa, formerly *Petrotilapia frontosa*, is the only species in its genus. It is found in deep water (between 6 and 30 metres) in Lake Tanganyika, one of the African Rift Valley Lakes. Despite its size—it can grow to 30 cm (approx. 12 in.) in the wild—*C. frontosa* is a peaceful species. It is quite capable of looking after itself and does defend its home territory, but it does not do so with the aggression of other (often smaller) species. Water conditions are not critical but hard, alkaline water between 22° and 27°C (approx. 71°-81°F) is preferred. This species is predominantly carnivorous in the wild but will take a wide range of foods in captivity. Both sexes possess the nuchal (forehead) hump which gives the species its name. It is, however, somewhat larger and deeper in mature males. *C. frontosa* is a cave-breeding mouthbrooder. The female is responsible for the incubation of the eggs. The duration of the incubation period is largely controlled by temperature and can last as little as 2½ weeks at the higher end of the range or as long as 4 weeks at the lower limits. The fry are large and well-formed when released and are, therefore, not difficult to rear.

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CICHLID CLASSIFICATION

by Ian C. Sellick

THE need to apply a name to an animal goes back long before the science of zoology was even considered. With the discovery of more and more animals as the world was opened up by explorers, the need arose for a system whereby each animal and plant should have a unique name. The system used since the time of Linnaeus is the *binomial* system, whereby each organism has a name composed of two parts, the generic name (e.g. *Pseudotropheus*, *Apistogramma*, *Cichlasoma*), and the specific name (*tropheops*, *borelli*, *meeki*). This is familiar to all aquarists (pronunciation permitting!). Usage of a system such as this immediately leads to a need to study the relationships of one organism to another. It is obvious, for example, that the flag cichlid and the rose breasted cichlid are very much alike, and it therefore comes as no surprise that they are in the same genus (*Aequidens curviceps* and *Aequidens dorsigerus* respectively). The binomial system would be useless if it allowed, for example, discus and blue acara to be included in the same genus! Yet these fish are similar, they both have double lateral lines and a single nostril on each side of the head; they are both bony fishes with single dorsal fins, so they are obviously closely related. By extending the binomial system to form a branching tree-like chart of classification, it should be possible to illustrate the relationships of all fishes. Discus and blue acaras are both members of the family Cichlidae. These cichlids are somewhat perch-like, and belong in the Order Perciformes, and so you can go on, each level of classification relating to a more broadly defined level above it.

Traditionally, cichlids are classified by various features of the body, both external such as numbers of scales along the length of the body, or around the body at the 'shoulder', or internal such as bone structure, as well as numbers of spiny rays in the fins, structure of the teeth, and actual body dimensions in relation to one another. It is rare that one character alone will differentiate one fish from another, and combinations of characters are used.

It is up to the scientist studying the fish to decide which of these characters, alone or in combination, that (s)he considers important. Enough characters must be studied to adequately distinguish the fish from all similar fish, and ideally a *dichotomous* key should be given to aid in differentiation of species. This key consists of a series of 'either-or' questions which will logically lead to the correct identification.

The final 'proof of the pudding' is that, in a free choice situation, the fish designated as species A will only breed with other fish of species A, and not with fish of species B, C, D, etc., in the wild.

Paraphrasing Darwin, C. Tate Regan, one of the greatest ichthyologists of his time, said in 1925 that "a species is a community or a number of related communities whose distinctive morphological characters are, in the opinion of a competent systematist, sufficiently definite to entitle it, or them, to a specific name". Leaving aside the delicate question of who may be considered a "competent systematist", it can be seen that while Regan's statement will normally hold true, this definition must be extended and qualified. Simple morphological characteristics are no longer sufficient to distinguish

a great many cichlid species and, especially in the case of cichlid flocks in lakes such as Victoria and Malawi, classical taxonomy is about as useless as a British Rail ticket on the Paris Metro (i.e. in its place, it works well enough!).

So why doesn't classical taxonomy work, and who is to blame? Firstly it should be said that the great cataloguers of cichlids, such as Gunther, Boulenger, Regan were not at fault. They worked extremely hard and accurately within the limits of techniques and knowledge available to them. The descriptions they published were adequate to describe species as then known, based on the characters observed by them in preserved material. What is at fault, and thankfully this is changing, is the system under which cichlids are classified. As it is no longer good enough just to count scales and fin rays ('meristics'), and measure body proportions ('morphometrics'), what else can be used? Perhaps to illustrate why the old systems don't work, examples would help.

In Lake Malawi there are perhaps 500 species of cichlid, of which nearly 200 belong to the mbuna, the rock dwelling fishes. For the aquarist these are colourful, hardy, easy to breed fish, and in most cases, reasonably easy to distinguish one from another. All are mouthbrooders, and all are fairly similar in body shape. Now while the aquarist may recognise and be able to sort out these different types (and I use "types" instead of "species" advisedly), can a specific name be put to them? The mbuna are generally described on the basis of jaw structure and dentition, points frequently of little value to the aquarist, except in extreme cases such as *Labeotropheus*: does this have any real

relevance?

The answer all too frequently is no. Not only may dentition be an essentially 'plastic' feature, varying with age, habitat and habits of the fish in question, but it can be extremely misleading. While Malawi fish seem to have teeth adapted for particular very specialised roles, almost all will eat anything that comes to hand. Specialisation of this nature is only useful where there is a superabundance of food and it becomes possible to be fussy and specialise in one source; when food becomes limiting, you will eat anything you can get your teeth into. Outside the mbuna, there is evidence that teeth even change in individual fish depending on diet. The Haplochromine, *Astatoreochromis* from Uganda develops heavy crushing teeth on a diet of snails; when fed soft foods, these do not develop. A species of Mexican *Cichlasoma* is polymorphic in tooth structure, fry from one brood may have several different tooth forms, all apparently 'adapted' for different purposes. We must be careful, therefore, that when using a character such as this, it not only truly distinguishes the fish from another, but that it is a relevant character.

In '*Pseudotropheus zebra*', aquarists recognise some 20 different forms on the basis of colour patterns, a feature all too frequently ignored as of little value to the taxonomist, and many have also realised that

there are small differences in behaviour between some of these forms. If all these forms are the same species, they ought to be able to breed with one another: yet, if you try it, in a free choice situation, morphs tend to breed with their correct colour type. Here we have a situation where classical taxonomy cannot distinguish what clearly consists of a collection of a number of different species. The morphological basis of classification must be extended to include behaviour, colouration, and geographical distribution, for these zebra types are frequently geographically separated.

Taxonomy, therefore, must not be just the dry museum subject it is often (and too often truthfully) described to be. The system of type descriptions, where specimens described as being typical of the species are deposited in museums for reference is inadequate in a case like this. Other methods of recording are needed, perhaps video or film, as well as the preserved material.

Is it possible, however, to correlate behavioural differences, and significant differences in colouration, with some feature of the fish that may be preserved? Here, modern analytical techniques may help. If the fish is genetically programmed to display this behaviour, or these colours, there will be slight differences in the genome (the genetic make up of the fish).

There may be other, invisible, small differences in body chemistry. These may now be detectable. Gel electrophoresis is proving a very valuable tool in studying fish both at the species and population level. Small portions of tissue (muscle, brain, liver, etc) are extracted and the proteins in them dispersed in a carrier solution. They are then placed on a gel across which an electric current is passed. The proteins will migrate according to their structure in bands along the gel, and can be stained to show them up to the naked eye, or by their reaction to ultraviolet light, or a number of other detection methods. The pattern of bands of protein generated is often quite distinctive of the species and this could be a valuable additional technique.

From the foregoing it should be clear that the problems in cichlid classification are many. They are proving difficult for the many dedicated and highly trained scientists working in this field to solve. As aquarists we must be patient, help where we can by making relevant observations, and not hinder by publishing descriptions of our own of fish we might consider to be a species. We should also express our disquiet at aquarium magazines that consider they are doing science a favour by publishing such descriptions.

EXAMPLES OF DICHOTOMOUS KEYS

Gymnogeophagus

1. More than 11 soft rays in the dorsal fin. *Gymnogeophagus balzani*
Less than 11 soft rays in the dorsal fin.....2
2. Flanks marked with vertical lines split in two.....*G. australis*
Flanks without vertical lines split in two.....3
3. Dark spot under the upper lateral line, caudal peduncle
on average deeper than long.....*G. rhabdotus*
Dark spot above the upper lateral line, caudal peduncle
on average as deep as long.....*G. gymnogenys*

In large genera, it is sometimes helpful to split keys into geographical sections where appropriate. For instance, to identify a species of *Geophagus* without knowing its origin, you would have to work through a key containing 24 steps. If you knew the locality to be, say, Panama or Colombia, then the key can be shortened:



Gymnogeophagus balzani



Geophagus crassilabrus
Photo: T. J. Townshend

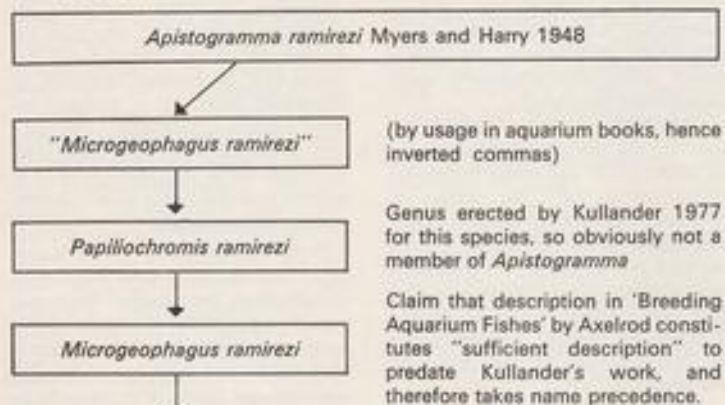
Geophagus from Panama and Colombia

1. Caudal and dorsal fin spotted.....*Geophagus hondae*†
Caudal and soft dorsal fin uniformly coloured.....2
2. Dorsal XV-XVII (usually XVI), Panama....*Geophagus crassilabrus*
Dorsal XVI-XVIII (usually XVII), Colombia.....*G. pellegrini*‡

Notes: †see "Fates of some taxonomic designations"
‡see "Fishes of Darién," this issue. I have caught this fish in Panama

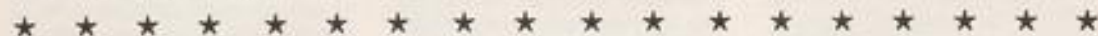
THE FATES OF SOME TAXONOMIC DESIGNATIONS

1. THE RAM

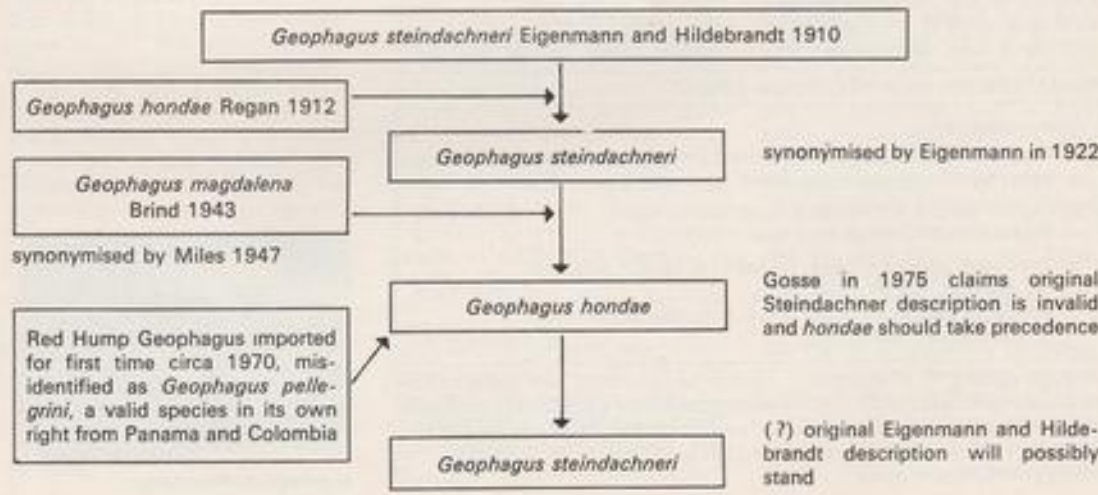


The Ram
Photo: courtesy British Cichlid Association

Appeal to International Commission on Zoological Nomenclature



2. THE RED HUMP GEOPHAGUS





Red hump Geophagus
Geophagus steindachneri
Photo: courtesy British Cichlid Association

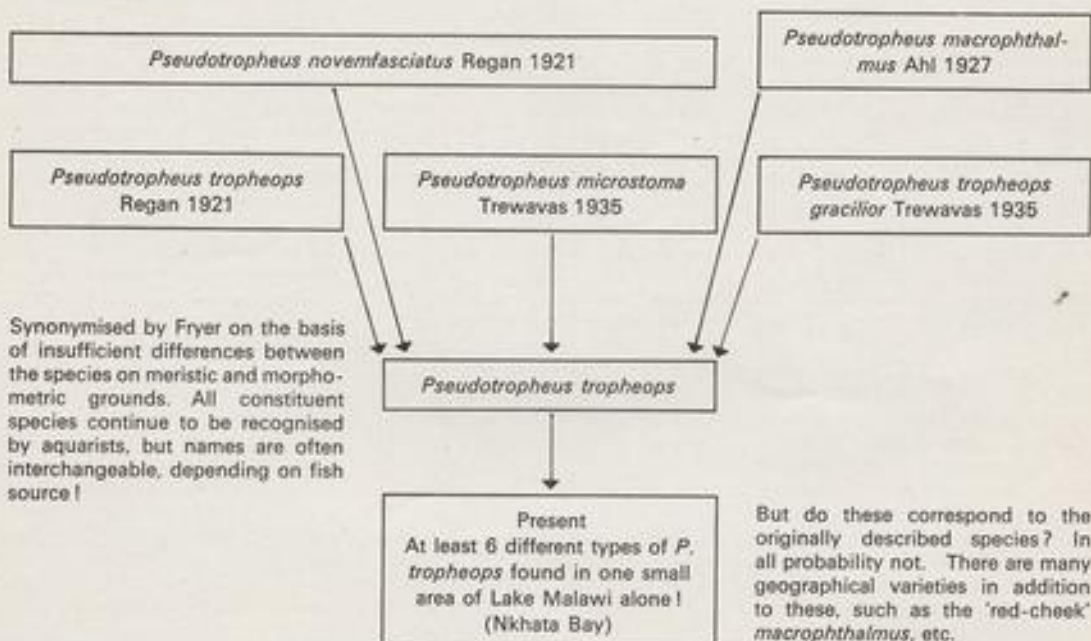


Pseudotropheus tropheops
Photo: courtesy British Cichlid Association

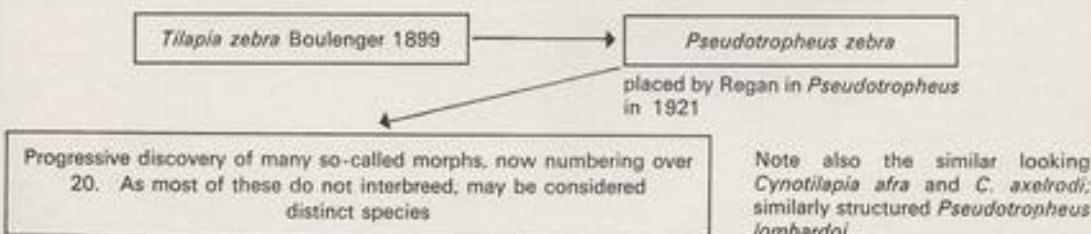


Pseudotropheus zebra
Photo: courtesy British Cichlid Association

3. THE 'TROPHEOPS' GROUP OF MBUNA



4. LAKE MALAWI ZEBRAS



SPOTLIGHT

Electric Blue HAPLOCHROMIS

(*Haplochromis ahli*—Trewavas 1935)

by John Ferguson

THIS species was originally described by E. Ahl in 1927 as *Haplochromis serranoides*, a name previously used for a member of the Lake Victoria *Haplochromis* flock.

Haplochromis ahli, a patronymic honouring the original describer, was proposed by E. Trewavas as a replacement name.

If, which seems likely, a new generic name is adopted for the Lake Malawi *Haplochromis*, the original name, *serranoides* will take priority.

Haplochromis ahli is commonly sold in the United States and Europe as the 'Electric Blue *Haplochromis*'. This species is probably the best coloured cichlid to come out of Lake Malawi with aquarists saying 'you have to see it to believe it'. Wild-caught specimens imported from Lake Malawi demand extremely high prices but, fortunately, enough tank bred specimens are around and may be purchased at somewhat less than the asking price of wild adults.

In its natural habitat this species lives around the rocky shores and in fairly deep waters. If they are to be kept in aquarium conditions, a fairly large tank is advisable with plenty of cover. Males are very intolerant of one another but, on their own, are fairly docile. They do not dig or damage plants which is more that can be said of other *Haplochromis*.

Feeding-wise, this species, in the lake, appears to be a predator

with piscivorous tendencies so other fish of equal size should be kept with it.

In coloration the males are a bright electric blue with a white edge to their dorsal fin and a reddish/yellow hue to their anal fin. They are 'torpedo' shaped in appearance.

The females on the other hand are beige/brown in coloration with tiny hints of blue.

Males grow to around 6½ in.-7 in. SL and females slightly less; 5½ in.-6 in. SL. This species is, of course, endemic to Lake Malawi.

The species is a maternal mouth-brooder. Males court females extremely vigorously and, if one is not observant, one can end up with aborted spawnings and even death—another good reason for plenty of cover in the tank. This cichlid is best spawned in a harem situation, (only if it can be afforded).

The eggs are carried by the female for approximately twenty four days. One way of ensuring a successful spawning is to remove all the other fish from the tank or to partition the female if possible.

The fry, upon release, measure approximately 6.00 mm—7.00 mm and spawnings of up to one hundred fry have been recorded. Newly released fry look like exact replicas of their mother.

Like their parents, the fry tend to be a little more delicate than other *Haplochromis* but, with good tank maintenance and frequent partial water changes, they can

reach lengths of 1 in.-1½ in. in seven to eight weeks.

The fry can be fed on either prepared foods or *Artemia nauplii* as their first food.

For the larger specimens, both live and prepared foods are eagerly accepted. There have been reports that tubifex are to be steered clear of. These reports state that "there seems to be some correlation between Tubifex and the occurrence of systemic bacterial infections such as 'Malawi Bloat' ". Bloodworm and *Daphnia* go down a treat.

Tank temperatures should be between 70°F (21°C) and 85°F (30°C) and the water chemistry should be the same as for other Lake Malawi Cichlids; that is, alkaline water of pH 7.5-8.5 and 100-0-400-0 ppm hardness.

Haplochromis ahli tends to be more intolerant of dissolved metabolic wastes than other species. Therefore, success is determined by it's keepers willingness to make frequent partial water changes thus keeping the habitat as near perfect as possible.

As with a lot of other *Haplochromis* from Lake Malawi, tank bred specimens do not hold the same degree of deep coloration as do their wild counterparts but, in saying this, they are still very worthwhile keeping. One other report from the United States backed up by a number of European aquarists states that *Haplochromis ahli* has a yet unexplained tendency to produce spawnings that consist of 75%-80% males, so when selecting fry from a batch to grow on, it is best to include some of the smaller fry in the selection. That way, there is a greater chance of getting a female in the group.

Literature Cited.

- Cooney, P. 1983. A.C.A. Index 3(3): 1-2.
Axelrod, H.R. and Burgess W. E. African Cichlids of Lakes Malawi and Tanganyika. Ninth edition. T.F.H. Publications.



You asked for readers' experiences with pencilfish. *Nannostomus beckfordi* (Photograph 1) subspecies seems easily spawned at 78-80°F, in a 24in. tank thickly furnished with floating plants.

Spawning pairs quiver, side by side, about 6cm. below the surface, showing intensified red coloration. Eggs and hatchlings seem too small to see but fry will venture out from plants three to five weeks after hatching. Minimal air flow produces good survival rates. I found fish hard to spawn/shorter lived while using Gro-Lux—possibly due to artificial intensification of red spawning coloration?

"... I don't know about micro-chips but I feel that post-E.E.C. 'safety' heaters/thermostats can be a poor bargain in some cases. The central heating went off on May 3rd. I then discovered that almost all the 'safety' units had failed—but my two ancient, glass-tube units are working faithfully on. One dates from my earliest years in the hobby." This letter was written by Miss Margaret Cairns, B.A., 17 Watts House, 105 Wernington Road, London, W10 5QG.

Mr. Paul Crofts is a 17-years-old student who lives at 27 Bradstock Close, Parkstone, Poole, Dorset. He writes: "Having kept tropical and freshwater vertebrates and invertebrates for nearly six years, and tropical marine fish for just over a year, I recently decided to set up a 30-gallon marine invertebrate aquarium in my bedroom. I did so only after several weeks of careful thought—not, as one might suppose, because of the financial outlay, but because of a matter which to me is equally important. Cold-water ornamental fish have been bred for the purpose of recreation for many hundreds of years and are now intensively farmed. The same has happened during the past 20 years or so to tropical freshwater fish and as a result natural stocks are no longer seriously threatened. However, all marine fish and invertebrates are removed directly from the tropical seas—reefs—where they have evolved over millions of years to suit their delicately-balanced ecosystem.



WHAT IS YOUR OPINION?

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

"For me to set up a marine aquarium the reasons had to be more than just aesthetic or recreational. All marine aquarists are pioneers in their field, two books rarely agree completely, and much is still to be learned. We are like the early tropical fish keepers, seeking knowledge to keep and breed these animals so that natural resources may not only be left alone but also be better understood and protected. Eventually we should end up adding to wild stocks—as with salmon and trout at the present.

"As an 'A'-level candidate in zoology I have found my aquarium incredibly interesting and helpful in my studies. I have seen live medusae—the planktonic stage of corals—'born' into my tank and I have seen a sterile glass vessel blossom into life as algae, sponges and plankton establish themselves. At the moment there is an air of mystery surrounding the culture of marine life. Lists of 'impossible' fish and invertebrates are frequently published, along with rules for success. As a result few people experiment—and who can blame them with such high prices at stake; but nevertheless, experimentation is what is needed. I could write about my system and my successes and failures in detail, but since it would be impossible even for me to duplicate the biosystem within

my aquarium exactly, I see no point. As an example, I have read in an American book that mushroom coral and sun coral would thrive in my system; the reverse was true however; but certain 'stony' corals which are supposedly problematic (*sic*) show no signs of waning even after several months.

"My opinion, and after all this is an opinions' column and not a 'this-is-a-brief-description-of-my-tank-and-contents' column, is that aquarists other than those who have a tank because it looks pretty should widen their outlook and experiment to find which conditions best suit our slimy friends. We should, to a certain extent, ignore the personal feelings of others, interesting though they may be, as this leads to 'photo-copy' aquariums



Nannostomus species

and 'photo-copy' failures, for as yet we have failed to find out how to breed but a few marine fish. Some people, for all their efforts, become too narrow-minded, looking at conductivity of the water, for example. What fish cares about that! The answer to the marine quiz will come as a result of many people's findings, but the removal of animals from the wild will be senseless unless they are used to further our knowledge."

Some of Paul's comments are somewhat controversial. What is your opinion? To enhance his comments I include Photograph 2, which shows a fancy coldwater fish belonging to my East End friend Ron Baldry; and an attractive pair of marine clowns spawning in my East Antrim friend Bob



Fancy coldwater fish

Crossan's beautiful marine tank.

Sometimes we forget how the work of the professional breeders allows the prices of many fish to sink to levels that most of us can afford. Recently I visited the Belfast shop, Ulster Aquatics, and was pleased to see that its former manager had come out of retirement and was once again behind the counter. I bought six neon tetras—and Mr. Morris told me that they remain his best-selling tropical fish. I told the gentleman that I had one of his old catalogues. Ulster Aquatics was situated at Orangefield House, Castlereagh Road, Belfast, according to the address on the catalogue; although that address had been erased and replaced by Montgomery Street, Belfast 1. I remember both establishments—to mention but a few! Mr. Morris made the observation that just after the war neon tetras cost 35/- (35 shillings for the younger readers) each. 35/- now would equal £1.75 in theory; but Mr. Morris said that at that time 35/- was a small fortune and would be equal to about £35 today.

With me on the recent visit was 16-years-old Robert Robinson, a pupil who has contributed to *The Aquarist* in his own right, as well as appearing in *Meet the Aquarist*. Robert stood quietly in the background while Mr. Morris and I chatted—and it was obvious from Robert's facial reactions that he thought we were discussing prehistoric times. Readers may be interested to learn of some of the product prices from the old price list—which, unfortunately, does not contain prices of fish or plants. Some examples are: Rena Super

aerator, 62/-; Zoobecko power filter, 165/-; 24in. x 12in. x 12in. aquarium, 55/-; ditto polycosted, 105/-; ditto stainless, 104/-; Sedijet cleaner, 8/6; compost, 4/- for 10 lb.; Hykro flake, 1/3; Tetramin Staple 2/7 to 33/4; Brosiam, 2/-; Liquifry, 2/9; white worm culture, 3/6; Dow Corning Sealer, 19/6; Uno heaters, 25 to 150 watts, 10/-; Dial-O-Matic, 47/-; Uno Popular thermostat, 11/6; Es-Es Major thermostat, 16/6; Es-Es Dumpy thermometer, 7/2; Uno Blue Line thermometer, 4/-; methylene blue, 1/-; and Liquitox, 2/-. The two most expensive items listed were a stainless 30in. x 16in. x 12in. aquarium at 268/-; and a Sanders Ozonizer at 240/-. I suspect that the cover on the price list is rather older than the actual duplicated price list stapled inside the cover. I still have and use my first two aquariums—both bought from Ulster Aquatics either in the late Forties or the early Fifties. They have rounded aluminium frames and have been in continuous use in the Forties (if I'm correct), Fifties, Sixties, Seventies and Eighties. So have I—which is even more frightening! Half-way through the decades I began to write regularly for *The Aquarist* and *Pondkeeper*.

Younger aquarists may be interested to know that amongst the ten pieces of written work that Robert Robinson composed for inclusion in his Certificate of Secondary Education English Literature Folio was an article about tropical fish. It added an interesting variety to the many poems, stories and playlets that I had to mark from my examination candidates. By the time you read this Robert and his peers will have learned their C.S.E. results and will be about to learn their G.C.E. 'O' and 'A' level results. I hope that all my younger readers will be successful in their examinations and that they will find jobs, or continue their education.

Photograph 4 shows a cardinal tetra. Please drop me a line if you have managed to breed it—or any of the other fish shown in this month's photographs.

I was rather shocked by a story told to me today by a pupil. It concerned a lady who had not noticed that her goldfish had jumped out of its bowl onto the carpet until she stepped on the fish. "Was it injured?" I asked. "Sir, it was like a flatfish!" replied the pupil.

Miss Beverley J. Sherwood is 18-years-old and her home is at 6 Furlongs Road, Upton-on-Severn, Worcestershire. Beverley has kept fish for two-and-a-half years and has been reading this feature for two years. She has bred a variety of fish and thinks her unusual story about breeding pearl danios would interest readers. She writes: "One morning, on examining my community tank, which contains danios, gouramies, tetras, *Corydoras*, barbs, swordtails, platies, guppies, a Malayan angel, a Siamese fighter and two sucking loaches, I saw what I can describe as a dark thing stuck to the glass amongst the gravel (*sic*). Then as I looked I discovered more fry and it dawned on me that it must have been the pearl danios that had spawned. For a few minutes I panicked because I had no idea what to do with the fry and it looked as if I was going to have to let the other fish eat them. You see, I had only two heaters—one in my community tank and the other in my 24in. tank, which at that time contained baby guppies and platies. Then I had one of my famous brainwaves. I obtained a clean bucket and my siphon tube—now my dad's garden hosepipe is 5ft. shorter—and siphoned out as many of the fry as I could see. Eventually I had about ten babies, which I considered better than nothing.

"Next I filled a milk bottle with water from the community tank and

Continued on page 34



Marine Clowns spawning

IDENTIFICATION PROBLEMS WITH **Apistogramma** Species

by
Peter Fitchett

FOR many years the positive identification of the dwarf cichlids of the genus *Apistogramma* has been a frustrating exercise and the aim of this article is to help aquarists with this problem.

Reference to the presumably authoritative books and other literature in the hobby only illustrates the extent of the problem.

Many species are seldom or never seen in the hobby, because of difficulties in collecting and exporting from South America. Imports often arrive as "mixed *Apistogramma* species" with no indication of collection area.

Identification problems seem to have started in the early 1900s when collectors found these fish and errors were made in published scientific papers. Authors of material in fish-keeping books then perpetuated the errors and ever since confusion has existed in the hobby.

One reason for some of these early errors was that because a fish apparently differed from an early find and/or it came from another locality, it was given a new name despite evidence that it was taxonomically the same.

It is possible that some of these early authors did not have access to all the descriptive papers or may not have been aware of their existence.

The specimens used to provide the descriptive material were sometimes not examined until some time had elapsed and in many cases this examination was performed by a person other than the collector so that evidence of the locality was not necessarily correct.

The fish were preserved in a medium such as alcohol or formalin and life colour patterns are not kept, the only patterns shown being that of the black pigments, often reflecting a fright condition, if bearing any relation to a natural pattern at all. The condition of many of these preserved specimens is very poor, particularly the finnage, which makes it extremely difficult to determine their original form.

Fowler described a species in 1914, despite only having two female fish to examine, which had previously been described and named as *A. steindachneri* by REGAN in 1908 and gave it another name, *A. ortmanii rupununi* which is actually a junior synonym.

Apistogramma females are extremely difficult to identify visually as many species are very similar in shape, size, markings and coloration. The colour patterns vary

considerably at different times, e.g. fright conditions, brood care and as the fish matures.

Apistogramma cactuoides is an example where there are many variations of colour and marking. Even within the same spawning it is possible to obtain fish with any number of red or yellow spots in the caudal fin or even none at all.

There are also many other reasons for colour variations such as diet, habitat and chemical or mineral absorption.

Species with noticeable colour forms and frequently seen in the hobby are *A. cactuoides*, *A. bitaeniata* and *A. agassizii*.

Sven Kullander, the eminent Swedish taxonomist, has devoted some years to reviewing the genus as far as possible by a re-examination of the original specimens loaned to him for the purpose by various institutes and museums. His comprehensive review of Brazilian and Peruvian species was published in 1980 and this article is based on his study.

Some of these problems were discussed at the 1981 British Cichlid Association Convention, held at the London Zoo, and guest speaker, Paul Loiselle from the University of Wisconsin, agreed that re-classifications were justified.

An *Apistogramma* Study group in the United States has been concerned with the problem for some years. So in both Europe and America the problem has been recognised.

It is worth noting that the fish often shown as *Apistogramma borellii* in literature is in fact *A. cactuoides*. It was wrongly identified in a paper by Klee in 1965, who was following an earlier mistaken identification of Meinken in 1961. The true *A. borellii* is a round tailed Paraguayan species not a lyre tailed fish. *A. reitzigi* is now considered a junior synonym of *A. borellii*. *A. ornatipinnis* and *A. wickleri* are not valid species as they are both *A. steindachneri*. *A. kleei* and *A. klausewitzii* are both *A. bitaeniata*.

LIST OF VALID APISTOGRAMMA SPECIES

Species	Author	Distribution
<i>A. taeniata</i>	Günther (1862)	R. Cupari, Brazil
<i>A. amoena</i>	Cope (1872)	R. Ampí Yacu, Peru
<i>A. egassizii</i>	Steindachner (1875)	R. Amazonas and R. Solimões
<i>A. trifasciata</i>	Eigenmann and Kennedy (1903)	R. Paraguay and R. Guapore
<i>A. combrae</i>	Eigenmann and Regan (1906)	R. Paraguay
<i>A. borellii</i>	Regan (1906)	R. Paraguay
<i>A. steindachneri</i>	Regan (1902)	Guyana, Surinam
<i>A. pleurotaenia</i>	Regan (1909)	R. Paraguay
<i>A. pertensis</i>	Haseman (1911)	Manacapuru to Santarem
<i>A. ortmanni</i>	Eigenmann (1912)	Guyana
<i>A. rondoni</i>	A. de Miranda Ribeiro (1918)	R. Paraguai
<i>A. parva</i>	Ahl (1931)	R. Capim, Brazil
<i>A. bitaeniata</i>	Pellegrin (1936)	Upper R. Solimões, R. Amazonas in Peru
<i>A. aequipinnis</i>	Ahl (1938)	R. Paraguay (?)
<i>A. cacatuoides</i>	Hoedeman (1951)	Upper R. Solimões R. Amazonas and Ucayali in Peru
<i>A. sweglesii</i>	Meinken (1961)	Leticia Region, Peru
<i>A. hoignei</i>	Meinken (1965)	R. Portuguesa, Venezuela
<i>A. gibbiceps</i>	Meinken (1969)	(?) R. Negro, Brazil
<i>A. geisleri</i>	Meinken (1971)	Ob Dos
<i>A. luelingi</i>	Kullander (1976)	Todos Santos, Bolivia
<i>A. macmasteri</i>	Kullander (1979)	R. Meta, Colombia
<i>A. hongslol</i>	Kullander (1979)	R. Guarrojo, Cano Perro Colombia
<i>A. viejita</i>	Kullander (1979)	R. Yucao, Colombia
<i>A. iniridae</i>	Kullander (1979)	R. Inirida, Colombia
<i>A. moae</i>	Kullander (1980)	R. Moa, Brazil
<i>A. regani</i>	Kullander (1980)	Near Manaus, Brazil
<i>A. caetei</i>	Kullander (1980)	R. Caete, R. Apeu, Brazil
<i>A. piauiensis</i>	Kullander (1980)	R. Parnaíba, Brazil
<i>A. elisabethae</i>	Kullander (1980)	R. Uaupés, Brazil
<i>A. brevis</i>	Kullander (1980)	R. Uaupés, R. Tiquié, Brazil
<i>A. personata</i>	Kullander (1980)	R. Uaupés, Brazil
<i>A. meinken</i>	Kullander (1980)	R. Uaupés, Brazil
<i>A. uaupes</i>	Kullander (1980)	R. Uaupés, Brazil
<i>A. gephyra</i>	Kullander (1980)	Mouth of R. Negro to Santarém, Brazil
<i>A. pulchra</i>	Kullander (1980)	R. Candeias, Brazil
<i>A. roraimae</i>	Kullander (1980)	Boa Vista, Roraima, Brazil
<i>A. nijsseni</i>	Kullander (1980)	R. Ucayali, Peru
<i>A. eunotus</i>	Kullander (1981)	R. Ucayali, Peru
<i>A. reticulosa</i>	Kullander (1980)	R. Madiera, Brazil
<i>A. inconspicua</i>	Kullander (1982)	Rio Candelaria in Rio Guaporé drainage, Bolivia and Rio Paraguay in Brazil
<i>A. gossei</i>	Kullander (1982)	Oyapock and Approuague drainages in French Guiana and Brazil

Some species are now known to be taxonomically different from the *Apistogramma* and have been re-assigned to different genera:

A. ambloplitoides is now *Acaronia nassa*

A. ramirezi is now *Papiliochromis ramirezi*

A. weisei is now *Taeniacara candida*

It is probably only fair to state that examination techniques, photographs and information distribution have improved since those early days and the people concerned did not have the advantage of being able to compare specimens side-by-side.

Universal dissemination of the information seems to be the present problem. Showing enthusiasts could initiate the corrective process by entering their fish under their correct names, although this may pose problems initially to judges and show secretaries. The various bodies responsible for show standards could also help by reviewing their literature as soon as possible. This will at least make a start in resolving identification of these species.

It is unlikely that specialist books will be changed overnight (even loose leaf ones!) and it may be many years before new ones are published with the correct names against colour plates.

The following is a listing of all the valid *Apistogramma* species as of January 1982.

There are a few new species currently being examined and described which may be added later.

Bibliography

- Sven O Kullander, 1980.
A Taxonomical Study of the Genus *Apistogramma*.
Regan, with a revision of Brazilian and Peruvian.
Species (Teleostei: Percoidae: Cichlidae).
Bonner Zoologisch Monographien.
14.

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Identification problems with *Apistogramma* species



Apistogramma agassizii, male
Photo: I. C. Sellick

Apistogramma cactuoides, male
Photo: I. C. Sellick



Apistogramma steindachneri, female
tending eggs
Photo: I. C. Sellick



Apistogramma iniridae, male. One of
the new species of *Apistogramma*
Photo: Martin Evans

Continued from page 27

stood it on the gravel in my 24in. tank with the neck of the bottle above water level. I then put the fry in the bottle and hoped for the best. I kept them at a temperature of 77°F—which is the temperature of my community tank. To cut a long story short, after weeks of changing half of the water in the bottle daily, six of the fry grew; and now, 18 months later, they too have spawned. These fifty were spawned in a separate tank on a bed of Java moss. Speaking of the latter, I must just say that this must be the easiest plant to grow. It grows like fury in my tanks. I have a 30 watt Gro-Lux tube and use U/G filtration. Every four or so weeks I have to take a large plastic bag of Java moss to my local fish shop to get rid of it. . . .

"I am a great believer in siphoning one quarter of the aquarium water out each week and replacing it with clean water; I think this is the secret of a healthy tank."

Beverley states that she would like to hear from aquarists in her age group as she has no friends who keep fish; and does not know of any clubs in her area. She ends by saying: "I would just like to add that I look forward to your



Cardinal tetra

column every month and learn a great deal from it."

I'll conclude with that flattering remark. I hope readers have a pleasant summer holiday. If you have a few spare minutes please send me a few lines about your tortoise; garden pond; other reptiles; cichlids; *Cryptocoryne* plants; aquarium hoods; lighting; and public aquaria visited while on holiday. I hope to hear from you. Have a happy summer break.

NEXT MONTH

GOBIES. Dr. R. J. Goldstein describes some of the divine and fascinating members of this group of fishes. (colour feature)

Our **SPOTLIGHT** is focused on the **GIANT GOURAMI.**

FISHBREEDING. Roy Pinks plans the menu for breeding fish.

KOI SHOW IN JAPAN. Hilda Allan describes a major event.

And much, much more! Only 75p

OSCAR

G. Robinson





**Coldwater
Jottings** by Frank W. Orme

NEXT month, on the 10th September, the Bristol Aquarist's Society will be staging their very popular Annual Open Show (details can be found in the section of this magazine listing forthcoming events), the format following that of last year—which proved so successful. However, this year they will also have a class for junior exhibitors, in which they hope to see the younger members of the hobby showing their fish. Additionally, they will be staging the class which competes for the 'Nationwide' trophy. This trophy circulates between the open shows of the B.A.S., the Goldfish Society of Great Britain and The Northern Goldfish and Pondkeepers Society annually, each having the choice of variety that is to compete for it; this year the Bristol Society has decided to allocate the trophy to the Lionhead variety. I have been informed that the show schedule will contain a class for Lionheads, and another for "Ranchu Type Lionheads", from these two classes an independent judge will select the best fish—and it will be that fish which is awarded the 'Nationwide' trophy. There will be another class for the "Best Coloured Calico Fish irrespective of type, or non-type."

My informant, Mr. H. C. B. Thomas, comments that "it is hoped by putting on classes for the two types of Lionhead and another for the best coloured calico fish, those who are

interested in a revision of current show standards may be able to get a clearer view of what is possible, and available, in respect of colour in the calico types. And, it is thought, it may be possible to form some objective opinions in respect of the Lionhead types, both of which have their adherents."

Readers may wonder what difference there is between the two types of Lionhead; in the very simplest of terms it could be said that the main difference is in the dorsal contour. In the main British show standards depict a fish with a moderate curve to the back, the curve flowing in a continuous line through the peduncle to the caudal fin. On the other hand, the Japanese Ranchu has a much higher dorsal line which, in some, drops steeply through the peduncle to the caudal fin. Since imports from Japan have made the



Lionheads will be competing for the 'Nationwide' Trophy at the forthcoming B.A.S. Open Show

Ranchu available in considerable numbers there has been a divergence of opinion in respect of this variety of the goldfish, and pressure has been growing for the Japanese type to replace the accepted standard. My own view is that we should stay with the type depicted in our Standards—but that is a personal opinion which many are aware of.

It is a strange facet of the goldfish hobby that, despite a professed desire for a single National Standard for all recognised varieties of the goldfish, the various groups just cannot reach an amicable agreement. In the past meetings have been held, and it seemed progress was being made but always, without exception, the discussions broke down. The result is that now there are as many sets of standards as there are goldfish societies.

Possibly the most incomprehensible fact is that these various standards are so alike in many respects; in all other matters the societies support and cooperate with each other, yet a single set of standards seems to prove an insurmountable obstacle—why? And now, it seems, the two major Koi Societies are independently considering the question of show standards. Hopefully, they will eventually join forces to produce standards acceptable to all Koi enthusiasts, for it would be a pity if they were to follow the same path as that of the goldfish hobby. How fortunate are the other branches of livestock breeding and showing, for they have only one standard to work to—and these are ruled over by a National body.

Perhaps there lies the problem: is it that the goldfish societies are too independent to accept a set of standards which they could not call their own—especially if it might, at some time in the future, lead to the setting up of an 'overseeing body', yet this was almost the method adopted when they created the now defunct Associated Goldfish Societies of the United Kingdom!

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Tomorrow's AQUARIST



If you have any ideas, opinions, anecdotes, experiences or facts that you feel would help to develop the skills and/or knowledge of fellow aquarists, please let us know. We would also like to hear of any activities, competitions, etc., that your Society might be involved in and which you feel might fit within the framework of our title, "Tomorrow's Aquarist". Remember, there is no age limit! Send your contributions to:

The Consultant Editor,
The Aquarist & Pondkeeper,
The Butts, Half Acre,
Brentford, Middx.

★ ★ ★ ★ ★ ★ ★

THE AVON SCHOOLS CONSERVATION PROJECT

Our countryside is reportedly disappearing at the frightening rate of 37,000 acres per year. If you find this figure difficult to visualise, one acre is about half the size of an average football pitch. Therefore, an area equivalent to that covered by 18,500 pitches is being lost every twelve months—and that is 18,500 pitches too many!

Rather than sit back and bemoan this disturbing fact, the British Trust for Conservation Volunteers have, for some time now, been doing something about it. The B.T.C.V. is the only organisation in the UK which exists entirely to promote practical conservation work by volunteers. Its aims commit it to maintaining the character, wildlife and archaeology of our countryside and to improving the environment of our towns and cities.

From its Regional Centres (details obtainable from Headquarters—see below) it organises conservation projects for individuals and groups and assists in their execution.

The Avon Schools Conservation Project is an excellent example of the work carried out by one such Regional Centre, the South-West Conservation Volunteers. It was launched in 1979 under the auspices of S.T.E.P. (Special Temporary Employment Programme) guided by the Manpower Services Commission.



Some of the young pond-diggers/
keepers of Avon

The scheme was set up to cater for the increasing demands made by schools to become involved in some form of practical conservation work. The initial remit was very broad, aiming to introduce practical work to children of all ages. As the project has developed, the ideals and policies have become better defined. As a result, the creation of nature reserves on school grounds is now of fundamental importance. It is here that the notion of Tomorrow's Aquarist comes in because an essential part of a school nature reserve is the pond. A large number of these have been created throughout the country, and because of the seemingly natural affinity between children and water, they have proved to be most successful.

Almost all the ponds that have been established have been left to colonise naturally, thus resembling more the traditional countryside pond than the more formal garden/goldfish pond. Although following no particular guidelines, ponds (as with nature reserves

in general) tend to fulfil a variety of different functions, with the educational value being the most important in the S-W.C.V.'s view. As an educational resource, a pond has immense value to school children of all ages. At primary level, it is not only a source of wonder and fascination but also provides a base for topic or project work which can cut right across traditional subject boundaries. At secondary level (even up to sixth form standard), it is a habitat that can be studied in depth and form part of the curriculum work for subjects such as Biology, Rural Studies and Environmental Science. Using the children themselves to do all the hard work of digging, maintaining and managing the ponds also instils in them a more positive attitude towards their environment and helps them to appreciate the world outside the classroom.

As an introduction to "things aquatic", the Avon Schools Conservation Project must rate among the best, particularly when the work involves, not just the digging of new ponds, but also the maintenance and overhauling of long-established ones that, for one reason or other, become "unbalanced".

The Conservation Volunteers, being a national organisation, have similar projects in other parts of the country and can provide expert advice to any schools interested in setting up or maintaining a pond or nature reserve.

Fuller details may be obtained from:

1. **The British Trust for Conservation Volunteers (Headquarters),**
36 St. Mary's Street,
Wallingford, Oxon.
Tel. Wallingford 39766.
2. **South-West Conservation Volunteers,**
Old Estate Yard,
Newton St. Loe,
Bath, Avon.
Tel. Saltford 2856.



BOOKS ON **Cichlids**

by Ian C Sellick

"CAN you recommend a good book on cichlids?" is perhaps the question I am most frequently asked by newcomers to the ranks of cichlids. It is also the most difficult to answer, as usually the answer has to be "no", unless, that is, you happen to be able to read German. As you will see from the list that follows, the majority of books on these fascinating fishes are in German. The few that are in English are now woefully out of date. The other very obvious feature of this list is that African cichlids receive the greatest part of the coverage, there are no books specifically on American cichlids; the volume on this topic promised for some 10 years by TFH has never materialised for various reasons. All books on cichlids suffer, as do all books on fish if it comes to that, from obsolescence the minute they are published, especially when new fish are being discovered all the time, or are being imported for the first time; an almost daily occurrence as regular trips to our specialist dealers will soon show!

This list includes a few of the more useful (to the aquarist) scientific treatises on cichlids; there are many more in addition to these, the Natural History Museum in particular publishing a large number of highly technical booklets on cichlids. A catalogue can be obtained from them on request. Many continental museums and institutes also publish works of a similar nature. These technical papers are usually somewhat expensive to buy,

but can be obtained by your local library through the InterLibrary Loans service.

Finally, there is no better source of information than that obtainable by joining the British Cichlid Association!

This list is by no means comprehensive, but is nearly so. I have generally omitted small booklets, such as the 'Enjoy' series.

Axelrod, G. S. 1979. Rift Lake Cichlids. TFH Publications. A cheap hardback that provides a reasonable beginners introduction, with sparse selection of examples.

Axelrod, H. R. 1970. All about discus. TFH Publications. Coloured pictures galore and some info in a rather shallow treatise that includes reprints of even older articles.

Axelrod, H. R. 1978. Beginning with mbunas. TFH Publications. His nephew does it better. Plenty of pictures.

Axelrod, H. R. and Burger, W. 1980. African cichlids of Lakes Malawi and Tanganyika. 9th Edition. TFH Publications. More comprehensive guide. Proof that pictures sell books. Text somewhat thin on the ground.

Baerends, G. P. and Baerends-van Roon, J. M. 1950. An introduction to the ethology of cichlid fishes. E. J. Brill, Leiden. The original work on cichlid behaviour that set the standard for others. Very interesting. Still available, I believe, but rather expensive for a paperback.

Balow, E. K. 1974. Fishes of Lake Kariba, Africa. TFH Publications. Interesting but of little value, virtually no aquarium fish.

Brichard, P. 1978. Fishes of Lake Tanganyika. TFH Publications. Well worth having, written from years of experience.

Dow, S. 1976. Breeding angelfish for the hobbyist and professional. Palmetto Publishing, Florida. Rather thin treatise, interesting, but not well suited to the UK breeder. Everything you probably already knew.

Fryer, G. and Iles, T. D. 1972. The Cichlid fishes of the Great Lakes of Africa. Oliver and Boyd. Sadly now out of print, the work for the serious minded aquarist. Many conclusions now rather out of date, but a good source book. Many words and few

pictures, masses of data on the fish in the wild.

Ghadially, F. N. 1967. Angelfish—the king of the aquarium. Buckley Press. A nice good value beginners guide. Could do with an update, for instance, colour variety list is lacking.

Goldstein, R. J. 1970. Cichlids. TFH Publications. First attempt at a comprehensive overview and it shows. *Goldstein, R. J.* 1973. Cichlids of the world. TFH Publications. A more realistic volume, now sadly out of date, but still a useful introduction to the groups of cichlids. Very thin on Malawi cichlids, strong on Americans.

Goldstein, R. J. Introduction to the cichlids. TFH Publications. Pictures and some words from the above. Not worth it.

Gosse, J. P. 1975. Revision du genre Geophagus. Koninklijke Academie voor Overzeese Wetenschappen, Brussels. In French. For the geophagus nut, everything you wanted to know about identification and virtually nothing else.

Greenwood, P. H. 1981. The Haplochromine fishes of the East African Lakes. Kraus International, Munich (Available from British Museum (Natural History)). Expensive, daunting book summarising Dr. Greenwood's 25 years' efforts on these African fish. Heavy going, but full of useful notes and references. For the real nut case only!

Hayley, A. Baby Discus. FAMA, Sierra Madre, California. Interesting little book with novel method of artificial rearing.

Hew, J. Your angelfish. Colourmaster International. Cheapie beginners picture guide.

Jackson, P. B. N. and Ribbinck, A. J. 1975. Mbuna—rock dwelling cichlids of Lake Malawi, Africa. TFH Publications. Anecdote ridden but otherwise interesting. No, perhaps its the anecdotes that are the interesting bit. . . .

Kullander, S. O. 1980. A taxonomical study of the genus Apistogramma. Alexander Koenig Museum, Bonn. A must for the dwarf cichlid buff. Very technical but readable. Use in conjunction with Schmetkamp's book.

Linke, H. and Staack, W. 1981. Afrikanische Cichliden. I. Buntbarsch

aus Westafrika. Tetra Verlag. The Germans show how it should be done. An excellent book with good colour pics on West African cichlids.

Mayland, H. J. Buntbarsch des Malawi-Sees. Albrecht Philler Verlag.

Mayland, H. J. Buntbarsch des Tanganjika-Sees. Albrecht Philler.

Mayland, H. J. Buntbarsch Ost- und Westafrikas. Albrecht Philler. Three cheap German beginners paperbacks.

Mayland, H. J. 1978. Cichliden und Fischzucht. Landbuch Verlag, Hannover. Beautifully presented German treatise on all cichlids and a good section on fish breeding and behaviour. I often use this as my standard reference. Some mis-identifications, but well worth getting, even at nearly £30.

Mayland, H. J. Die Könige Amazoniens Diskusfische. Landbuch. Not seen this, but its on my Xmas list.

Mayland, H. J. 1980. Die Buntbarsch Amerikas. Albrecht Philler. The only solely American cichlid book. Haven't seen this one either. Would appreciate a review copy, Hans!

Mayland, H. J. 1982. Die Malawi See und Seine Fische. Landbuch. Excellent book on the lake and its fish from Germany's most prolific cichlid author.

Neergaard, S. 1974. Nyasa Cichliden. Clausens Forlag, Copenhagen. The first of the good aquarist oriented books. Trouble is, it is in Danish! Recently published German version doesn't make matters much easier!

Neergaard, S. 1976. Tanganyika Cichliden. Clausens Forlag, Copenhagen. Ditto.

Pinter, H. 1981. Cichliden, Buntbarsch im Aquarium. Eugen Ulmer. Just proves the Germans aren't infallible.

Prosek, N. 1972. Oscars. TFH Publications. Big print stretches basic info to 96 pages, could have been done in 20. Worth getting for the colour reproduction of Cuvier's original description and engraving.

Ribbinsk, A. J. et al. 1983. A preliminary survey of the Cichlid Fishes of Rocky Habitats in Lake Malawi. South African Bureau for Scientific Publications (through British Cichlid Association in U.K.). Colour illustrations and detailed text of virtually every species of mbuna should make this

indispensible to the African enthusiast. Schmetthamp, W. 1982. Die Zwergcichliden Südamerikas. Landbuch. A must for the dwarf cichlid keeper. Beautifully illustrated and laudably up to date, covers every *Apistogramma* ever exported from the wild (I think).

Silva, T. and Kotlar, R. 1980. Discus. TFH Publications. Cheap unpretentious hardback that makes a useful intro.

Staeck, W. 1974/7. Cichliden—Verbreitung—Verhalten—Arten. Engelbert Pfeim Verlag, Wuppertal. Two large volumes and a third rumoured to be on the way at about £25 each. Deals with fish by behavioural grouping. Already badly needs updating, but a useful source work.

Staeck, W. 1982. Handbuch der Cichlidenkunde. Franckh Kosmos Verlag. Haven't been able to get hold of this one yet.

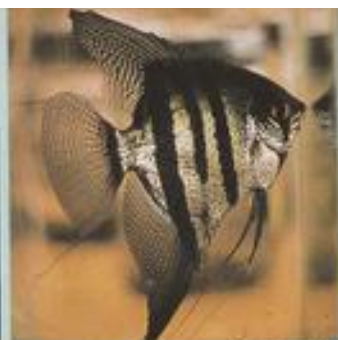
Staeck, W. and Linke, H. 1981. Afrikanische Cichliden. II. Buntbarsch aus Ostafrika. Tetra Verlag. Companion volume to the one on West African fish. This one tries to cover 50 times more fish; means you get the authors' choice rather than comprehensive survey. Well worth getting though. Pester Chris Andrews for them.

Thorson, T. B. 1974. Investigations of the ichthyofauna of the Nicaraguan Lakes. Nebraska University Press. Comprised of reprints of diverse articles that have appeared elsewhere, but useful to have them in one place. Trouble is, it means chapter you want is likely to be in Spanish, or German; most are in English though. Worth a look.

Tretzner, E. 1983. A review of the tilapine fishes of the genera *Sarotherodon*, *Oreochromis* and *Danakilia*. British Museum. To be published in October at about £45. Ouch!

Vierke, J. 1979. Dwarf Cichlids. TFH Publications. Good inexpensive beginners guide to American and African dwarf cichlids. Quite a few misidentifications, but the info is generally good.

Voss, J. 1980. Colour patterns of African Cichlids. TFH Publications. West African cichlids in fact. Originally published in French in A4 format,



There are more books dealing with Angelfish than any other single group of Cichlids

the small format of the English language version unnecessarily cramps excellent and well researched material.

White, W. 1975. The angelfish: its life cycle. Sterling, New York. Worth getting study of biology, principally anatomy, and developmental stages of angelfish. Adult fish photos rather grotty.

The over-riding conclusion seems to be that you must learn to speak German before you should attempt to keep cichlids!! There is a desperate need for a good introductory guide to cichlids in English.

ANNOUNCEMENT FROM TETRA

"COMPLETE AQUARISTS GUIDE"

As regular readers of the *Aquarist and Pondkeeper* will realise, this month's free pull-out leaflet on marine and coldwater fishkeeping is the last in the seven part series and adds the final touch to the *Complete Aquarists Guide*. Subjects as diverse as fish breeding, diseases, water quality and feeding have been dealt with in previous leaflets by Dr. Chris Andrews of Tetra, and the guide has been very well received.

In the event that there are readers who have not been able to collect the full set of leaflets (and their full colour cover), please write to the Tetra Information Centre, 15 Newlay Lane place, Leeds, LS13 2BB, enclosing a large stamped addressed envelope. An additional free leaflet on the holiday care of aquarium fish will be sent with each copy of the guide.

THE province of Darién in Panama, Central America, has a singularly bad reputation as being inhospitable. Memories come back of the famous British Army expedition in 1972 when Major Blashford-Snell led a team, two Range Rovers and a Land Rover across the notorious "Darién Gap",† when a vast array of problems had to be overcome; the terrain, the climate, the sheer size, and the lack of tracks,

FISHES OF Darién

by
Ian C Sellick

let alone roads. Apart from that account, the only other reference to Darién that came to mind was the verse of Keats:

"Or like stout Cortez† when
with eagle eyes
He stared at the Pacific—and
all his men
Looked at each other with wild
surmise—
Silent, upon a peak in Darién"

Even now, few people have been into Darién, and there is very little information available about the fish from the many rivers of the province. There have only ever been two or three scientific collections made from the area; no fish have ever been brought back alive.

With these few facts as a background, and as I was in Panama anyway, I decided that it would be worth attempting to get as far as possible into Darién to try and obtain some fish and at least photograph them, if not actually introduce them into the aquarium hobby. I suppose I was really quite unprepared for the sort of adventure that was to transpire. I decided to go on the spur of the moment, and with 24 hours' pre-

paration drove out of Panama City in a rented Toyota Corolla estate car, laden down with photographic equipment, food, fishing tackle, polythene bags, polystyrene boxes, and a 10 gallon all-glass aquarium!

The InterAmerican Highway leaves Panama City at Tocumen Airport, heading as straight as a die for a distant chain of mountains, and it remained a good metalled road as far as Chepo, 50 miles distant, which was to be the first stopping place. There the last few items were purchased—a huge ball of brightly coloured string to mark trees in case of having to walk, and a machete and file for sharpening it to hack through undergrowth. Mosquito netting proved impossible to locate, so with fingers crossed I set out again, very soon running out of tarmac and on to a reasonably good gravel road, the potholes in which got more frequent and larger the further I progressed.

The next major landmark was the Bayano Valley, where the Bayano River has been dammed in the last few years to form Lago Bayano, a massive new lake providing electricity for much of Panama. There the fish fauna is exotic, with imported freshwater sharks and sawfish from Nicaragua. On the shores of the Lake we found the first Indian village, straw thatched huts in which lived Cuna Indians. The Cuna are one of the three remaining tribes of Panama, their main base being the beautiful San Blas Islands of the Atlantic coast.

Indeed, all along the road were dotted thatched huts, interspersed with tiny board and tinsplate "restaurants" sporting gaudy Western advertising hoardings quite out of place, but useful for a stopping place for Coca Cola or cigarettes. Most of these huts are occupied by Campesinos, Latin people who work in the forests as labourers and farmers, and who support entire families from the land around them by growing corn, bananas, rearing pigs and chickens. Because of the access afforded by this gravel road,

vast areas of forest have been cleared, the timber being mahogany and a local teak and thus valuable commercially. Unfortunately, areas are cleared and left, and the poor topsoil characteristic of the tropical rain forest soon dries out and blows away, leaving areas barren of the beautiful and diverse vegetation that was once present.

The gravel road was dry and dusty, but I was making good progress; at least there were bridges across the rivers, and it was difficult to resist the temptation to stop at every one and see what fish were present. After about 150 miles, it was late in the afternoon, and the rapid tropical sunset was almost due, so rather than risk driving along this unknown road in the dark, I decided to call it a day, stopping by the side of the road, and electing to sleep in the car. Night fell at 6.20 p.m. precisely, and the nocturnal chorus of insects, frogs and monkeys soon started. A few hours were spent with a torch looking for animals along the edges of the forest, with a marked lack of success. A few fascinating millipedes, a small hawk perched on a tree stump and most irritated at being disturbed after dark, and thousands of scurrying ants, beetles and other insects were the main finds. The tree frogs have a remarkable talent for ventriloquy—you think you have found the area they are calling from, and can search it in vain, and then realise they are several yards away from where the sound appears to come.

The following morning, the road came to life early, people appearing as if by magic from the forest all around, carrying machetes and walking along the road to their forestry operations nearby. One of them stopped and invited me back to his house for breakfast. His name was Ramirez and he lived in one of the straw and banana leaf thatched huts near the road. His hospitality was gratefully received, and after a difficult exchange of conversation (my Spanish is deci-

dedly lacking), a meal of Tortillas and fried eggs followed by home grown coffee, in exchange for tins of meat, I left to drive further into Darién along the gravel road.

I was soon very glad I had decided to stop where I did, for driving across a bridge at a small village called Canclun, I hastily applied the brakes and skidded to a stop—the road did not continue further! Ahead of me was a solid wall of trees, with merely a rough track

leavers. More tins of meat were dispensed in gratitude and off again.

The next few hours passed in a wearying almost nightmare kaleidoscope of activity and interesting sights. I decided the only way to get through the forest was to drive as fast as possible, the reasoning being that if you hit a muddy patch fast, your momentum will carry you through. I would stop the car on a hill top, walk to the top of

The stop came a lot sooner than expected. Rounding a large tree on a trail I hadn't prospected properly, I ran straight into a fallen log, which in itself wouldn't have been much of a problem, except that I neatly impaled the radiator on a protruding branch!

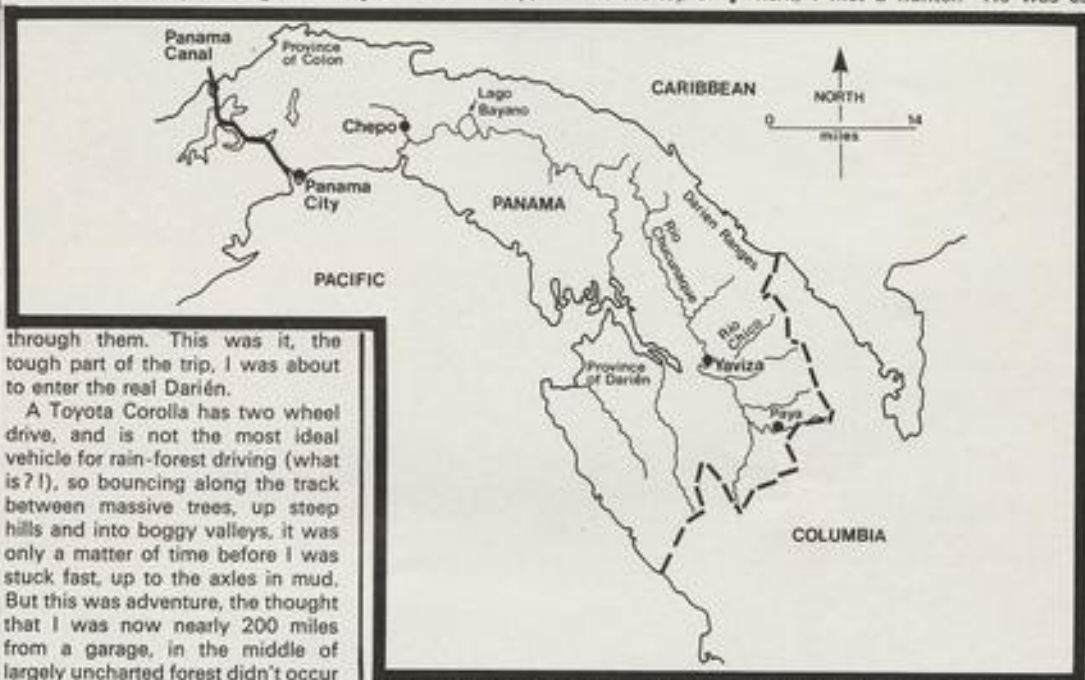
That really was it, and I started walking. Nearly giving up some 1½ hours later, and about to return to the car to decide what to do next, I met a hunter. He was as

through them. This was it, the tough part of the trip, I was about to enter the real Darién.

A Toyota Corolla has two wheel drive, and is not the most ideal vehicle for rain-forest driving (what is?!), so bouncing along the track between massive trees, up steep hills and into boggy valleys, it was only a matter of time before I was stuck fast, up to the axles in mud. But this was adventure, the thought that I was now nearly 200 miles from a garage, in the middle of largely uncharted forest didn't occur to me at the time. I got out and started walking, stopping to examine the *Echinodorus*-like plants that were growing by the car, trying to photograph butterflies, and watching a shoal of *Rivulus* in a tiny puddle—until I noticed the big cat paw prints in the mud at its edges! After half an hour's walk I could hear cutting, and found two Indians clearing undergrowth preparatory to felling a tree, and persuaded them to come and help me. Overcoming their amazement at seeing a car in the jungle, they set to work and soon freed it using two poles cut from the jungle, as

the next hill prospecting a route, cutting branches with a machete, clearing rocks, and then walk back and drive, or skid to the next hill top. It was very hot, very humid. The printed word cannot begin to describe the variety of problems of steering, navigation, the sheer idiocy of it all. I didn't give a thought to why I was doing it, or how I was ever going to get out again. I was tired, and running on adrenaline alone, knowing that eventually I must come to the Chucunaque or Tuyra rivers, and hopefully fish, a village perhaps, and an excuse to stop!

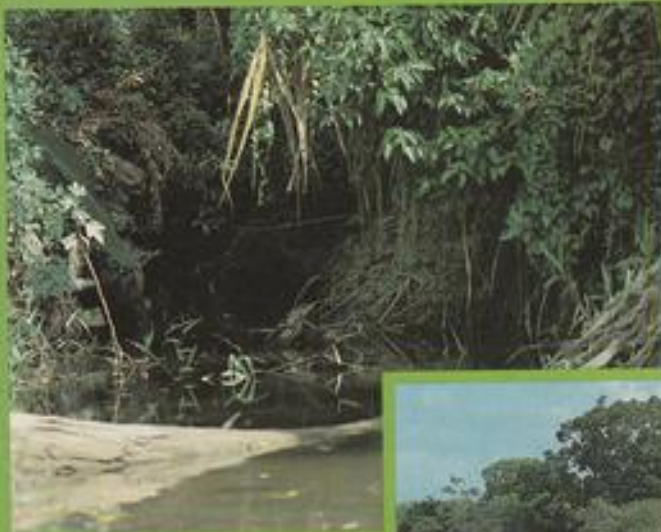
surprised to see me as I him, but the encounter was fortuitous. He guided me to the nearest village, Yaviza, another hour's walk away, got out his dug-out canoe, strapped on an outboard motor, asked me for 10 Balboas for petrol, and off we went, up the Chucunaque river, collecting a mechanic on the way, back to the car, which it turned out was near the river upstream from the village. The mechanic took away the radiator in the canoe, and left me to spend an uncomfortable night in the car, praying that he would be back as promised the next morning.



Cichlasoma umbriferum captured in a quebrada off the Rio Chico, Darién



Quebrada off the Rio Chico, Darién. Note dense overhanging vegetation and logs in the water. Width at this point is about 10 feet, and depth 3 feet



Geophagus pellegrini captured in the Rio Chico, Darién



Confluence of the Rio Chico and Chucunague at Yaviza, Darién. Note clear waters of the Chico in the background (appearing dark), contrasting with muddy brown water of the Chucunague (foreground)



The author in a piragua (dug-out canoe) on the Rio Chucunaque, Darién

Hoplias malabaricus caught in quebrada off the Rio Chucunaque, nr. Yaviza, Darién



Cichlasoma calabrense from the Cañazas Saddle region of Panama

Cichlasoma tuyenense

FISHES OF Darién

He was, fixed the car mainly with electrical tape and string, and charged 40 Balboas (about £25) for his time, materials etc. Very good value for money. Travelling by canoe was so easy, however, that I left the car where it was, and went to Yaviza, which was to be my base for the next few days of fishing and exploring Darién. Yaviza boasts electricity, drinking water, an "hotel", and an incredible person called Garcia, an ex-American cop who has settled here in the middle of nowhere. He was very useful to me, finding boats, hiring men (10 Balboas a day each), even getting me out of jail on one occasion (now that is another story . . . Panama, don't forget, is a Central American military dictatorship).

Well, what of the fish, and their habitats? There are two main rivers in Darién, the Tuyra, which I was not able to explore, and the Chucunaque, these two joining near the coast before issuing into the Pacific at Las Palmas on the Galfo de San Miguel. The Chucunaque is a brown, slow flowing, milky river with many tributaries mostly on the northern side, feeding from the Serrania del Darién.

My main fishing sites were small streams (Quebradas) off the main rivers. These were paddled up by canoe until they were small enough to be about waist deep, and were then seined using a $\frac{1}{2}$ in. mesh, 10 foot seine. The first Quebrada, off the Chucunaque, yielded a collection of characins, as yet unidentified, a beautiful pair of *Cichlasoma tuyrense*, a huge *Haplias malabaricus*, some catfish (*Rhamdia wagneri*?) and what appeared to be small eleotrids, looking like torpedo shaped versions of the sleeper gobies. To catch the adult *C. tuyrense* in the first net haul was a real thrill, as this fish appears to be restricted to

Eastern Panama and has certainly never been seen alive before. Interestingly, *C. tuyrense* shows virtually no sexual dimorphism, and was only caught in these very muddy rivers. The slightly tubular mouth is well adapted for sucking up material from the substrate which I assume is the way it feeds. In the aquarium, the dots on the body stand out well and although not brilliantly coloured, the fish is well worth a look.

The native boatmen were less interested in the fish than the fresh-water shrimps we caught in the seine, and they collected these, filling old Coca Cola tins with them. They are delicious fried!

The most interesting river, however, was the Rio Chico, a clear water river that joins the Chucunaque at Yaviza. From the village, you can see the confluence, the junction being marked by a clear line between the black-looking Chico waters and the pale brown Chucunaque water. The Chico is a faster flowing, shallower river with gravel shoals, many stranded tree trunks, and a fascinating collection of Choco Indian houses along its banks. Here we again caught *C. tuyrense* in muddy pools along the edge of the river, and in silty Quebradas off the main river. Characins were particularly abundant, ranging from large silvery main stream fishes (*Curimata*) through *Astyanax*, to delicate little tetras that would grace any aquarium (*Cheirodon* type). Molly-like livebearers were abundant in places, mostly in still shallow water, and Loricariid catfish could be seen on the gravel bed of the river. I caught *Ancistrus*-type fishes by picking them up from the bed of the river, never in a net.

In the Chico, the greatest thrill was to don a snorkel and mask, and watch the fish swimming around you, specimens that weren't caught in the nets, gobies hopping along against the current in small schools, many tetras, and lots of cichlids.

The cichlids were found only

in the pools at the side of the river where some mud was deposited, or in still water behind tree trunks in the river. These included a beautiful acara, similar to *Aequidens coeruleopunctatus*, but differing slightly in some characteristics. *Cichlasoma umbriferum*, the juveniles of which are beautiful, but adults at 15 in. or so are unmanageable in the aquarium! The best find though, for me, was *Geophagus pellegrini*, not so far recorded from this river system. Unfortunately, I was only able to catch one specimen, even though there were plenty present—the usual story. Every fishkeeper knows how difficult it can be to net fish from an aquarium. Imagine then the difficulty when they have got an entire river to swim around in!

What of the water? The Chucunaque and its Quebrada have moderately hard water, about 120 ppm total hardness, calculated as CaCO_3 . The pH was 7.0, and conductivity 275 $\mu\text{S}/\text{cm}$. Suspended solids were 32 ppm, traces of copper, zinc and iron were found, lead was absent, as was chloride. Phosphate was moderately high at about 0.2 ppm. Nitrites and nitrates were not tested for.

The muddy Quebrada off the Chico were similar in composition, 110 ppm hardness, pH 7.0, conductivity 250 $\mu\text{S}/\text{cm}$, phosphate 0.4 ppm.

The Rio Chico itself had soft water, 57 ppm total hardness, was slightly alkaline at pH 7.4, conductivity 125 $\mu\text{S}/\text{cm}$, relatively high in copper and zinc, low in iron. Lead and chloride absent. Phosphate about 0.1 ppm.

Bear in mind that these results are based on single spot samples and that water conditions will vary significantly with season. These are dry season figures. For comparison, one German degree of hardness (DH) is equivalent to 18 ppm total hardness as CaCO_3 . Conductivity is a measure of the total dissolved salt in the water, these conductivity readings are

low, confirming that the water is very pure.

Temperature was extremely variable, from 90°F in shallow exposed pools alongside main rivers, to the mid-70s for jungle streams sheltered by trees. Temperatures felt cooler towards the bottom of muddy streams where no mixing occurred. The fish, however, were moving from one to the other even when not frightened by our presence, for instance from the approximately 73°F water of the mainstream Chico to the edge pools at nearly 90°F with no hesitation!

Fish were housed in shallow plastic buckets and large polythene bags in the rented room in Yaviza until, all too soon, it was time to leave. Everything was packed, the fish, and some lizards, all the rest of the gear, and stowed in the by now familiar dug-out canoe, to be transported back up-stream to the car. The trip out was far less eventful. Although I got stuck far more often, this time I had the advantage of having two villagers with me who were paid 20 Balboas each to get the car out of any scrapes I might get into. They dug it out of the mud, pushed when necessary, lifted it between them out of a small ravine that suddenly opened up under the wheels, and then, once Canclun was reached, quite cheerfully set off to walk home!

The gravel road after the forest seemed to have as good a surface as the M1, and I treated it like a motorway, oblivious of the potholes, uncaring about the battered state of the car, the tape and string that was holding much of it together, happy in the knowledge that I had a car-load of fish, alive, that were unique. Some of these I have brought back to this country and they have been distributed to breeders in the hope that they will be made available to all aquarists. I hope that in the not too distant future, all aquarists will be able to try their hand at keeping a few of the fascinating fishes of Darién.

Checklist of the Fishes of Darién

One of the most difficult problems when collecting fish in the wild is identifying what you have caught. To help in this, I compiled a list of all the fish that have been caught previously in Darién, as well as some that I thought might occur there. This list is presented below: it is of interest to note the amazing diversity of types of fish found in one relatively small area of Central America. This, unfortunately, is *not* a list of the species I was able to catch!

Ariidae (Sea Catfishes)

Felichthys pinnimaculatus
Selanopsis dowi
(*Galeichthys seemani*)
(*G. jordani*)
Galeichthys guatemalensis
Netuma planiceps
N. oscula
(*Arius multiradiatus*)
A. taylori

Doradidae (Thorny Catfishes)

Trachycorystes amblops

Ageneiosidae (Barbel-less Catfishes)

Ageneiosus caucanus

Pimelodidae (Long-whiskered Catfishes)

Rhamdia wagneri
Pimelodus clarius (punctatus)
Pimelodella chagresi

Pygididae (Trichomycteridae—Parasitic Catfishes)

Pygidium striatum
Callichthyidae (Callichthyid Armoured Catfishes)

Hoplosternum thoracatum

Loricariidae (Armoured Catfishes)

Hypostomus plecostomus
H. p. panamensis
Lasiancistrus planiceps
Chaetostoma fischeri
Ancistrus spinosus
Leptoancistrus canensis
(*Loricaria uricantha*)
Loricaria filamentosa
Loricaria variegata
Loricaria altipinnis
Sturisoma panamense
S. citreum

Astroblepidae (Aegidid Catfishes)

Astroblepus longifilis

Characidae (Characins)

Curimata magdalenae
Apareiodon dariensis
A. compressus
Characidium marshi
Compsura gorgonae
Cheirodon affinis
Phanogonistius macrolepis
Gephyrocharax atricaudata

Astyanax fasciatus
A. ruberrimus
Bryconamericus emperador
Hemibrycon dariensis
Gasteropelecus maculatus
Creagrutus affinis
Raeboides occidentalis
Brycon striatus
Brycon argenteus
Plabucina festae
Ctenolucius hujeta
Hoplias malabaricus

Sternarchidae (Apteronotidae—Electric Knifefishes)

Sternopygus dariensis
Eigenmannia virescens
Hypopomus occidentalis
Sternarchus rostratus

Poeciliidae (Livebearers)

Poecilia caucana
Priapichthys dariensis
Neoheterandria cana

Cyprinodontidae (Killifishes)

Rivulus chucunaque

Cichlidae (Cichlids)

Aequidens oeroleopunctatus
Cichlasoma taylori
C. calobrense
C. umbriferum
C. panamense
Geophagus crassilabrus
Geophagus pellegrini

Psittidae (Sawfishes)

Pristis microdon

Synbranchidae (Swamp Eels)

Synbranchus marmoratus

Clupeidae (Herrings)

Ilischia fuerthii

Mugilidae (Mullet)

Mugil curema

Syngnathidae (Pipefishes & Seahorses)

Syngnathus elacipitanensis

Centropomidae (Snooks)

Centropomus unionensis

Sciaenidae (Drums & Crockers)

Stellifer sp.

Ophiocion strabo

Tetraodontidae (Puffers)

(*Sphaeroides annulatus*)

Eleotridae (Sleepers)

Gobiomorus maculatus

Domitator latifrons

Eleotris picta

Gobiidae (Gobies)

Gobionellus dagnae

Microgobius miraflorensis

Awaous transandeanus

Bothidae (Lefteye Flounders)

Citharichthys gilberti

Soleidae (Soles)

Achirus fonssecensis

Note: Species in brackets are doubtful due to principally marine habit or only postulated presence in Darién Rivers.

†Described in Russell Braddon's book "The Hundred Days of Darién". Collins 1974.

‡Keats got it wrong—Cortez never went anywhere near Darién. This refers to Balboa.

Company Profile

Rolf C Hagen (UK) Ltd.

ROLF C. HAGEN (UK) Ltd. started trading on 1st March, 1983 from their base in Leeds. Leading the team are Managing Director Andrew Bartyla and Sales Director Derek Shankland. Ernie Stanton, previously Company Secretary with a haulage firm, is their General Distribution and Commercial Manager.

The new operation in UK is an example of Hagen's policy of dealing direct to the Pet Trade rather than having to go through an established distributor.

Although the company markets a very wide variety of items for dogs, cats, cage birds, hamsters, rabbits and other pets, it is their range of aquarium products and accessories that are (obviously) of greatest relevance to our readers. This aspect of their activities is also the largest in terms of turnover and variety.

Many of their products are their own versions of the normal range available to hobbyists but some, such as the new Fluval Power Filter (Model 302), incorporate new features (See Press Release section for fuller details).

Hagen believe that merely putting items on show in a shop window is



Andrew Bartyla and Derek Shankland

not enough. Therefore, they have set up a model shop at their Leeds premises to show visiting traders how their products can be merchandised.

They also have their own laboratory where they test their own as well as competitors' products in order to confirm that they do the job they claim to and in an attempt to review and improve their range on a regular basis.

Hagen take great pride in their attention to detail, an example of which is their clearly marked Solar heater/stats which they claim allow for accurate pre-setting (to 1°F) of any temperature within the normal

tropical range. They also aim to make things as easy as possible for beginners by producing a number of "Starter Kits". Among these is a Guppy Starter Kit, a Junior Aquarium Accessory Starter (Filtration) Kit, a Complete Accessory Starter Kit and a DeLuxe Starter Kit. Each of these packs consists of a selection of items such as an air-pump, filter, filter wool and/or charcoal, thermometer, air-line, a tub of Nutrafin (Hagen's food range), etc.

The company also states as one of its major policies the stimulation of the hobby among young people. They hope to do this in the near future by launching (in addition to other activities) a programme similar to their successful Cage Bird project in which cages, accessories and budgerigars were offered free to schools, provided they agreed to certain criteria aimed at ensuring the welfare of the animals in question. We (Aquarist & Pondkeeper) hope to bring you further news of this project in due course.

Hagen also hope to rekindle interest in some products that were very popular in the past; prominent among these is peat. Hagen now produce packets of quality peat fibre for fish species which prefer acid conditions and compressed peat plates as a growing, trouble-free medium for plants. These, and all the other, products are under permanent test in the aforementioned laboratories. Rolf C. Hagen (UK) Ltd. may be contacted at 275 Kirkstall Road, Leeds. Tel. (0532) 796 566.



TELLING the age of fish may be from reading growth-rings on their scales, or in sectioned otoliths or ear-bones (only in bony fish), or from tagging or marking fish. "Could you please tell me how long goldfish live?" writes a reader. In her small, 12 ins deep fish-pond she had two fish until her cat caught them. One it was consuming, the other lay gasping on the bank when she flung it back. It survived, but turned white all over.

The "boozers book of records" gives the goldfish a record age of 41, a fish called Fred dying in 1980. Goldfish are usually senile after 25; females live longest, but German claims for 150 and 200 years in captivity need confirmation. Carp are recorded by the Zoological Society 50 years in captivity. European catfish, or wels, graced the lake at Woburn for over 60 years. Common and American eels are claimed at 50 years. Golden orfe, garpike, striped bass, sea-perch, plaice, halibut, thunder-loach, ray, Australian lung-fish, small catfish, Nile bichir (*Polypterus*) and elephant-fish are recorded in their twenties. It seems that smaller fish live shorter lives (the goby a year); but this may be due to the difficulty in marking them. Old fish don't weigh very much and have very irregular scales.

An eel caught in 1889 was still alive and 13 ins. long 42 years later. The Scottish Zoological Society's famous elver caught in 1895 died 57 years later only 12 ins. long after living 42 years fed only on lob-worms in a glass battery-cell. False readings may come from scales or ear-bones of lake-eels prevented from migrating, some scales having only 10 annual rings on eels introduced 45 years earlier into Lake Como, and only 6 to 8 rings on eels over 30 years in a Brandenburg clay-pit. Eels live longest when migration is prevented—one to 54 years. One was kept 55 years in a well in Denmark and another 37 years in a small container in France. There's an unconfirmed claim for 60 years. Size depends on food, so the Petersen method of size-frequency can be unreliable for age.



by Eric Hardy

Sturgeon are supposed to mature at 20-30 years and Canadian biologists determined one to be 152 years.

Pike age at 12-15; perch at 4-5 but may, like trout, attain 8. Most fish live longer in captivity. While carp have a life expectancy of 15 years, black bass have 8, sunfish 6 and white bass 4.

Catfish can be aged by taking specimens of the fin-spine or backbone for microscopically examining growth-rings. The number of scales remains the same throughout the life of a fish, the edges being added to as each grows. The last few rings or circuli laid down at the end of the year may be incomplete, then, when faster growth resumes in spring, new complete rings cut across the ends of the incomplete ones inside of them, the first complete circulus of the new year being the year-mark. A micro-projector may make reading easier than a microscope. Growth slows down as fish grow older, with a narrowing of the bands of rings, making aging increasingly difficult. Falsely greater age-estimates may be made where injury, disease, or spawn-

ing caused a check in the growing season like another year-mark.

Otoliths or ear-stones are organs of balance in bony fishes, in three pairs with only one pair large enough to read. They vary from flat oval to spindle and concentric growth-layers around the nucleus vary with factors like water-temperature. Sectioned under the microscope, spring-summer layers are opaque white, autumn-winter layers dark and translucent, and light and dark together make an annual mark. They are better than scales for aging very old fish, but one has to kill the fish to obtain them.

As already indicated, sections of the thin bones supporting fin-rays often age the fish by concentric light and dark bands, especially in sturgeon, catfish, bullheads, haddock and suckers. Likewise gill-cover bones and vertebrae may be used, the former being banded along the growing edge, the latter around the centre of the backbone. As a fish may stop growing when partially starved, this will upset the scale or bone-readings. Such fish tend to show a large head and narrow, shrunken body.

Scale-reading isn't always easy. I recall a freshwater fish symposium at one of our universities where a leading Dutch fish-biologist was checked for misreading the age of a scale he projected during his paper. Then an embarrassing controversy ensued.

Early Frog-Spawnings

A national frog-spawn enquiry in the past mild winter had its first record in Cornwall on Christmas Day, the second at Cambridge on New Year's Day, and several January records in South Wales and the West Country. Scotland's earliest was 11 February at Stranraer.

New orchid

Wetland plant-hunters should look for a new orchid, Young's marsh-helleborine, *Epipactis youngiana*, named from plants discovered growing with common marsh-helleborines in damp, brambly oakwoods by the South Tyne, 15-27 km from Newcastle, where the



Catfish such as this Bristle-nose *Ancistrus* may be aged by means of growth-rings in the fin spines or backbone

soil contains zinc and lead pollution. It is a more robust, yellowish, pink-tinted open, large flower, self-pollinat-

ing and with slightly hairy leaves. The rare fen-violet has been rediscovered at Cambridgeshire's Wicken Fen and the rare hornwort pondweed

virosa in Hanmere mere and Llyn Hedydd on the Shropshire border. Also ivy-duck-weed in Clwyd's Llyn Helyg, with the sedge *serotina*.

Around the north Norfolk waters this May, I watched marsh-harriers nesting not only at their Titchwell reserve they share with bearded tits and bitterns, where we also saw spoonbill, Temminck's stint and American Baird's sandpiper, but on the Ovary marshes end of Holkham coastal reserve, where a special watch also protects them. At the famous Cley Marsh reserve both marsh and Montagu's harriers were visitors, though the latter nests right across the county at Weeting Heath. Bitterns boomed either side the famous East Bank at Cley; then one flew over us, mobbed by gulls. Gadwall nest widely here, especially in Gunton Park where we also found Egyptian geese with young. Greylags and Canada geese breed wild all over Norfolk: the countryside is almost like a farmyard with their calls.

Coldwater Jottings

Continued from page 35

Over recent months I have been receiving copies of an American hobby magazine. *Freshwater and Marine Aquarium* is produced in Sierra Madre, California and circulates nationwide. By British standards it is a rather expensive publication, costing \$2 per copy (over £1 in our currency); however, it does contain some first class articles and superb colour photographs—mainly, as the title suggests, of marine and freshwater tropical fish. In the May issue an article appeared, written by Paul D. Harvey, in which the point is made that all aquarists should collect their own library of reference books and magazines. Mr. Harvey gives his reasons for advocating the selective collection of reference material—the most telling being: "In summary, the aquarist should invest in a fish library to minimize the frustration

and expense of trial and error learning. A modest investment in a library allows a neophyte hobbyist to educate himself more quickly in the basics of fish-keeping. This will result in longer lived fish, a more satisfying involvement in the hobby, and a longer commitment to it." (Comments which I fully endorse).

At this time of the year the current season's young goldfish, (and, perhaps, Koi), should be well-grown and of good size. Although still immature, they will be large enough for their potential adult quality to be assessed reasonably well. Faults in body and finnage will be revealed, if they are looked for, and such fish can be avoided in the knowledge that faults will not go away—in fact, they may well get worse as the fish grows. This then is a good time to visit amateur fish breeders, to acquire decent home-bred stock which will prosper.

Courtesy, of course, demands that an initial enquiry be made, and subsequently a convenient appointment arranged, to ensure that the fish breeder

has young of the chosen variety for sale, and the price required. Such enquiries, if written, should be accompanied by a self-addressed and stamped envelope. Do not expect to pay 'pet-shop-prices', in most instances the fish will be much more expensive; however, this will be reflected in the quality. It must be remembered that raising fish is a fairly costly business—especially nowadays—and a good deal of food, space and heat, not to mention time, has been expended in growing the fish to a saleable size. I might also add that you must not expect to be able to buy the young which the breeder has selected for retention, nevertheless the fish which are offered will normally be good representatives of their type.

It is highly unlikely that the sexes of the fish, at this age, can be distinguished with any certainty, therefore, if males and females are required, it is usual to purchase a minimum of six fish. From the six fish it should be possible, with any sort of luck, to find at least one opposite sex when the fish have grown to adulthood.

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



terrapians and fish...

Can I keep terrapians in my fish tank, and can you send me some general information on the care of terrapians?

I would not recommend the keeping of terrapians in a fish tank. Terrapians are likely to chase, nip the fins of, and maybe even eat the fish! They also like quite shallow water and getting out of the water onto rocks. A few general hints on their care are provided below.

These reptiles must be kept warm and away from draughts. A water temperature of about 25°C suits them best. This almost invariably calls for the use of an aquarium heater-thermostat and keeping these animals at very much cooler temperatures will result in problems. Small aquaria are an ideal home for terrapians. In an unheated room during the colder months of the year it may be necessary to also use a hood or coverglass. This will exclude draughts, reduce evaporation and keep the above water temperature comfortable for the inmates. During the warmer months the hood may be removed and the terrapin allowed to bask in natural sunshine. For this purpose a dry, easily accessible, sunning area should be available in the tank. This may take the form of a smooth rock or a piece of floating tree-bark. Rough rocks will damage the shells of these reptiles. If the tank is placed near to a sunny window,

care must be taken to ensure that part of it is in shade to prevent over-heating. During the dull, winter months terrapians will benefit from artificial light from overhead bulbs, though this is probably not essential.

Terrapians must be fed correctly. When very small they should be offered finely scraped raw meat, chopped earthworms and occasionally raw fish. Some terrapians also enjoy to nibble on lettuce leaves and pond-weed (*Elodea*, etc.) from time to time. Fatty or cooked meat must be avoided. It is a good idea, and particularly important during the winter months, to add calcium and vitamin D to the diet of these reptiles. A diet low in these nutrients, along with our cloudy climate, can easily produce soft shells in terrapians. Simply roll the food in powdered turtle-bone and/or fish liver oil about once a week. The terrapians should be fed three to four times a week, trying to avoid overfeeding. As they grow older they may be offered larger pieces of raw meat and fish, whole earthworms etc.

Terrapians are very messy feeders and hence the tank will need cleaning at least once a week. Remove the terrapin to a bowl of water at the



Terrapians should not be kept in a fish tank.

correct temperature, and switch off all electrical appliances connected to the tank. Clean the tank out well and fill up to the desired level with water at the correct temperature. Switch on the heater-thermostat and then replace the terrapin. Without regular cleaning these reptiles may develop a number of disorders, including eye troubles. As a precaution, it is wise to wash your hands after dealing with these animals.

earthworms...

Are earthworms a good live food for fish?

Chopped or fed whole, there are few better (or safer) live foods than earthworms. In damp weather, they can be dug up relatively easily from the garden. In dry weather a supply may be sustained by placing one or two damp sacks in a shady part of the garden and 'baiting' them with vegetable scraps about once a week. Following collection, the earthworms should be maintained in a sealed container with small air holes containing a little damp grass or moss. Within a few days they will have 'cleaned' themselves—and are ready for feeding to your fish. However, no live food should be fed to the exclusion of all else. Hence I suggest that you use them as an occasional treat for larger fish, maintaining the fish for the most part on good quality prepared foods. In this way you will be sure that your fish get a correct balanced diet. C.A.

COLDWATER

Arthur Boarder

PLANTS

Vivian De Thabrew

KOI

Hilda Allen

MARINE

Richard Sankey

DISCUS

Eberhard Schulze

Coldwater**upside-down
oranda . . .**

I recently found one of my Orandas upside down on the bottom of the tank with a pebble stuck in its mouth. I removed it with tweezers and the fish seemed all right after this. Why did this happen?

I have always recommended aquarists to use washed river grit and not gravel for a base compost. Goldfish will be often searching through the compost for food and so suck in some of this matter when any pebble could get stuck in the mouth of the fish. Remove the gravel and get something with smaller particles but not very fine sand as this can pack down too tightly after a time and prevent roots from entering.

**breeding
goldfish . . .**

I have a pond 10 x 6 x 2 ft., with a shallow part at one end for breeding purposes. Which are the best water plants for using as a spawning medium and which fishes shall I stock the pond with?

I have found that the best plant for your purpose is the Hornwort, (*Ceratophyllum demersum*). It has many very thin leaves almost needle-like. Its main advantage is that it never makes any roots and so is ideal for placing in a hatching tank which has



London Shubunkins make good stock fish for pond breeding

no base compost. Make a good sized bunch of the plant and anchor it near the surface at the shallow end and near the surface. When eggs are seen the bunch can be removed to the hatching tank and replace with a fresh bunch of plants. Stock with Fantails or Shubunkins.

A.B.

Koi**nicely coloured
koi . . .**

When going the rounds of Koi-dealers last Autumn I was disappointed to find that few of the fish on sale looked like those shown in a large Japanese book I have. I would appreciate your advice on where I can buy some nicely coloured and patterned Koi?

In fairness to existing or potential Koi-keepers and the trade as a whole I must make it quite clear that I am not prepared to publish any recommendations on where or from whom

Koi as you require may be purchased. You have done the right thing in looking around and have no doubt come to some conclusions on the variety and quality available.

The insignificant types mentioned may be cheap imports from countries other than Japan which bear little resemblance to the more colourful and expensive Koi from Japan itself.

As regards the Koi usually depicted in books, it must be understood that generally you are looking at mature fish of specimen or champion quality most unlikely to be seen in this country except at a very few specialised suppliers and then only in the higher price range.



Large specimen fish such as this Kohaku are very expensive

The large picture book you referred to is actually quite old and uses photographs which may themselves be even older and in the last 10 to 15 years there have been many changes in varieties and patterns. New varieties or perhaps better expressed as pattern-changes are being bred all the time and it is well-nigh impossible to keep up to date either with them or their Japanese names.

From your letter it is obvious that you are only concerned with smaller Koi and this does pose a problem.

Continued on page 62

Cichlasoma maculicauda

1

Observations in the wild

by Teresa J Townshend
and Ian C Sellick

1 *Cichlasoma maculicauda* from Lake Gatun, Panama, showing bacterial and fungal infections
Photo: T. J. Townshend



2

2 *Cichlasoma maculicauda* the Black Belt Cichlid
Photo: I. C. Sellick

3 Typical shoreline habitat of *Cichlasoma maculicauda* in Gatun Lake, Panama. Note underwater boulders
Photo: I. C. Sellick



3

4 Spawning pairs of *Cichlasoma maculicauda* may choose tree-stumps as substitute spawning sites

4



DURING our recent trip to Panama in Central America, we were able to observe the Black Belt cichlid, *Cichlasoma maculicauda* in its natural habitat, and as a follow-up to the Spotlight feature in the February 1983 issue of 'The Aquarist and Pondkeeper', are able to pass on these notes.

Our observations were made around the shores of Barro Colorado Island in Gatun Lake, Panama. Gatun Lake is artificial, formed in the early years of this century as part of the Panama ship canal, and is one of the largest lakes in Central America. Although much of the natural fish fauna has disappeared due to the introduction of *Cichla ocellaris*, the eye spot cichlid, the Black Belt thrives in the Lake, apparently because the *Cichla* have reduced the number of small fish predators, such as characins, smaller cichlids etc, and thus enabled fry rearing for the large Black Belts to become slightly easier. The Black Belt does have its predators, notably Ospreys, while *Hoplias malabaricus* and *Cichla* do prey on young and sub-adult fish. The pelicans which are one of the commonest large birds along the length of the canal do not appear to feed on the cichlids, their crash-landing diving technique only really being suitable for engulfing shoals of small surface living fish, such as *Atherinids*, silvery relatives of the aquarium rainbow fish.

The Black Belts spend all their time in relatively shallow water, one to three metres deep, around the shores of the island, particularly in cover where overhanging vegetation reduces the amount of light getting through to the water. This means that the principal aquatic plant present in the Lake, *Hydrilla* an *Elodea* like-species, does not grow in the area, and the Black Belts are found in small aggregations among the rocks and three stumps of the margins. The vertical or fallen tree stumps, and the rocky areas,

composed of boulders about two feet in diameter, grading to pea-sized gravel, make an ideal cichlid habitat, and also make it near impossible to catch the fish! Netting is out of the question, as the fish simply disappear under rocks, and trying to catch them with rod and line using a variety of baits, bread, crickets, and fish, also failed. *Cichla ocellaris* on the other hand are easy to catch by angling, and this is an important sport both for the local people, and tourists who come to the area.

The Black Belts feed from the bottom, stomach contents of those fish that were caught containing small molluscs, detritus, insect larvae and some fruit. They are "pickers" rather than "sifters" as are, for instance, *Geophagus*. The detritus content of the stomach is incidental, and its presence indicates that the fish are not sieving the food after a mouthful is taken in.

Breeding space in the Lake is not limited, and there is little interaction between pairs, or between pairs and other fish. There is occasional intrusion by juvenile *Cichla ocellaris*, but these are chased away by parental adults. They are somewhat colonial, two or three pairs breeding close together. Spawning sites are variable; in the rocky areas the eggs are laid in holes among the rocks. Here they are completely hidden from view, and the area is quite easy to defend against predators.

A more unusual, and apparently favourite, place to breed, however, is on tree stumps. This is probably not a natural site, but is an adaptation to the changed habitat. In an artificial lake, there are many submerged tree stumps, and the fish like to breed on top of these, probably because they are so easy to defend. However, when the eggs hatch, and the young wrigglers start hopping around, the parents are presented with the problem of fry falling off the stump and are conti-

nually having to retrieve those that have fallen from the nest!

Once the young are actually free swimming, the parents have less of a problem. Parental duties are shared on a 50:50 basis, both in care of the eggs and care of the young. The average size of breeding pairs is about 8 in., the males being slightly larger than the females, not so much in length but in the more massive body proportions. The fish reach a size of about 12 in. in the lake and the memory of a couple of large Black Belts cruising among the piles of the jetty of Barro Colorado Island is one that remains clear. A wonderful sight, these were the first tropical fish seen on arrival in Panama! Asking the local people the name of those fish, we were told they called them *haviaja*, or "the old lady".

Interestingly, many of the fish seem to have fungal growths on the bodies and fins. This does not seem to bother them, but makes us wonder whether conditions in the Lake are not absolutely ideal, perhaps due to a change in water quality?

At night, adults appear to rest above the *Hydrilla* beds, presumably to avoid nocturnal deep water predators. However, they can only do this all the time in the rainy season, as in the dry season the lake level drops and the *Hydrilla* beds are exposed. This may be a habit adopted by only a few individuals; and observations were made casually from a boat. Scuba diving at night may reveal that most fish rest between or under rocks.

To see fish such as these in the wild is an incredible and unforgettable experience. We count ourselves very fortunate to have been able to study these, and other cichlids, catfish, characins and livebearers in their natural habitat and hope by passing on these few notes all fishkeepers may benefit from our trip.



by
Roy Pinks

THE QUALITY of water is as important to the aquarist as the nature of soil is to the farmer. And to both it has always been of great interest whether the water or the soil happened to be alkaline or acid. It has, however, struck me as an unnecessary pomposity that this simple condition has been expressed, even in beginners' books as a pH reading, giving a number and a point, followed by another number: how much simpler for all if the chemistry had been left for the Appendix and the whole thing related to a single number on an acid/alkali meter.

Unfortunately, until recently, there was no such thing, commonly available, as a meter, and one had to refer to the relative colours of bits of paper or liquids, to which the water had been added, against a pH scale. This was all a bit approximate when one considers the colour blind and that arguments can go on for hours as to whether a given colour is actually blue or green. Improved technology has now brought us a series of acid/alkali meters (mine reads from 4 to 10) which gives some extremely odd readings and shoots off the scale if I touch the side of the tank with the probe.

Further, I have to clean the end of the latter with sandpaper, so that in time it will no doubt wear down

from 10 inches long to practically nothing. Never mind, if my model is anything to go on, serious approximation is still with us.

Does all this matter one iota? The stock answer used to be that acidity/alkalinity was of little real consequence to the general fishkeeper, who usually obtained his water from the kitchen tap and hoped for the best. The aquarist specializing in particular species or who wished to carry out breeding would have to be careful, especially when dealing with fish from the wild, whose natural needs would have to be matched. The overriding principle seemed to be that most fish adapted to changes of acidity, provided that these were gradual, and this is sound, since any violent variation in environment is dangerous.

It is interesting to recall that when the Neon first came to this country there were serious reservations whether it would ever survive in tanks watered from the alkaline areas, but time has shown just how wrong this opinion was. Exactly how long 'gradual' needs to be will vary from species to species: water changes can be made over mere hours or days, but in some cases months will be required to achieve success. Just for the record, the pH scale operates from 0.0 (very acid) to 14.0 (very alkaline), with neutral at 7.0. Most species we meet with in tropical culture require reactions between 5.5 and 7.5—a comparatively small part of the spectrum, and assuming that the tapwater practice was sound (which it generally was), most deaths probably stemmed from an imbalance of other conditions or, more likely, from sheer mishandling of the specimens. For those who wanted to keep awkward species or to spawn others we would recommend the collection of rainwater, typically taken from temporary hollows in the garden lined with polythene sheeting.

Care would have to be taken that surface water could not drain into these hollows: flat dwellers were advised to catch rainwater in non-galvanized containers left outside permanently, though one would commiserate with them over the actual rate of collection! This cosy state of affairs has, in the

last year or so been shattered by the scientists who have been reporting on the incidence of 'acid rain' over wide areas on the globe, notably Europe, and some truly astonishing readings have been noted.

It appears that water-bearing clouds exposed to industrial pollution for long periods absorb quite readily many of the harmful chemicals exuded, and the resultant solutions may be deposited as rain hundreds of miles away. One reading in Scotland was about 2.5, with 4.0 not uncommon, and this will be seen to be badly out of line with what we would expect from collected rainwater—something around 7.0. A lot of environmental stirring is going on about all this, mainly on account of matters very far removed from fish-keeping, about which governments care little, but we should keep a close watch on all this.

What it now amounts to is that we should be trusting our taps more and more and suspecting natural sources until they have been shown to be trustworthy. A good fallback is mature pondwater strained of its harmful bugs and known to support a wide range of life, though qualify this by the fact that most creatures adjust; therefore, still take a reading in case the locals have developed a taste for dilute hydrochloric acid during the past year or so. So, it may well be, advisable to dust over those elderly pH test kits and see what you make of the local sources of water. We did learn a lot about all this during the recent water workers' strike, and some readers will have had analyses made to determine whether or not given waters were 'safe'. At one time one could take water samples to the Public Analyst and get a full specification. Today the matter seems to lie between the local water authorities and the environmental health departments, reference to which would certainly be advisable if you knew that the tapwater was unsuitable for your species, because not only would an analysis reveal such basic matters as acidity or hardness, but also the presence of any harmful chemical salts drawn by the water from the terrain through which it made its way to your collecting bottle.



of the Aquarium

Ictaluridae

THE Ictaluridae (Ameiuridae) constitute a relatively small Family of relatively large fishes. Along with some other 30 Families, they constitute the Order Siluriformes, the Catfishes. There are only five genera of Ictaluridae with a total of about 39 species distributed in North America. Their geographical distribution today, although wide, has been largely achieved by introductions, rather than natural dispersal. In the past, from the Eocene to the Pliocene (from 55 to 15 million years before the present), Ictaluridae were native to the western parts of North America. However, they are now thought to be native only east of the Rockies.

Within the aquarium hobby, the Ictaluridae are known as the North American or Bullhead Catfishes, the most common of which is the Channel

Catfish, *Ictalurus punctatus*.

At a maximum weight of around 20 Kg (c. 45 lbs), it can hardly be regarded as an ideal aquarium fish. However, even this seems small compared to the 70 Kg (c. 155 lbs) recorded for the Blue Catfish, *I. furcatus*, which can grow to a length of around 2 metres (6 ft).

This, plus their good culinary properties, has made these members of the Ictaluridae prized game and table fish in the States where angling for them as well as their commercial



Albino *Ictalurus punctatus*

exploitation in fish farms are big business.

Channel Catfish are also rather unusual in that they are among the few species that can be found in considerable numbers as albinos in nature. This feature has been exploited commercially in the belief that the lighter-colour makes them more acceptable to some for eating.

Within the aquarium hobby, these albinos seem to be more popular than the normal, spotted wild-type which loses its spots as it grows.

Interesting among the other characteristics of the Ictaluridae are the possession of venomous spines by some species (such as the Seoncats and Madtoons), the ability to breathe atmospheric air (thus being able to survive in oxygen-deficient and/or polluted water), the development of a system of chemical communication (by means of substances called pheromones) which enables shoals to establish a hierarchical "pecking" order and thus live in relative harmony and the existence of eyeless troglolobionts (cave-dwelling species—*Satan* and *Trogloglanis*).

Jawless Fishes

JAWLESS FISHES belong to the Super-class Agnatha, one of the major divisions in the Classification hierarchy. The term "Agnatha" means "without jaws", a feature which is significant enough to separate these fish-like vertebrates from the "real" jawed fishes (Superclass Gnathostomata).

In fact, it is wrong to call the Agnathans fish at all because they differ in several fundamental ways from the general definition of the word "fish". For example, in addition to the absence of a jaw, Agnathans also lack a true, complete backbone, have inwardly-directed gill arches, possess gill "pores" rather than gill slits, have no pelvic fins and have only two semicircular canals in each ear (instead of the normal three which play a part in sound perception and balance).

There are 14 genera with 63 species living today, the best-known being the Lampreys (Family Petromyzonidae) and the Hagfishes (Family Myxiniidae). In addition, there are numerous extinct Families with histories stretching back almost 500 million years to the Ordovician Period.

Of all the Jawless Fishes, the only ones having any significance in aquarium terms are the Lampreys, of which there are two types, parasitic and non-parasitic.

Parasitic Lampreys attach themselves to their fish victims by means of a sucker-like downward-pointing mouth, rasp an opening in the skin and feed by sucking out blood through the wound. This is made easier by the production of an anti-clotting secretion from the Lamprey's salivary glands.

Non-parasitic Lampreys, such as the one shown here, are usually referred to as "Brook Lampreys" and it is these that are most likely to end up in

an aquarium since they may be quite easily collected in shallow, fast-flowing streams along with the more common Crayfish, Bullheads and Stone Loaches. If this happens, feeding should present no problems because non-parasitic Lampreys only feed during the larval stages. They then spend a few months, as adults, without food, until their sexual organs develop fully. Once this has been achieved, they mate and die. Spawning takes place in streams and rivers while the long larval stages (up to 5 years) may be spent in fresh or seawater, depending on the species.



Head of Brook Lamprey, *Lampetra planeri*



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Head of Brook Lamprey, *Lampetra planeri*

Infusoria



Paramecium sp.—Highly magnified
A = macronucleus
B = micronucleus

THIS term is used quite loosely in the aquarium hobby to refer to any culture of microscopic organisms that can be used as a first food for fry. In a more restricted (but more scientific) sense, *Infusoria* are single-celled organisms belonging to the Subphylum Ciliophora which consists of a single Class, the Ciliates. At 6,000 species strong, it is the largest Class of Protozoa (single-celled animals), all characterised by the presence of cilia (short bristle-like structures) which are used in locomotion and/or foodgathering.

Ciliates have two types of nuclei:

(i) a *macronucleus* which is not necessary for reproduction and is often referred to as the vegetative nucleus, and (ii) a variable number of *micronuclei* (up to 80) which are essential in reproduction and which give rise to new macronuclei. Reproduction can be asexual, in which cells divide, or sexual, in which two separate individuals exchange micronuclei. The most common ciliates are those belonging to the genus *Paramecium*.

Infusoria cultures are prepared by pouring hot or boiling water over a suitable medium such as hay, crushed lettuce leaves or banana skins, or (even) potato peelings, and allowing the mixture to stand for a few days in a warm environment. To discourage algal growth, the container should be kept in the dark.

After this time, the substrate should be removed. The liquid should, by then, have turned milky coloured as a result of a bacterial "bloom". These bacteria will act as the food for the *Infusoria* themselves. If the container has been left uncovered, then

the chances are that it will have "seeded" itself with Infusorian spores from the air. A much better, controllable (in terms of species) and, therefore, successful method is to seed the medium with a bought culture of a known ciliate such as *Paramecium*. Sub-cultures should then be started every few days in order to maintain a regular supply for the fry.

Apple Snails (*Ampullaria* sp) produce waste-products which, reportedly, form ideal food for *Infusoria*. Since the snails can be easily kept on a diet of plant leaves or vegetable flake, a permanent source of fry food can, therefore, be very easily set up and maintained.



Apple snail

Jenynsiidae

THE members of this Family of live-bearing fish were first described (variously) in 1842 as *Lebias lineata* and *L. multidentata* by Leonard Jenyns, after whom the genus was later named.

Numerous descriptions of various species closely resembling the original ones followed, culminating, in 1911, with Haseman's description of *Jenynsia eigmanni*.

However, C. Tate Regan examined a "large number of specimens" in 1913 and came to the conclusion that there is only one species in the genus—*J. lineata*. The Family Jenynsiidae is, therefore, said to be MONOTYPIC



Jenynsia lineata male

(i.e.) it consists of a single species and genus. Other "species" such as *J. pygogamona* and *J. maculata* may still be found in some of the early publications but these are merely varieties of *J. lineata* which is now known to be an extremely variable species.

Although superficially similar to the Poeciliidae, *Jenynsia* nevertheless differs from them in several significant ways. For example, in *Jenynsia*, the gonopodium starts off as a circular (ring-like) outgrowth from the skin of the vent region. It grows in length until it forms a hollow tube wrapped around the anal fin. In Poeciliids, the growth of the gonopodium takes place without this growth of tissue and involves considerable modification of the third and fourth rays of the anal fin.

A second difference is that in *Jenynsia* males, the gonopodium can only be swung in one direction. Males are, therefore, dextral ("right-handed") or sinistral ("left-handed"). Females,

similarly, have their genital aperture deflected to one side by a large scale. As a result, successful mating can only take place between a dextral male and a sinistral female or vice-versa. In this respect, *Jenynsia* resembles the Four-eyed Fish, *Anableps* (Family—Anablepidae). This unusual feature has also given rise to the common name, One-sided Livebearer.



J. lineata embryo with trophonema attached

Also worth noting is the unusual form of embryonic nutrition found in *Jenynsia*. This consists of a flap of ovarian tissue with an extension, known as a TROPHONEMA, that actually passes through the gill slit of the embryo into its mouth and throat, finally protruding from the mouth.

Meet the Societies



THE ASHFIELD & DISTRICT FISHKEEPERS



The A. & D. F. logo



An Albino *Corydoras aeneus*

THE trials and tribulations experienced by Societies in their efforts to become established constitute a never-ending source of amazing and fascinating stories. Similarly, the number of times that Aquatic Societies appear in some way linked with sources of "liquid refreshment" must surely have some profound, psychological significance! Take the A & D Fishkeepers as a prime example:

In their short life (they were formed in 1980), they have had to contend with football teams, pigeon fanciers and brass bands, have been made welcome by a number of kind-hearted Publicans . . . and have survived! Before you misconstrue all this, it must be stressed that these "encounters" occurred during the many months of concerted effort that the Founder Members had to put into finding a permanent, convenient and pleasant meeting place for their Society.

To their credit, they have not only found ideal accommodation, but have developed interest in the Society to such an extent that meetings are now held every other Tuesday at 8.00 p.m. at The Forest Tavern, Forest Road, Skegby (in the outskirts of Ashfield) in Nottinghamshire.

During these meetings, any one of the following, or a combination, may be organised:—lectures, film shows, quizzes, raffles, discussions on possible visits to fish farms, Fish Shows (such as the Yorkshire Aquarist Festival and the British Aquarist Festival), fish importers, shops . . . the list goes on. A & D Fishkeepers clearly believe in variety, as this selection of activities demonstrates.

They also believe in quality, finishing in top place on the Yorkshire Show League in 1981 with a total of 1515 points, an impressive total by any standard. (This feat was repeated in 1982). For those unfamiliar with this aspect of showing, a Society is awarded points for every First (3 pts.), Second (2 pts.) and Third (1 pt.) place won by members at competitive Shows. Also on the competitive front, A & D have now held two successful Open Shows and are already planning the one for 1983.

Children are not forgotten either—they have their own annual Christmas Party, even with a resident Santa!

Subscription Rates: Single Membership, £2.00; Family Membership, £3.00; O.A.P.'s and Children, £1.00.

Apply to: Mr. A. Marples, 8 Bretby Court, Mansfield, Notts. Tel. No. (0623) 647 489.

THE BRITISH CICHLID ASSOCIATION



The B.C.A. logo



Julidochromis ornatus

IN THE late 60's, the cichlid "hobby" received a major boost with the introduction of numerous hitherto unseen and (in some cases) unknown species from the Rift Valley area of Africa. This accelerated moves that had already been initiated by a number of enthusiasts around the country to get together and pool their knowledge of these fascinating fish. The result of this activity (and following advertisements in national magazines) was the birth of the B.C.A. By the following year, 1971, things had really got under way and this is, therefore, regarded as the *real* birthdate of the Association.

The first publication, the Cichlid Clarion, was followed in 1974 by a regular Newsletter and a periodic magazine, Cichlidae, carrying longer, more detailed articles on all aspects of cichlid biology. A start was also made on a series of Information Pamphlets, each dealing with a specific fish or topic in depth. So far, there have been about 80 Newsletters, 20 issues of Cichlidae and 30 Information Pamphlets.

The B.C.A. also has a collection of nearly 200 colour slides (also available as photographs) which may be bought at very favourable rates.

Since it is difficult to arrange regular national meetings in any large Association, the B.C.A. encourages the formation of Area Groups. These are largely autonomous but report to the main body of the Association.

Another area of activity is the organisation of Conventions every few years at which major international authorities are invited to speak. These Conventions are well attended and highly regarded.

At the 1981 Convention, an Auction was held for the first time. This proved so popular that a second one was arranged for April 1983. Again, it was a great success.

Unlike many other Societies, the B.C.A. does not hold competitive Shows. However, it has a Technical Subcommittee which handles all types of queries, a Species Controller who maintains listings of species held and spawned by members and a Sales Officer through whom a comprehensive range of publications, badges, T-shirts, etc. is available.

Subscription Rates: £6.50 per year (£10.00—Overseas).

Apply to (enclosing a large S.A.E.): Dave Monk, 33 Kirkmeadow, Bretton, Peterborough, Cambs.

Continued from page 55

Small colourful fish do not always grow into large colourful fish and patches of colour can spread, become smaller or even disappear altogether with age.

Most large Koi are attractive and if grown from being small they are at least a tribute to their keeper.

Beauty is in the eye of the beholder and choosing fish is no exception; Koi especially offer a very wide choice indeed and buying those that appeal to you will inevitably give you most satisfaction. **H.A.**

Plants

unwelcome inmates . . .

I should be most grateful if you could advise me on the best way of ensuring that aquatic plants are free from fauna. At the moment I use a mixture of remedies, together with water and temperature changes. I had believed that this killed potential pests (it kills about 50% of the more delicate plants!) However, I recently reared *C. lalis* fry by a method which precluded water changes and involved intensive feeding with 'Liquifry', and was horrified by the amount of what, in a marine tank, I suppose would be called zooplankton, which began to appear. Since this would have been greedily welcomed in any



Glassiphoniid "livebearing" leech—always unwelcome

other tank I wasn't too disturbed, until a full-grown and very hungry leech appeared in a tank of *R. maculata*. Both the *C. lalis* and *R. maculata* tanks require delicate, fine-leaved plants which just won't stand up to my methods of pest removal.

There are no chemical remedies which you could use to rid your tank of its less welcome inhabitants without harming the fish and plants. I'm afraid the only real answer is to strip your tank completely and clean all your water plants in salt water. Leave any new plants you purchase in a bucket of salt water for about ten minutes before planting them in your re-washed planting medium. This should certainly clear your tank of unwanted fauna, but if you have any further problems, please do not hesitate to let me know.

green weed . . .

When I first set up my tropical fish tank the plants in it were very healthy and some of them still are, but a lot of them have been covered with a small green weed. It looks furry, but it isn't mould. It grows up to 3 inches long, but is mainly about $\frac{1}{2}$ an inch long. It also grows on the gravel and the rocks. I have tried lots of things, even a Sucking Loach, but that wouldn't touch it. Could you please tell me how to get rid of it as it is ruining my aquarium.

The 'green weed' covering your aquarium plants is a type of algae with very fine filaments. The thing to do is to concentrate on giving proper lighting, and not too much. I suggest you use a moderate light, for example a 30 watt warm white, for about 8 hours per day if your tank is, say, 24 in. x 15 in. x 12 in. The temperature should be 72°-76°F and the pH slightly acid, say 6.5-6.9. It would also help to dose your tank with some aquarium salt, at the rate of 1 tsp. to 1 gallon about once a fortnight.

These methods should certainly go a long way towards preventing the growth of further algae in your tank. If you have any further problems, please do not hesitate to contact me.

hardwater problems . . .

I have had a tropical aquarium for two years and during that time I have failed to produce any growth on plants. The best that can be said of the plants is that they stay alive without growth, but in time they get eaten. The natural water of the area is hard and strongly alkaline and I have been reluctant to move away from local water.

I have tried all other variables such as light, both tungsten and Grolux and changing the period of lighting but without effect. I have changed from undergravel filter to box filter and have changed the gravel size. I have used plant fertiliser and plant 'pillows' with peat. Nothing has succeeded in giving a strong plant growth on the most common plants.



Some Crypts like alkaline water

The main reason for your lack of success with plant growth is, I feel, your water condition, which you say is hard and strongly alkaline. The majority of aquarium plants prefer soft, slightly acid water. The most effective way of achieving these conditions is by sandwiching a thin layer of washed aquarium peat between a mixture of coarse sand and gravel. Alternatively, you could filter your aquarium water through peat, by using an outside filter with peat placed inside the filter chamber. A third alternative would be to use filtered rainwater, if available. Plant fertilisers and pillows may be useful, but they have only a limited or temporary effect, and the real answer is a suitable medium for your plants. The total depth of your medium should be a good 3½-4 inches, to allow for good root development. Your lighting should be kept on for 8 to 10

hours per day, and an average temperature range of 70°-76°F would be acceptable for most popular aquarium plants.

The only alternative to making this fundamental change in your water condition would be to select only alkaline-loving plants for your aquarium, such as *Cryptocorynes ciliata* and *petckii*, *Echinodorus tenellus*, *Egeria densa* (*Elodea*), the *Myriophyllum* and *Potamogeton* species and *Vallisneria spiralis*.

V.T.

Marine



coldwater marines . . .

I am thinking of setting up a coldwater marine tank. Could you please give me some advice about suitable fish and invertebrate, sea salts, plants, lighting and temperature controls. What size tank would you recommend. Also can you please tell me where I can obtain all these articles within a few miles of my home, and last of all, is it possible to give me a rough guide as to the total cost?

Setting up and establishing a coldwater marine aquarium is no different from setting up a tropical marine aquarium, with the exception of a heater thermostat, which in a coldwater aquarium is not required. However, maintaining coldwater marine aquariums can be a little difficult during the summer months when the weather becomes warm. Furthermore, the collection of coldwater marine fishes can be a little difficult in winter when the seas are very rough. So for these two reasons very few aquarium shops stock coldwater marine fishes. So, if you want to establish a coldwater marine aquarium, you will need to collect all your own animals yourself. May I suggest that before you dive in at the deep end, you get hold of a comprehensive beginner's book on setting up a tropical marine aquarium. This will be an invaluable guide for you.

keeping beadlet anemones . . .

I would be very grateful if you could forward me the following information concerning the Beadlet Anemones. I am in the process of setting up a 48 in. x 12 in. x 15 in. tank using 40 lbs of calcium plus and 40 lbs. of coral sand, also a top grade salt mix. Can you tell me if they would survive in this tank and what temperature I could go up to? I would also like to know what kind of lighting and how many tubes. Could I keep tropical marines shrimp and living rock in this set-up?



Beadlet Anemone, *Actinia equina*

There is no doubt that the Atlantic Beadlet Anemone is the easiest of our local invertebrate to keep.

The only real criteria is that the aquarium should not be allowed to get too warm. They are also best kept if they are collected just in the Summer months when they are already used to slightly higher temperatures. I have found in my own experience, that keeping them at a temperature of 70°F is important. Never take them from cold seawater and place them into an aquarium at 70°F as they are unlikely to survive. If you collected them from pools during the summer months when the temperature is often around the high 60s or low 70s, you should have no difficulty at all. I would suggest that you either use oolitic coral sand or coral gravel, but in my own personal opinion I do not think it wise to mix different particle

size media. I would suggest that three fluorescent lights should be used on your aquarium of the conventional 36 in. length. Generally speaking I advise people to aim for the blue end of the spectrum. However, Beadlet Anemones, as they are from shallow water, do benefit from some infra-ray light. In your particular case I would suggest one north light, one warm light and one Growlux tube.

At 70°F you should find that most tropical coral shrimps will do well. However, care should be taken that you select the hardier types as the Beadlet Anemone is not adverse to eating the more sensitive species.

starting up . . .

I have been keeping tropical fish for a few years and now wish to start a marine system. I have a 36 in. x 15 in. x 15 in. tank. Is this of an adequate size? Also I would like some advice regarding methods of filtration. Some people advise me to have U.G. filtration and others a power filter. One that has been recommended by my local supplier is the Tunze system. What would you recommend and which fish do you consider suitable for this type of tank?

First, let me say that your aquarium sounds like an ideal first marine aquarium, and I would suggest however that before you proceed any further you purchase an up-to-date handbook. I would suggest the *Marine Aquarium Handbook* by Martin Moe. It will be an immense help to you, not just in the early stages of your going into the hobby, but also as you become more experienced.

The Tunze filtration system from West Germany is an excellent product and the dealer that you have mentioned I am sure will be only too pleased to demonstrate to you the way the system can be applied to your aquarium. As regards your initial fishes, there are an enormous number of coral fishes available, that are extremely easy to keep and very tolerant to the new tank syndrome. Again, good dealer advice is recommended here.

R.S.

NEWS...



SOUTH WEST



Bristol Aquarists met to discuss the scale variations found in Goldfish. Conrad Thomas dealt with the metallic types and was able to use fish on show to illustrate the colour changes. Vic Cole then spoke about the colours required in the colour varieties with special reference to violet. Table Show Results: Orandas (12): 1, A. Cole; 2 and 4, S. Howells; 3, G. Smith. Moons (2): 1 and 2, W. Perkins, who won the Gold Trophy. Cichlids (3): 1 and 4, I. Hughes; 2 and 3, Miss H. Morgan. Characins (2): 1 and 2, Miss H. Morgan.

RESULTS of Swindon A.S. open show held on 4th June. The Best Fish in Show was a Black Molly with 91 points, owned by P. Andrews (Reading).

Guppy (Male): 1, R. Perkins (Port Talbot); 2, C. Tonna (Reading); 3, D. Ford (Bracknell); 4, G. Perrett (Reading). Guppy (Female): 1, C. Tonna (Reading); 2, D. Ford (Bracknell); 3, G. Perrett (Reading); 4, J. Egan (Port Talbot). Platies: 1 and 2, R. Perkins (Port Talbot); 3, J. Egan (Port Talbot); 4, C. Curtis (Swindon). Sweettails: 1, J. Egan (Port Talbot); 2, K. Fellows (Swindon); 3, P. Andrews (Reading); 4, R. Collier (Swindon). Mollies: 1, P. Andrews (Reading); 2, Mrs. Grace (N. Wilt); 3 and 4, M. Stanley (Swindon). A.O.V. Livebearers: 1, C. Tonna (Reading); 2, P. Andrews (Reading); 3, Mrs. S. Walters (N. & D.A.S.); 4, R. Collier (Swindon). Barbs up to 7cms: 1 and 2, C. Tonna (Reading); 3, Mrs. E. Perkins (Port Talbot); 4, D. Ford (Bracknell). Barbs over 7cms: 1, J. Egan (Port Talbot); 2, P. Andrews (Reading); 3, C. Tonna (Reading). Hemirhamphus: 1, G. Perrett (Reading); 2, Mrs. E. Perkins (Port Talbot); 3, Mrs. S. Walters (N. & D.A.S.); 4, W. Gipsone (W.S.M.). A.V.O. Characins: 1, D. Ford (Bracknell); 2 and 4, P. Andrews (Reading); 3, P. E. Stoodley (Leamington). Siamese Fishery: 1 and 4, C. E. Curtis (Swindon); 2, R. Perkins (Port Talbot); 3, P. Vernon (Reading). A.O.V. Anabantids: 1, N. Lambshaw (Swindon); 2, C. Tonna (Reading); 3, P. Grimes (Leamington); 4, D. Davey (Swindon). Corydoras and loaches: 1, Mrs. N. L. Ralph (Swindon); 2, G. Ford (Bracknell); 3, C. Tonna (Reading); 4, P. Armstrong (Bracknell). A.O.V. Catfish: 1, P. G. Stoodley (Leamington); 2, W. Gipsone (W.S.M.); 3, C. Tonna (Reading); 4, P. A. Gipsone (W.S.M.). Boies and True Loaches: 1, N. Bekker (Nantes); 2 and 3, M. Panton (W.S.M.). Rasbora: 1 and 4, P. G. Stoodley (Leamington); 2, Mrs. E. Perkins (Port Talbot); 3, C. Tonna (Reading). Danios and Minnows: 1, C. Tonna (Reading); 2, P. Andrews (Reading); 3, J. Grimes (Leamington). Labors and Sharks: 1, N. Bekker (Nantes); 2, R. Collier (Swindon); 3, N. Curry (North Avon); 4, D. Davey (Swindon). Dwarf Cichlids: 1, D. Ford (Bracknell); 2, Mrs. E. Perkins (Port Talbot). Angels: 1, J. Egan (Port Talbot); 2, R. Collier (Swindon); 3, K. Geese (North Wilt). Rift Valley Cichlids: 1 and 3, G. Perrett (Reading); 2, D. Ford (Bracknell); 4, S. Grimes (Leamington). A.O.V. Cichlids: 1, J. Egan (Port Talbot); 2, N. Lambshaw (Swindon); 3, D. Davey (Swindon); 4, B. and J. Quinn (North Wilt). Toothcarps: 1, P. Grimes (Leamington); 2, R. Collier (Swindon). A.V. Pairs (Livebearers): 1, C. Tonna (Reading); 2 and 4, P. Andrews (Reading); 3, K. Fellows (Swindon).

From Aquarists' Societies

A.V. Pairs (Egglayers): 1 and 2, D. Ford (Bracknell); 3, K. Fellows (Swindon); 4, P. Andrews (Reading). Breeders (Livebearers): 1, C. Tonna (Reading). Breeders (Egglayers): 1, D. Ford (Bracknell); 2, J. Clapstone (W.S.M.); 3, N. Curry (North Avon); 4, Mrs. E. Perkins (Port Talbot). A.V. Fish Junior: 1 and 4, Miss E. Fellows (Swindon); 2, Miss S. Ralph (Swindon); 3, Carmel Tonna (Reading). Shubunkins: 1 and 2, R. H. Thackway (Reading); 3, K. Fellows (Swindon); 4, P. Grimes (Leamington). Single Tail Goldfish: 1 and 2, M. Dibble (Nantes); 3, P. Grimes (Leamington); 4, M. Panton (W.S.M.). Twin Tail Goldfish: 1, Mr. and Mrs. Glover (Swindon); 2 and 3, P. Grimes (Leamington). A.V. Pond or River Fish: 1, P. Grimes (Leamington); 2, G. Perrett (Reading). Best Pairs: D. Ford (Bracknell). Best Breeders: Derek Ford (Bracknell). Best Goldwater: R. H. Thackway (Gloscester). Best Society: Reading Swindon A.S. would like to thank all those who contributed to make this a successful event. 1984 open show is on 2nd June.

SOUTH EAST



THE July S.P.A.S.S. meeting was divided into two sections. After welcoming a new member, Dave Brooks chaired a general post open show Forum with the audience discussing last week's event and making suggestions for next year. The rest of the evening was dedicated to Lily Grey, aided by projectionist for the night Eric Franklin, gave a slide presentation of her recent trip to Japan and some beautiful pictures of her own fish at home. Mr. Mike Caldwell kindly brought along some examples of adult imported stock and British bred youngsters, which were all showing good colour and growth. South Park Aquatic (Study) Society specialises in coldwater fish-keeping and meets at 8 p.m. on the third Tuesday of every month at the Wimbledon Community Centre, St. George's Road, London SW19. New members and visitors always welcome.

Full details from: Mrs. Marguerite Dudley, 163 South Park Road, Wimbledon, London SW19 8RX. (Tel: 01-940 5662).

South Park Aquatic (Study) Society held their annual open show on 18th June at the usual venue of Wimbledon Community Centre. The event attracted a large entry of Fancy Goldfish, Koi, Native and Foreign fish plus a wide variety of plants. Results were as follows: Veiltail: 1 and 4, B. Cook; 2, E. R. Metcalf; 3, D. R. Piza. Bristol Type Shubunkin: 1, B. Cook; 2, G. Bell; 3 and 4, G. King. Globe-Eye: 1 and 2, M. Dudley. Bream-head: 1 and 3, J. A. Pollard; 2, A. Field; 4, S. Herman. Bubble Eye: 1, E. R. Metcalf; 2 and 4, D. Morgan; 3, S. L. Greenham. Channa: 1, D. Morgan; 2, E. R. Metcalf. Pom Pom: 1, 2 and 3, J. A. Pollard; 4, S. L. Greenham. Parrotfish: 1, J. A. Pollard; 2, M. Dudley; 3, R. S. Williams; 4, P. Whittington. Common Goldfish: 1, R. H. Read; 2, 3 and 4, Dave "MAC" Mackay. London Shubunkin: 1, 2 and 3, P. Whittington; 4, J. A. Pollard. Oranda: 1, D. R. Piza; 2 and 4, J. Webster; 3, M. Franklin. Broadtail Moor: 1 and 3, M. Dudley; 2, R. Field. Fantail:

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

J. A. Pollard; 2, R. H. Read; 3, M. Dudley; 4, S. L. Greenham. Comet: 1, Dave "MAC" Mackay; 2, Mrs. Parker; 3, E. Madewy; 4, M. Dudley. Breeders: 1, G. King; 2 and 3, G. Bell; 4, G. King; R. S. Williams. Native and Foreign: 1, J. A. Pollard (Pat Head Minnow); 2, J. A. Pollard (Lutrenis); 3, D. Brooks (Chub); 4, H. Berry (Smelt). Contrivables: 1, E. Franklin (Green Sunfish); 2 and 3, E. Franklin (Pumpkinseed). Koi Under 7 in.: 1, 2 and 4, D. Herman; 3, E. Franklin. Koi Over 7 in.: 1 and 3, D. Herman; 2, D. R. Piza; 4, M. Mcintosh. A.O.V. Fancy Goldfish: 1, M. Dudley (Ryukin); 2, D. R. Piza (Ryukin); 3, J. Bartrip (Brown Oranda); 4, S. L. Greenham (Chocolate Oranda). Rooted Plant: 1, J. A. Pollard (Water Plant); 2 and 3, C. A. Greenham (Willow Plant); 4, M. Dudley (Hornwort). Plant Cuttings: 1 and 3, P. Badsons (Hornwort); 2, D. Brooks (Hornwort); 4, M. Dudley (Hornwort). Floating Plants: 1 and 2, M. Franklin (Druckweed); 3 and 4, D. Morgan (Anolis).

Ilford & District Aquarist & Pondkeepers' Society annual exhibition of fish, on 15th October, at The Lambourne Rooms, Ilford Town Hall, Ilford, Essex. Doors open 2 p.m. (approx).

The Society meets every second Monday of the month at Wanstead Library Hall, Spratt Hall Road, Wanstead. Meetings commence 8 p.m. till 10.30 p.m. There is a raffle and table show at every meeting and talks by various speakers on all subjects of the hobby throughout the year, plus social events. Next year the club celebrates its 50th year when it is hoped a very full agenda of meetings and events will mark this occasion. Anyone interested in joining this society is welcome as a visitor at any meetings or failing that by contacting the membership secretary, L. Smith, 80 Mighall Avenue, Ilford, Essex. The club also encourages junior members, a section which is growing quite steadily.

Southend Leigh and District A.S. would like to thank the many exhibitors, judges and officials who turned up and made our show the most successful to date. We had 691 exhibits (14 Furnished Aquaria & Aquascapes) entered by some 130 exhibitors; 8 stands all viewed by some 400 people during the afternoon. The show was brilliantly organised by the late Dave Cherrington and carried through in his absence by the members of the Society. Winners: Class A: T. Walter. Ak: P. Mills. B: E. Byssouth. Bc: J. Parr. C: J. Parr. Cd: K. Haines. D: S. Summers. Ds: R. Wrenley. Dm: M. Draper. E: R. Scoring. Ea: A. Waller. F: C. Cherrington. Fd: C. Cherrington. G: D. Winder. H: J. Rowney. Ha: D. Winder. J: M. Smith. K: M. Smith. L: D. Winder. La: M. Draper. M: R. Scoring. N: M. Taylor. Nc: T. S. Parnson. O: P. Cox. P: T. Lochlin. Q: J. Parr. R: K. Scoring. S: S. Benjamin. T: P. Scary. U: R. Woodward. V: S. Parnson. W: T. Laughlin. Ws: B. Woodward. Wt: F. Taylor. X: M. D. Ridgwell. Xa: F. Scary. Xb: S. Parnson. Z: P. Mills. Za: T. Gibson. Bb: S. Byssouth. Bc: C. Thomson. U: W. K. Holt. Top Society: Walthamstow. Best Fish: B. Woodward. Best Entry: D. Ridgwell.

A Lecture entitled "The breeding of tropical fish" was the main event of the June meeting of the East Kent Aquatic Study Group. The speaker was local aquatic dealer Mr. Dave Byfield of Field Aquatic Nurseries, Herndon, Canterbury. Dave explained some of the equipment that can be used to rear young fish in the home aquarium and related some of his experiences in spawning and raising various species of fish. Following a tea break there was an auction of pond plants and other fish-keeping gear. This month's table show was for coldwater fish which were judged by Joan and Collins Panel. There were three classes which resulted: Single Tail Goldfish: 1, T. Lynn; 2, D. Bridgman; 3, A. Martin; 4, A.

Epoch, Tropical Goldfish; 1, K. Edwards; 2, A. Hasleford; 3, D. Martin. A.O.V. Goldwater; 1, J. Edwards; 2, C. Mayes; 3, D. Bridgman. The Society's fourth annual exhibition of fishkeeping is to be held at the Memorial Hall, Littlebourne, Canterbury, on 17th and 18th September.

For further details of the exhibition or club meetings ring Canterbury 52982.

MIDLANDS AND WALES



RESULTS of the Llanwrthwl A.S. open show. Barb: 1 and 3, G. Roberts; 2, J. Egan; 4, A. Ibbertson. Character: 1, J. Egan; 2, P. and M. Watts. H/B: Character: 1, C. Turner; 2, J. Egan; 3, A. Parker; 4, K. Perkins. F/W Character: 1, C. Turner; 2, J. Egan. Cichlids: 1, J. Egan; 2, R. N. Price; 3 and 4, P. and M. Watts. Angels: 1, J. Egan; 2, Mr. and Mrs. Perks; 3, P. and M. Watts; 4, E. Newton. Dwarf Cichlids: 1, E. M. Perkins; 2, C. Turner; 3, J. Thompson; 4, C. Martin. Labrynth: 1, C. Turner; 2, P. and M. Watts; 3, D. Williams; 4, R. G. Collins. Fishers: 1, R. Morgan; 2, R. G. Collins; 3, D. Williams; 4, A. Ibbertson. Catfish: 1, P. and M. Watts; 2, Mr. and Mrs. Perks; 3, J. Egan; 4, K. G. Collins. Corydoras: 1, J. Egan; 2, G. Roberts; 3, E. M. Perkins; 4, A. Ibbertson. Redstart: 1, C. Turner; 2, D. Lewis; 3, E. M. Perkins; 4, D. Williams. Danios: 1, J. Egan; 2, D. Williams; 3 and 4, A. Ibbertson. Loaches: 1, C. Turner; 2, Mr. and Mrs. Perks; 3, D. Lewis. A.O.S. Raguier: 1, A. Parker; 2, Mr. and Mrs. Perks; 3, G. Roberts. Sword Plant: 1, Mr. and Mrs. Perks; 2, C. Martin; 3 and 4, P. Breakspere. Guppy (Male): 1, R. G. Collins; 2 and 4, P. and M. Watts; 3, S. Perkins. Guppy (Female): 1, J. Egan; 2, C. Turner; 3, P. and M. Watts; 4, J. Thompson. Swordfish: 1, Mr. and Mrs. Perks; 2, J. Egan; 3, D. Lewis; 4, D. Williams. Flats: 1, E. Newton; 2, J. Thompson; 3, R. Perkins; 4, A. Ibbertson. A.O.S. (Labyrinth): 1, A. Parker; 2, D. Lewis; 3, C. Turner; 4, R. Morgan. Zaner: 1 and 3, E. Newton; 2, A. Samuel; 4, C. Collins. Breeder (Guppies): 1 and 2, C. Martin; 3, E. Newton; 4, G. Lewis. Breeder (Livebearer): 1, C. Turner; 2, E. Newton; 3, D. Lewis; 4, J. Thompson. Goldfish: 1 and 4, P. and M. Watts; 2 and 3, C. Turner. A.O.V. Goldwater: 1, C. Martin; 2, C. Turner; 3, P. Breakspere; 4, A. Samuel. Best Fish in Show: C. Turner—Belonia Hasseli.

Kettering Tropical Fish Club held its open show on Sunday, 10th April. Results are as follows: Class 1: 1, J. Richard (Leicester); 2 and 3 Mrs. D. Crutchbank (Hendon); 4, R. Smith (Leicester). 2a: 1, J. Richard; 2, E. Davies; 3, Mrs. Wainwright (Leicester); 4, M. Such (Kettering). 2b: 1 and 4, J. Richard; 2, K. Haines (Ipswich); 3, Mrs. Wainwright. 2c: 1, 2 and 4, E. Davies; 3, R. Standforth (Kettering). 3a: 1, J. Mayle (Northampton); 2, A. Irons (Kettering); 3 and 4, C. Wright (Kettering). 3b: 1, C. P. Swain (Northampton); 2, P. E. Riley (Barnet); 3, A. Irons; 4, P. Crumpton (Halesowen). 3c: 1, T. Hudson (Halesowen); 2, G. Crumpton (Halesowen); 3, S. Vickers (Kettering); 4, A. Walter. 3d: 1, S. Vickers (Kettering); 2, M. Such (Kettering); 3, N. Craddock (Kettering); 4, R. Vickers (Kettering). 4a: 1, K. Haines; 2, N. Craddock; 3, A. Craggs (Kettering); 4, J. Mayle. 4b: 1, G. Wooley (Corby); 2 and 3, Mr. Laughlan (Haringey); 4, P. Tricker. 5: 1, 2 and 4, G. Crumpton; 3, G. Hoes (Bedford). 6: 1, J. Mayle; 2 and 4, C. Larman and P. Burton (C.A.G.B.); 3, T. Crutchbank (Hendon). 7: 1, Mr. B. Cox (Wellingborough); 2, J. Richard; 3, R. Rendell; 4, G. Sheppard (Kettering). 8: 1 and 2, E. Davies; 3, Mr. B. Cox; 4, Miss H. L. Sheriff (Wellingborough). 9: 1,

D. Konarski (Wellingborough); 2, N. Craddock; 3, K. Haines; 4, M. & B. Cox. 10: 1, R. Smith; 2, T. Sheppard (Kettering); 3, M. & B. Cox; 4, G. Crumpton. 11: 1, E. Davies; 2, J. Mayle; 3, G. Hoes; 4, R. Bryan (Kettering). 12a: 1, T. Ward (Wellingborough); 2 and 3, R. Smith; 4, T. Ward. 12b: 1, T. Ward; 2 and 3, G. Hemmings; 4, T. Laughlan. 13: 1, R. Bryan (Kettering); 2, R. Standforth (Kettering); 3 and 4, D. Wright (Kettering). 14: 1, R. Wilkinson (Northampton); 2, J. Mayle; 3, Mrs. Wainwright; 4, A. Walter. 15: 1, A. Walter; 2, T. Ward; 3, R. Vickers; 4, H. Craggs (Kettering). 16: 1, J. Richard; 2, S. Furusudon (Walthamstow); 3, N. Craddock; 4, D. & P. Lambert. 17a: 1, E. Davies; 2, Mrs. D. Crutchbank; 3, Mr. Laughlan; 4, B. Such (Kettering). 17b: 1, J. Mayle; 2, D. P. Lambert; 3, Mayle; 4, M. & B. Cox. 18a: 1 and 3, G. Hemmings; 2, Mrs. Wainwright. 18b: 1 and 3, D. & P. Lambert; 2 and 4, J. Mayle. 19: 1, B. Tucker (Leicester); 2, Mrs. G. Parker (Wellingborough); 3 and 4, A. Burton (Wellingborough). 20: 1, B. Tucker; 2, T. Hudson; 3, M. Wright (Bedford Green); 4, Mr. Laughlan. 21: 1, N. Craddock; 2, M. Wright; 3, T. Hudson; 4, A. Burton.

Best Fish in Show: M. & B. Cox, Best Raguier; M. & B. Cox, Best Livebearer; R. Wilkinson, Best Cichlid; J. Mayle, Best Goldwater; N. Craddock, Best Plant; J. Mayle, Best Hood; D. & P. Lambert, judged by Association of Aquarist Standards, 492 Fish Beaches.

EAST



LAST month St. Edmundsbury and District A.S. held an exhibition in the town. It was the second year this had been run.

On show were some 150 of the club members fish. There was also equipment for sale from a local aquatic retailer and a few other stands manned by members giving advice on fish-keeping, aquatic plants, etc. A tonbola and 'guess the weight of the cake' stand added a more jovial air to the proceedings. Club members were asked to put in furnished tanks to be judged by the public by filling in a simple form. The winning tank owner received a cup donated by a local company. The club made an entrance charge and advertised the event which to everyone's surprise attracted just over 700 people. Many more than had been expected.

What was found most interesting was that the club has some fifty members, but that there appeared to be some 300 other fishkeepers in the town that were not members, many of whom did not even know of the club's existence. Larger premises may be sought for next year and it is hoped to involve more of the local businesses in the exhibition.

NORTH



Gateshead A.S. tropical fish show held at Gateshead Leisure Centre on Sunday, 12th July. We had over 400 entries and the day went well. Class B: 1, D. Russell (Stanley); 2, J. D. Taylor (Caer Urf); 3, F. Bell (Stanley); 4, W. Taylor (Novos). Bx: 1, T. Bell (Stanley); 2, A. Bell (Gateshead); 3, J. McCutcheon (Gateshead); 4, R. Young (Gateshead). C: 1 and 3, A. Bell (Gateshead); 2, P. Barrow (Gateshead); 4, D. Wilson (Redcar). Cr:

1, T. Sayer (Stanley); 2, Mr. & Mrs. Zamir (Bishop Auckland); 3, P. Kelly (Newton Aycliffe); 4, J. and L. Wilson (Redcar). C: 1, J. Middleton (Stanley); 2, K. Barrow (Gateshead); 3, J. A. Chapman (Darlington); 4, R. Brogan (Bishop Auckland). Da: 1, D. Morgan (Newton Aycliffe); 2, E. and C. Hargreaves (Newton Aycliffe); 3, L. Burda (Hexham); 4, M. Hall (Newton Aycliffe). Db: 1, D. P. Johnson (Redcar); 2, S. King (Redcar); 3, W. Sibbey (Ind.); 4, J. and L. Wilson (Redcar). Dc: 1 and 3, E. Hobson (Ind.); 2, C. Perry (Darlington); 4, J. Conner (Gateshead). D: 1, E. Robinson (Greworth); 2, J. and L. Wilson (Redcar); 3, Mr. and Mrs. Rodway (Darlington); 4, J. S. Godfrey (Sunderland). Ea: 1, S. King (Redcar); 2, J. and L. Wilson (Redcar); 3, L. Bueker (Hexham); 4, J. Priestley (Stanley). E: 1, M. Hall (Newton Aycliffe); 2, D. Burns (Novos); 3, S. Tipper (Redcar); 4, A. Richardson (Gateshead). F: 1 and 2, P. Barrow (Gateshead); 3, Mr. and Mrs. Zamir (Bishop Auckland); 4, J. and L. Wilson (Redcar). G: 1 and 3, R. Barrow (Gateshead); 2, J. D. Taylor (Caer Urf); 4, D. P. Johnson (Darlington). H: 1, F. Bell (Stanley); 2 and 4, S. and R. Kirkop (Caer Urf); 3, G. Temperley (Hartley). J: 1, A. Richardson (Gateshead); 2 and 3, R. Brogan (Bishop Auckland); 4, A. Bell (Gateshead). K: 1, J. McCutcheon (Gateshead); 2, J. and L. Wilson (Redcar); 3, S. King (Redcar); 4, T. Bell (Stanley). L: 1, S. Tipper (Redcar); 2, S. and R. Kirkop (Caer Urf); 3, J. Brady (Helm); 4, D. Turnbull (Hartley). M: 1, D. Morgan (Newton Aycliffe); 2, J. Carter (Ind.); 3, Mr. and Mrs. Rodway; 4, J. and L. Wilson (Redcar). M: 1, P. Barrow (Gateshead); 2, F. Bell (Stanley); 3, E. Jacob (Throckley); 4, M. Hall (Newton Aycliffe). N: 1, F. Bell (Stanley); 2, A. Bell (Gateshead); 3, R. Hainshy (Gateshead); 4, A. Morrison (Greworth). Not: 1, M. Conway (Helm); 2, D. Burns (Novos); 3, N. Forster (Bishop Auckland); 4, M. Hepton (Sunderland). O: 1, J. Priestley (Stanley); 2, R. Brogan (Bishop Auckland); 3, Mr. and Mrs. Roe (Bishop Auckland); 4, D. Clark (Hexham). P: 1, 2 and 3, N. Boot (Leicester); 4, G. Temperley (Hartley). Q: 1, 2 and 4, T. Tomson (Ind.); 3, T. Bell (Stanley). R: 1, T. Sayers (Stanley); 2, S. King (Redcar); 3, N. Boot (Leicester); 4, D. Russell (Stanley). S: 1, S. Kelly (Newton Aycliffe); 2, G. Bainbridge (Ind.); 3, R. Hughes (Anfield Plain); 4, R. Horsley (Bishop Auckland). T: 1, T. Sayers (Stanley); 2, J. A. Chapman (Darlington); 3, L. Bueker (Hexham); 4, J. A. Chapman (Darlington). U: 1, Mr. and Mrs. Roe (Bishop Auckland); 2, Mr. and Mrs. McGregor (Billingham); 3, B. Jameson (Ind.); 4, N. Boot (Leicester). V: 1, D. Clark (Hexham); 2, R. Scott (N.C.P.F.A.S.); 3, Hylton Castle Junior School; 4, Mr. and Mrs. Roe (Bishop Auckland). W: 1 and 4, D. Clark (Hexham); 2, J. Wood (Ind.); 3, J. Brady (Helm). X: 1, F. Bell (Stanley); 2, Roe and Clark (Bishop Auckland); 3, Mr. and Mrs. Rodway (Darlington); 4, J. and L. Wilson (Redcar). Y: 1, J. Priestley (Stanley); 2, M. Hepton (Sunderland); 3, S. and R. Kirkop (Caer Urf); 4, F. Bell (Stanley). Z: 1, J. Hunter (Gateshead); 2, R. Bell (Houghton); 3 and 4, Mr. and Mrs. McGregor (Billingham). Zoographic: 1, Mr. and Mrs. Zamir (Bishop Auckland); 2, Mr. and Mrs. Rodway (Darlington); 3, P. Barrow (Gateshead); 4, Mr. and Mrs. Zamir (Bishop Auckland). Zoology: 1, Rilla Malmwood; 2, Donna Laughlan; 3, Nicola Luke; 4, Christopher Lee. Painting, Kelvin Grove Junior School; 5, Christine, Gillingham; 2, Simone Davis; 3, Glen Forster; 4, Philip Rotherford. Best Society: Stanley A.S. Best Exhibitor: F. Bell (Stanley). Best in show: T. Sayers (Stanley).

THE result of Alfreton & District A.S. 17th annual open show held on Sunday the 19th June, 1983 was as follows. Section A Guppies—Males: 1 and 2, Mr. and Mrs. Hooley (Workshop); 3, M. Darlington (Alfreton). Females: 1, 3 and Section Winner, Mr. and Mrs. Pickford (H.C.A.G.); 2, D. Baker (Wyle). Section B Livebearers—Flats: 1, Mr. and Mrs. Lloyd (Workshop); 2, Mr. and Mrs. Course (Workshop); 3, B. Sharp (Bradford). Swordfish: 1 and 3, P. Draycott (A & IV); 2, M. Lake (I & E Louth). Mollus: 1 and 2, Mr. and Mrs. Lloyd (Workshop); 3, F. Draycott (A & D). A.O.V.: 1 and Section Winner, Mr. and Mrs. Silk (S.J.S.); 2, Mr. and Mrs. Hooley (Workshop); 3, M. Johnson (S.J.S.). Section C

Barbs—Small: 1, A. Smart (Chesterfield); 2, Mr. and Mrs. Pickford (H.C.A.G.); 3, Mr. and Mrs. Farrow (Lincoln). Large: 1 and Section Winner, Mr. and Mrs. Lloyd (Workop); 2, Mr. and Mrs. Howell (A & D); 3, A. Marples (A & D). Section D Characters—Small: 1, 3 (Grimsby & Cleethorpe); 2, R. Laverick (Wyke). Large: 1, L. Barker (Wyke); 2, F. Draycott (A & D); 3, Mr. and Mrs. Course (Workop). Section E Tooth Carps, Minnows and Danios—Kilifish: 1, 3 and Section Winner, Mr. and Mrs. Lake (Grimsby & Cleethorpe); 2, F. Draycott (A & D); 3, Minnows and Danios: 1 and 2, Mr. and Mrs. Lake (Grimsby & Cleethorpe); 3, I. & A. Johnson (Wyke). Section F Sharks and Foxes—Bardow: 1, 3 and Section Winner, Mr. and Mrs. Howell (A & D); 2, Mr. and Mrs. Howell (A & D); 3, B. Morrill (A & D). Rainbow: 1 and Section Winner, H. Thorpe (Doncaster); 2, Mr. and Mrs. Lake (Grimsby & Cleethorpe); 3, Mr. and Mrs. Howell (A & D). Section G Cichlids—Dwarf: 1, B. Morrill (A & D); 2, Mr. and Mrs. Beckenbury (H.C.A.G.); 3, Mr. Brown (A & D). Large: 1, Section Winner and Best in Show, Mr. and Mrs. Lloyd (Workop); 2, L. Barker (Wyke); 3, Mr. Brown (A & D). Angels: 1, Mr. and Mrs. Howell (A & D); 2 and 3, P. Greenes (No Society). Rift: 1, Mr. and Mrs. Lake (Grimsby & Cleethorpe); 2, P. Jackson (Keighley); 3, K. Whittington (Grimsby & Cleethorpe). Section H Catfish and Loaches—Corydoras and Brochis: 1, Mr. and Mrs. Lloyd (Workop); 2, Mr. and Mrs. Howell (A & D); 3, Mr. and Mrs. Hooley (Workop). A.O.V. Catfish: 1, Mr. and Mrs. Howell (A & D); 2, F. Draycott (A & D); 3, P. Greenes (No Society). Loaches: 1 and Section Winner, Mr. and Mrs. Hooley (Workop); 2, Mr. and Mrs. Cunn (Grimsby & Cleethorpe); 3, G. Jones (A & D). Section I Anabantids—Fighters: 1 and Section Winner, Mr. and Mrs. Beckenbury (H.C.A.G.); 2, Mr. and Mrs. Bradbury (H.C.A.G.); 3, Mr. and Mrs. Pickford (H.C.A.G.). Small: 1 and 3, Mr. and Mrs. Howell (A & D); 2, F. Draycott (A & D). Large: 1, Mr. and Mrs. Howell (A & D); 2, D. Baker (Keighley); 3, A. Bramell (Loughborough). Section J A.O.V.—Freshwater: 1, Mr. and Mrs. Silk (S.J.S.); 2, Hodgson and Jackson (S.O.D.I.T.); 3, Mr. and Mrs. Howell (A & D). Marine: 1, 2 and Section Winner, P. Martin (Kilnston); 2, Mr. Page (Stretley). Section K Pairs—Regulators: 1, 2 and Section Winner, Mr. and Mrs. Lake (Grimsby & Cleethorpe); 3, Mr. and Mrs. Howell (A & D). Livebearers: 1 and 3, F. Draycott (A & D); 2, Mr. and Mrs. Lloyd (Workop). Section L Junior—A.O.V.: 1, J. Johnson (S.J.S.); 2, K. Johnson (S.J.S.); 3, S. Taylor (Wyke). Section M Coldwater—Goldfish: 1, Mr. and Mrs. Silk (S.J.S.); 2, Mr. and Mrs. Allard (A & D); 3, K. and J. Johnson (Wyke). Stubbsianus and Fancy Goldfish: 1 and Section Winner, Mr. and Mrs. Cunn (Grimsby & Cleethorpe); 2 and 3, Mr. and Mrs. Silk (S.J.S.). A.O.V.: 1, Mr. and Mrs. Silk (S.J.S.); 2, C. Taylor (Wyke); 3, P. Greenes (No Society). Section N Breeders—Egglayers (1 and 2): 1 and Section Winner, Mr. and Mrs. Hooley (Workop); 2, A. Marples (A & D); 3, P. Jackson (Keighley). Egglayers (3 and 4): 1, Mr. and Mrs. Beckenbury (H.C.A.G.); 2, K. Whittington (Grimsby & Cleethorpe). Livebearers (3 and 4): 1, M. Johnson (S.J.S.); 2, F. Draycott (A & D); 3, K. Prendergast (Boston). Livebearers (3 and 4): 1, F. Draycott (A & D); 2, M. Johnson (S.J.S.); 3, M. Cook (Wyke). Section O Novice: 1, 2 and Section Winner, Mrs. Sharp (Bradford); 3, C. McHale (Lincoln). Section P Furnished Aquaria—Mini Jars: 1, 2 and Section Winner, Mr. and Mrs. Hooley (Workop); 3, Mr. and Mrs. Beckenbury (H.C.A.G.). Plantes: 1, Mr. and Mrs. Beckenbury (H.C.A.G.); 2, Mr. and Mrs. Pickford (H.C.A.G.); 3, Mr. and Mrs. Howell (A & D). Section Q Gaining Most Points: A & D Fishkeepers.

Allison & District A.S. would like to thank all who attended the show.

DUE to unforeseen circumstances this month's meeting of the West Yorkshire Marine Aquarist Group had to be re-arranged. Once again our Secretary, Steve Preston filled the gap with a lecture plus slides on the subject of "Oddballs in a marine tank". The reasons for coming into this category are many, from looks, habits, to dangers. Sometimes one or more, even all of the reasons come in the same "fish". Some of the fish

carry a powerful sting and Steve finished up with some very definite warnings, octopus being probably the most dangerous, and lionfish being the most common to come into the category of "oddball".

RESULTS of the Northwich & District A.S. open show held on 12th June. (Japan): 1, A. M. Redman (BL); 2, M. Daniels (BL); 3, Mr. and Mrs. Eastough (SA). Swedish: 1 and 2, Mr. and Mrs. Marshall (MR); 3, Mr. and Mrs. Prescott (RU). Mollies: 1, J. Lynch (MR); 2, P. A. and J. B. Jones (WR); 3, Mr. and Mrs. Daniels (BL). Platies: 1, T. Anson (ELL). A.O.V. (Livebearers): 1 and 3, P. Edwards (ELL); 2, J. Lynch (MR). Small Barbs: 1 and 2, Mr. and Mrs. Marshall (MR); 3, S. A. Graham (BRA). Large Barbs: 1, S. Whiting (NOST). 2, Mr. and Mrs. Baldwin (SA); 3, D. Price (ELL). Small Characters: 1, D. T. Milner (DA); 2, S. A. Graham (BRA); 3, Mr. and Mrs. Bibby (SA). Large Characters: 1, R. I. Payne (MR); 2, Mr. and Mrs. Eastough (SA); 3, Mr. and Mrs. Daniels (BL); 4, Mr. and Mrs. Daniels (BL); 5, C. A. Daniels (BL); 6, M. Daniels (BL). Small Anabantids: 1, D. T. Milner (DA); 2, M. and D. Hartley (SA); 3, S. and A. Graham (BRA). Large Anabantids: 1, Mr. and Mrs. Baldwin (SA); 2, Mrs. Baldwin (SA); 3, M. and D. Hartley (SA). Angels: 1, F. and S. Spencer (PR); 2, C. and A. Daniels (BL); 3, E. Whittington (RU). Fitz Valley Cichlids: 1, Mr. and Mrs. Eastough (SA); 2, Mr. and Mrs. Baldwin (SA); 3, R. Wilson (ST HE). Dwarf Cichlids: 1, Mr. and Mrs. Baldwin (SA); 2, R. I. Payne (MR); 3, F. and S. Spencer (PR). Cichlids: 1, Mr. and Mrs. Bibby (SA); 2, M. and D. Hartley (SA); 3, F. and S. Spencer (PR). Danios and Minnows: 1, Mr. and Mrs. Baldwin (SA); 2, D. T. Milner (DA); 3, D. Price (ELL). Rainbow: 1, R. I. Payne (MR); 2, B. Wilson (ST HE); 3, Mr. and Mrs. Baldwin (SA). Sharks: 1 and 2, Mr. and Mrs. Baldwin (SA); 3, Mr. and Mrs. Eastough (SA). Foxes: 1, R. I. Payne (MR); 2, E. Whittington (RU); 3, L. Holden (DA). Corydoras and Brochis: 1, J. Lynch (MR); 2 and 3, Mr. and Mrs. Baldwin (SA). A.O.V. Catfish: 1 and 3, J. T. Morris (SA); 2, Mr. and Mrs. Baldwin (SA). Loaches and Botias: 1, Mr. and Mrs. Bibby (SA); 2 and 3, Mr. and Mrs. Baldwin (SA). African Killifish: 1 and 3, D. Parkinson (ST HE); 2, R. I. Payne (MR). A.O.V. Killifish: 1, S. Tomlinson (MACC). Tropical: 1, S. A. Graham (BRA); 2, Mr. and Mrs. Peached (ST HE); 3, Mr. and Mrs. Eastough (SA). Pairs (Livebearers): 1, Mr. and Mrs. Baldwin (SA); 2, P. Edwards (ELL); 3, H. Buckley (NO). Pairs (Egglayers): 1 and 3, J. T. Morris (SA); 2, Mr. and Mrs. Baldwin (SA). Breeders (Livebearers) A-O: 1, Mr. and Mrs. Marshall (MR); 2, J. Lynch (MR); 3, R. and B. Cannon (WR). Breeders (Egglayers) A-B: 1, B. Wilson (ST HE); 2, D. T. Milner (DA); 3, Mr. and Mrs. Eastough (SA). Breeders (Egglayers) C-D: 1 and 2, D. T. Milner (DA); 3, K. Rawthorne (MR). Common Goldfish: 1 and 2, Mr. and Mrs. Bibby (SA); 3, C. A. Daniels (BL). Fancy Goldfish: 1, Mr. and Mrs. Bibby (SA); 2 and 3, J. S. Greenwell (PR). A.O.V. Coldwater: 1, Mr. and Mrs. Baldwin (SA); 2, D. Parkinson (ST HE). Junior Livebearers: 1, Miss J. Baldwin (SA); 2, M. Walters (ELL). Junior Egglayers: 1 and 2, D. Hartley (SA); 3, J. Baldwin (SA). Mini Jars: 1 and 2, D. T. Milner (DA); 3, H. Buckley (NO).

Key to Societies: (BL) Blackpool; (BR) Bradwell; (DA) Darwen; (ELL) Ellensworth Park; (MACC) Macclesfield; (MR) Mersy-side; (NOST) North Staffs; (NO) Northwich; (PR) Preston; (RU) Runcorn; (SA) Sand-grounders; (ST) St. Helens; (WR) Wrexham.

Total number of entries: 326.
Major Trophy winners: Thorne Trophy (Best Fish in Show): Mr. and Mrs. Eastough (Sandgrounders). Russell Allen Trophy (Best Livebearer): Mr. and Mrs. Marshall (Mersy-side). Sandway Trophy (Best Barb): Mr. and Mrs. Marshall (Mersy-side). Castle Trophy (Best Character): D. T. Milner (Darwen). Hartford Trophy (Best Anabantid): Mr. and Mrs. Baldwin (Sandgrounders). Darwen Trophy (Best Cichlid): Mr. and Mrs. Eastough (Sandgrounders). Warrington Trophy (Best Danio, Minnow or Rainbow):

Mr. and Mrs. Baldwin (Sandgrounders). C. and S. Yates Trophy (Best Sharks or Fox): R. I. Payne (Mersy-side). Hyland Trophy (Best Catfish, Loach or Botia): J. T. Morris (Sandgrounders). Bushbush Trophy (Best Killifish): D. Parkinson (St. Helens). Mid-Cheshire Trophy (Best A.O.V. Tropical): S. A. Graham (Bradwell). Barton Trophy (Best Pair of Fish): J. T. Morris (Sandgrounders). Benny Trophy (Best Breeders Exhibit): B. Wilson (St. Helens). Harry Buckley Trophy (Best Coldwater Fish): Mr. and Mrs. Bibby (Sandgrounders). Paul Connolly Trophy (Best Junior Exhibit): D. Hartley (Sandgrounders). Marbury Trophy (Best Mini-Jar): D. T. Milner (Darwen). Interpet Trophy (Society gaining most points): Sandgrounders. King British Trophy (Nordic, with member with most points): H. Buckley.

SCOTLAND



AFTER the A.G.M. of the Inverness and D.A.S. held on 8th May, 1983 the following were elected Office bearers: President Ian Bus, 34 Maxwell Drive, Inverness, Tel: 222778. Vice-President: Frank Hill, 12 Gengary Road, Inverness, Tel: 236904. Secretary: Bobby Marshall, 41 Windsor Place, Conon Bridge, Inverness, Tel: 237610. Treasurer: Alison Fraser, 7 Abertarf Road, Inverness, Tel: 237610.

The Society meets on the last Monday of the month from August to May in the Central School at 8 p.m. All visitors welcome.

AT the Arbroath A.S. annual open show held on Sunday, 6th June, there was a total entry of 484 exhibits with the results being as follows: Guppies (Male): 1, Henry Hoyle (D); 2, 3 and 4, 1. Hampton (P). Guppies (Female): 1, K. Smith (F); 2 and 3, C. Brien (M); 4, 1 and M. Gilchrist (S). Swords (Male): 1, D. D. and Walker (N); 2, D. MacFarlane (S); 3, J. and M. Gilchrist (S); 4, S. Craig (K). Swords (Female): 1, M. Walker (HAP); 2, J. Milligan (B); 3, J. Wells (D); 4, 1 and M. Gilchrist (S). Mollies (Male): 1 and 3, J. Steven (A); 2, S. Craig (K); 4, J. Kennedy (M). Mollies (Female): 1, 2 and 3, J. Steven (A); 4, J. Kennedy (M). Platies (Male): 1, J. Currie (D); 2 and 3, J. Steven (A); 4, J. Wells (D). Platies (Female): 1, J. Currie (D); 2 and 3, J. Currie (D); 4, J. Steven (A). A.O.V. Live (Male): 1, M. Kyle (DCC); 2, R. Fleming (DCC); 3, J. Steven (A); 4, W. Brown (K). A.O.V. Live (Female): 1, S. Dwyer (K); 2, W. Brown (K); 3 and 4, M. Walker (HAP). Characters (A): 1, D. Dobbie (D); 2, J. Fettes (Ab); 3, T. Ramsay (Sc); 4, D. D. and Walker (N). Characters (B): 1, 2 and 4, T. Ramsay (Sc); 3, D. Dobbie (D). Characters (C): 1, H. Laid, 2, J. Johnson (Sc); 3, B. Fleming (DCC); 4, F. McNeil (D). Barbs (A): 1 and 2, J. Mitchell (K); 3, T. Ramsay (Sc); 4, J. Milligan (B). Barbs (B): 1, P. Allan (M); 2, F. McNeil (D); 3, G. Talbot (F); 4, H. Rose (D). Dwarf Cichlids: 1, A. Longmore (F); 2, H. Rose (D); 3, V. Downie (N); 4, J. Fettes (Ab). Large Cichlids (N.W.): 1, J. Johnson (Ab); 2, J. Hampton (F); 3, J. McCollum (F). Large Cichlids (O.W.): 1, MacDonnell (F); 2, F. McNeil (D); 3, W. McFarquhar (Ab); 4, J. Johnson (Sc). Siamese Fighters: 1 and 4, T. Ramsay (Sc); 2, R. Shaw (A); 3, J. and M. Gilchrist (S). Trichogaster Sp.: 1, G. Talbot (F); 2, D. Long (D); 3, K. Johnson (D); 4, W. Arthur (M). Colisa Species: 1, T. Ramsay (Sc); 2, D. Long (D); 3, G. Talbot (F); 4, K. Johnson (D). A.O.V. Anabantid: 1, M. Kyle (DCC); 2, J. Johnson (Sc); 3, C. Brien (K); 4, R. Shaw (A). Corydoras: 1 and 2, J. Makin (S); 3 and 4, A. Scott (N). A.O.V. Catfish: 1, D. D. and Walker; 2, S. Hood (S); 3, G. I. Talbot (F); 4, J. Steven (A). Loaches: 1, J. Makin (S); 2, A. Longmore (F); 3 and 4, D. D. and Walker (N). Danios: 1 and 2, J. Wells (D); 3, C. Brien (K); 4, S. Booth (G). Rainbow: 1, J. Wells (D); 2, T. Ramsay (Sc); 3, D. D. and Walker (N); 4, J. Fettes (Ab).

Sharks: 1, Durie and Walker (N); 2, J. Wells (D); 3, Dune and Walker (N); 4, J. Sayers (G); Minnows: 1, J. Wells (D); 2, H. Hoey (D); 3, Durie and Walker (N); 4, C. Bore (M); Killies: 1 and 4, J. Stevens (A); 2, A. Robertson (RKA); 3, Durie and Walker (N). A.O.V. (Ragwort): 1, D. Long (D); 2, 3 and 4, J. McCullum (P). Pairs (Live): 1, T. Geare (SMT); 2, M. Walker (EAP); 3, H. Hoey (D); 4, H. Shields (EAP). Pairs (Egg): 1, J. Wells (D); 2, J. Davidson (N); 3 and 4, T. Ramsay (Sc). Breeders (Guppies): 1, J. Wells (D); 2, T. Ramsay (Sc); 3, W. Reid (C); 4, D. Long (D). Be. Plates: 1, J. Wells (D); 2, M. Gavig (K); 3, J. and M. Gilchrist (S). Br. Molles: 1, J. Stevens (A); 2, K. Smith (F); 3, D. Dobbie (D). Br. Swords: 1, D. Long (D). Br. A.O.V. (Live): 1, W. Brown (K); 2, H. Shields (EAP); 3, T. Ramsay (Sc); 4, J. Stevens (A). Br. (Egg) D: 1 and 4, J. and M. Gilchrist (S); 2, Downie and Brown (N); 3, M. Craig (K). Br. (Egg) C: 1, D. Long (D); 2, Brown and Downie (N); 3, J. Fettes (Ab); 4, J. and M. Gilchrist (S). Br. (Egg) B: 1, 2 and 3, R. Howe (A). Br. (Egg) A: 1 and 2, J. Mallis (S); 3, J. and M. Gilchrist (S). Common Goldfish: 1, W. Arthur (M); 2, M. Colhart (Co); 3 and 4, F. and A. Robinson (A). Shubunkin: 1, M. Colhart (Co). Fancy Goldfish: 1, S. McCullum (Co); 2, D. MacFarlane (S); 3, P. McNeil (D); 4, F. and A. Robinson (A). A.O.V. Goldfish: 1, B. Fleming (DCC); 2, J. MacDonald (F); 3, F. and A. Robinson (A); 4, J. and M. Gilchrist (S). Plaats: 1, A. Scott (N); 2, R. Fleming (DCC); 3, B. Fleming (DCC); 4, P. West (D). Jansons: 1, F. Stevens (A); 2, R. Spence (A); 3, K. Johnson (D); 4, S. and S. Booth (G). Trophy Winners: Best Livebearer: S. Davis (Kirkcaldy); Gambusia Virata: Best Characin (D); Pothor (Dundfermline); Mowbray Propelt: Best Barb: J. Mitchell (Kirkcaldy); Barbus oligolepis, Dwarf Cichlid: A. Longmuir (Forfar); Sotoceras Gasterius, Large Cichlid: J. McDonald (Forfar); Tilapia Burjurifera: Best Anabantid: T. F. Ramsay (Scottish); Colia Chana: Best Catfish: J. Makin (Stirling); Corydoras Omata: Best Shark: Durie and Walker (Newbattle); Epalazerosuchus Kallioptera: Best Toothless: J. Stevens (Arbroath); Aplocheilichthys Parichthys: Best A.O.V.: D. Long (Dundfermline); Hypoclinemus Cyprinoides: Best Pair: J. Wells (Dundfermline); Rasbora Parachanna: Breeder Livebearer: W. Brown (Kirkcaldy); Gambusia Virata: Breeders Eggbearer: J. Makin (Stirling); Corydoras Barbatulus: Best Goldfish: W. Arthur (Monroevie); Carassius Auratus: Best Plaats: A. Scott (Newbattle); Hydrocotyle Fulgata: Best Exhibitor: J. Wells (Dundfermline). Best Exhibiting Society: Dundfermline A.S. Best Fish in Show: S. Davis (Kirkcaldy); Gambusia Virata: Aquarist Gold Pen.

Key to Society Abbreviations: (A)—Arbroath A.S.; (Ab)—Aberdeen A.S.; (C)—Cumbernauld and D.A.S.; (Co)—Cowie and D.A.S.; (D)—Dundfermline and D.A.S.; (DCC)—Dalkith Community Centre A.S.; (E)—Edinburgh A.S.; (EAP)—Edinburgh A. and P.; (F)—Forfar and D.A.S.; (G)—Gorebridge and D.A.S.; (K)—Kirkcaldy A.S.; (M)—Monroevie A.S.; (N)—Newbattle A.S.; (Sc)—Scottish A.S.; (S)—Stirling A.S.

Dates for the diary

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

AUGUST

6th August: NORTHERN GOLDFISH AND FONDKEEPERS SOCIETY 7th open show at the Sports Centre, Silverwell Street, Bolton, Greater Manchester. Details and entry forms from R. Hodgkinson, 9 Stratford Close, Farnworth, Bolton BL4 6LZ. S.A.E. with application please. (Tel: 0204 75281).

6th & 7th August: LF.A.S. annual open show in Bangor Leisure Centre, Bangor, N.I. Contact: J. Little, 26 Greys Park Avenue, Belvoir Estate, Belfast, N.I.

6th August: BRISTOL TROPICAL FISH CLUB open show at W.D. & H.O. Wills Recreation Hall, New Charlotte Street, Redmossy, Bristol. Beaching 9.00 a.m.-12.00 noon. Schedules will be available from mid-June from Show Secretary Mr. T. E. Davis, 264, Redmossy Road, Cothpit Heath, Nr. Bristol BS17 2QW. S.A.E. with application please.

7th August: The Norwich Section of the BRITISH KOI KEEPERS' SOCIETY monthly meeting in Banham at the home of Mr. M. J. Crank. For further details contact the Secretary, Mrs. O. Crosby on Norwich 412095.

7th August: LEICESTER A.S. third open show at St. Matthew's Community Centre, Malabar Road, Leicester. All enquiries for schedules and further information to Show Secretary, J. Richards, 26 Huggot Close, Rushby Mead, Leicester. (Tel: Leicester 666314).

7th August: BLACKPOOL AND FYLDE AQUARIUM SOCIETY open show to be held at St. John Vianney School, Glassonbury Avenue, Blackpool. Enquiries to show secretary, Mrs. Solly Barrett, 175 Devonshire Road, Blackpool. (Tel: 0253 32153).

14th August: DORCHESTER TROPICAL FISH SOCIETY 3rd open show at the Boys Brigade Hall, Savemilla Lane, Weymouth Avenue, Dorchester, Dorset. Schedules from Mr. B. Syme, 3 Arnhem Green, Poundbury, Dorchester, Dorset or phone Dorchester 67557.

14th August: GRIMSBY AND CLEETHROPES A.S. at the T.A. Centre, Westward Ho, off Bargaue, Grimsby, South Humberside.

14th August: PRESTON & DISTRICT A.S. 1st open show at Preston North End Supporters Club, Deepdale Road, Preston. Enquiries to: Mr. W. Rawlinson, 364 St. George's Road, Preston (Show Secretary).

20th-21st August: YORKSHIRE AQUARISTS FESTIVAL, Doncaster Racecourse. Details from Mr. N. Bollen, 11 Sherburngate Drive, Pocklington, Yorkshire. Tel: 0592 3177.

20th August: NUNEATON AQUARIUM SOCIETY open M.A.L. show at the Trinity Centre, Artleborough Road, Nuneaton.

20th August: LONG RATON A.S. open show at Gregory's Home Gardens, Toton. For details send l.a.c. to Mr. D. Burton, 21 Lancaster Avenue, Stapleford, Notts NG9 8DL.

20th August: DARWEN A.S. open show at the Library Theatre, Darwen. Details from Derek Grew, 93 Greenway Street, Darwen.

20th August: ADAS open show at Sellindge Village Hall, Sellindge, Kent. 42 classes, all with trophies, 20 special classes. Championship Class M. Details from Ray Scotting, 6 Manor Way, Ashford, Kent. Telephone: 0233-21380.

20th August: DARLINGTON & DISTRICT A.S. are holding their first open show at Heathfield Junior School, The Broadway, Darlington.

20th August: (August Bank Holiday Monday), 7TH YORKSHIRE KOI FESTIVAL incorporating the Society's National open show, at Harwood House, near Leeds. For entry forms and trade stand details contact: The Show Manager, Stuart Bent, 58 Broom Crescent, Rotherham, S. Yorks.

SEPTEMBER

4th September: The Norwich Section of the BRITISH KOI KEEPERS' SOCIETY monthly meeting in Soham at the home of Mr. P. E. Jarvis. For further details contact the Secretary, Mrs. O. Crosby on Norwich 412095.

4th September: SALISBURY & DISTRICT A.S. open show at the Activity Centre, Wilson Road, Salisbury. Schedules and further information from Mr. D. Edalstein, 33 Somerset Road, Salisbury. (Tel: 0722 26219).

4th September: ANFIELD AQUARIST ASSOCIATION open show. New Venue Leagrave Cricket Ground, Near Consett. Further information from secretary Mrs. E. Emberton, Anfield Aquatics, Froms, St. Annfield Plain, Co. Durham.

4th September: WELLINGBOROUGH & DISTRICT A.S. open show at Wrofield School for Boys, Beckhill Road, Wellingborough, Northants. Further information from Andrew Barton, 86 Rochway, Wellingborough, Northants NN8 3YE. (Tel: Wellingborough 675862).

6th September: CASTLEFORD A.S. 10th open show to be held at Blackburn Hall, Kothwell, Nr. Leach. Secretary: Mr. L. Price, 92 Westbourne Avenue, Gorton, Leeds. Tel: Leeds 861900.

10th September: HOUNSLOW & DISTRICT A.S. open show at the Hounslow Youth Centre, Kingsley Road, Hounslow. Details from show secretary, T. Bullock, 2, Holmwood Close, V. Addenstone, Surrey (telephone: Weybridge 54970).

10th September: BRISTOL A.S. Colwater Fish Show at St. Ambrose Church Hall, Streetford Road, Whitball, Bristol from 3-5.30 p.m. Details and Schedules from Show Secretary, V. Casaldi, 7A, Walsingham Road, Bristol BS56 5BT. (Tel: 0272-64323).

11th September: LEAMINGTON & DISTRICT open show.

11th September: DUNFERMLINE & DISTRICT A.S. annual open show at Nethering Institute, Dundfermline. Any Enquiries Telephone Mr. Derek Long, Inverkerthing (413175).

11th September: HUDDERSFIELD TROPICAL FISH SOCIETY annual open show at St. Albans Civic Hall, Southwark, Huddersfield.

11th September A & D FISHKEEPERS 3rd open show at the Hilllocks Social Services Centre, Sutton in Ashfield.

11th September: READING & DISTRICT A.S. open show at the Youth Club in Northumberland Avenue, Reading. Schedules from chairman, C. Tomes, 51a Shirley Avenue, Reading.

11th September: BUXTON AND DIST. A.S. open show at St. Peter's Church Hall, Fairfield, Buxton. Beaching 12 noon-2 pm. For info. ring 0298 77951.

17th September: KINGSTON & DISTRICT open show at Raynes Park Methodist Church Hall, Worpole Road, Hayes Park S.W.20.

17th/18th September: EAST KENT AQUATIC STUDY GROUP 4th Annual Exhibition of Fishkeeping at the Village Hall, Littlebourne, Canterbury.

18th September: NORTHAMPTON & DISTRICT A.S. open show at the Gladstone Centre, Gladstone Road, Northampton.

18th September: CHESTERFIELD AND DISTRICT A.S. open show at Westfield Upper School, Mosborough, Sheffield. Schedules from A. Joyce, show Secretary, 27 Darcy Road, Eckington, Sheffield S31 9BN.

18th September: NORTH WILTS A.S. open show. For further information contact Mrs. J. A. Quinn, 9 Netherton Close, Park South, Swindon, Wilts. SN7 2AN.

18th September: TONBRIDGE & DISTRICT A.S. open show to be held at Haslowe Hall, Haslowe, Tonbridge, Kent.

25th September: WOLVERHAMPTON A.S. open show. The venue will be Pondford High School, Marsh Lane, Pondhouses Wolverhampton. Show Secretary Les Cook, 18 Evington Way, Wolverhampton. (Tel: Wolverhampton 53563).

30 September, 1st and 2nd October: BRITISH KILLFISH ASSOCIATION International Convention and a.g.m., York University. Enquiries: Howard Atkin, BKA 577, 63 Lee Moor Lane, Stanley, Wakefield WF3 4ES.

OCTOBER

2nd October: The Norwich Section of the BRITISH KOI KEEPERS' SOCIETY monthly meeting in Norwich at the home of K. J. Allen. For further details contact the Secretary, Mrs. O. Crosby on Norwich 412095.

2nd October: SUNDERLAND A.S. 1st open show at Pensywell Community Centre, Sunderland. Schedules can be obtained from the Show Secretary, Mrs. M. Hepton, 3 Home Street, Millfield, Sunderland, Tyne and Wear SR4 8LU.

2nd October: LEAMINGTON & DAS open show at The Bulls Hall, George Street, Leamington Spa. Schedules from: C.W. Stoodley, 29 Buckley Road, Lillington, Leamington Spa, Warwickshire.

9th October: RETINAL GREEN & INDEPENDENT A.S. 3rd open show at Windsor Road School, Manor Way, East Ham, London E6 4ED. Beaching from 9.30 p.m., Saturday, 6th October to 11.30 a.m., Sunday, 9th October. Schedules and further information from Mr. and Mrs. B. Rendell, 18 Tibbury Road, East Ham, London E6 4ED. (Tel: 01-472 7501).