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AQUARIST

AND PONDKEEPER

The Magazine for Fishkeepers



In this issue:

Spotlight on the

Rainbow Butterflyfish

Seaweed in the Aquarium

(colour feature)



COVER STORY Photo: A. van den Nieuwenhuizen

Hypsebrycon herbertaxelrodi, commonly known as the Black Neon, is a relative newcomer to the hobby. It also belongs to that ever-increasing group that we refer to as "accidental" introductions (see our April '83 Cover Story for another example—the Dash-Dot Tetra). But for the keen eyes of dealers or aquarists (in this case Karl-Heinz Stegeman), such fish could easily disappear without trace from the hobby even before they ever "arrive". The above-mentioned gentleman apparently spotted these previously unknown fish in a shipment from the Amazonian region of the Rio Taquary of Brazil in 1960. A year later, the fish was officially described and given its current scientific name by Dr. J. Gery, in honour of Dr. Herbert Axelrod. The Black Neon is a small (3-4 cm), non-demanding Tetra which will tolerate a relatively wide range of water and temperature conditions. However, it prefers soft, slightly acid water kept around 24°C (75°F). It spawns in typical Tetra fashion, scattering its eggs among fine-leaved vegetation. The incubation period is about one day at a temperature of around 25°C. The fry then take a further day or two in reaching the free-swimming stage and, from then onwards, can be raised quite easily on the usual range of fry foods.

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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



holiday worries . . .

Can you give me some information on the holiday care of my aquarium?

A well cared for aquarium can virtually look after itself during your temporary absence.

Within four to six weeks of your departure, it is not advisable to introduce new fish or plants into the tank unless absolutely necessary. This may disturb the 'balance' in your aquarium, or introduce a variety of disease organisms. If you must introduce fish into your tank, a preventative course of treatment with a reliable remedy is a good idea. Strictly speaking all new fish should be quarantined in a separate tank for two or three weeks before they are introduced into a community tank.

If you have a tried and tested maintenance routine then it may be best not to substantially alter this during the couple of weeks leading up to your holiday. If it has worked well for some time, changing it before you depart could have unfortunate results.

Regular partial water changes should already be a part of your routine tank maintenance. Every two to three weeks about 25% of the water should be siphoned out (along with accumulated debris and mulm), and the aquarium topped up with fresh water at the correct temperature. Tap water may be safely conditioned using *Aqua-Safe*. A partial water change, along with one or two other items of tank

maintenance, should be carried out during the last week before your holiday.

If you utilise an internal or external box-type filter, this should be thoroughly cleaned and re-furbished before your holiday. Remove the filter wool, carbon and gravel, and wash the latter in running water. The wool and carbon should be discarded, and replaced with new in a wool-carbon-wool 'sandwich.' This type of filter maintenance should be routinely carried out every two or three weeks. At the same time as replacing the filter media, it is also a good idea to clean all the filter tubing with a small bottle brush. Before the tubing is reconnected with the filter, it should be rinsed in running water.

Part of routine tank maintenance also includes the scraping off (and removal) of algae from the sides and front of the tank. Since a small amount of algae does no harm in the aquarium and many fish enjoy browsing upon it, this may be omitted just prior to your holiday. Unless the tank is suffering from a serious algal problem, many aquarium fish will make use of algae as an alternative food supply during your absence.

Before you depart, you should check that all the electrical connections are safe and not in danger of coming loose. The heater thermostat and air-pump are particularly important in many tropical aquaria.

During most of the year your fish should be fed two to four times per day, and offered only as much food as they will consume in a few minutes. As your holiday approaches there is no need to offer your fish extra food, and

(while you are away) there is no need to worry about feeding healthy fish in a well cared for tank. There may be some food remains or plant fragments and algae present that the fish can easily survive on. Similarly, if fed properly for most of the year, the fish will have accumulated some food reserves within their bodies, upon which they can draw during a temporary 2-3 week 'famine.' Fish fry are, perhaps, an exception to this, requiring many small but frequent meals for the first week or two of their free-swimming existence. C.A.

Coldwater



infertile orfe eggs . . .

I have a pond 12 x 9 ft., and 18 in. deep. In it I have 22 Golden Orfe each about nine inches long. Last year and also this year they have spawned well and produced many eggs but none has hatched. I have taken the eggs with weed to hatch away from the fish but they all turned white with Fungus disease. Can you explain this?

It is strange that none of the eggs hatched as you state that there appeared



Golden Orfe

COLDWATER

Arthur Boarder

PLANTS

Vivian De Thabrew

KOI

Hilda Allen

MARINE

Richard Sankey

DISCUS

Eberhard Schulze

to be several males chasing when spawning took place. The eggs could not have been fertilised or there was something the matter with the condition of the water in the hatching tank. I think that you may have too many fishes in the pond and have over twice the amount of fishes that pond should hold. This may have some effect on the health of the fishes and so reduce their fertility. When the eggs were removed to a hatching tank, it is possible that the water was impure. This would be the case if the water had come through copper pipes. Also, if the hatching tank was not very large and there were a large number of plants in it, it is possible that during the night time the water would lack sufficient oxygen and the eggs could die. It is important that aeration is supplied to a hatching tank and the lack of it could be the cause of your failure to get any fry.

peacock-eyed bass . . .

Centrarchus macropterus, one of the smaller members of the Sunfish Family, the Centrarchidae

I cannot find any reference to the Peacock-eyed Sunfish in your book, "Coldwater Fishkeeping." Can you give me any information about it please?

My book is not intended to be an encyclopedia of fresh water fishes or it would have had to consist of at least 900 pages. However, there is mention of three Sunfish or Bass, but as they are foreign fishes a great deal of space was not given to them. The Peacock-eyed Bass, (*Centrarchus macropterus*) is found in Eastern States of the U.S.A. It can reach a length of 18cm but rarely grows much larger than 10cm in a tank. It is mature at 8cm. Like the other Sun Bass it is carnivorous, and so is not likely to take any food except live. Therefore in its feeding habits it resembles our native Perch.

white lionhead . . .

I have a white Lionhead and wonder if it is more valuable than a red one?

Although it is rather unusual I do not think that it would be of more value than an ordinary one. However, it is quite possible that someone might be prepared to give a good price for it because it is uncommon.

live foods for pond fish . . .

Is it essential to feed goldfishes in a pond with live foods and if so which kinds?

It is not essential but the fishes may be better for an occasional feed with such things as garden worms, maggots and white worms. However, it must be realised that there is usually quite a fair amount of live food to be found in most ponds. There are such things as

water lice, fresh water shrimps and the larva of various insects. It is dangerous to feed the fishes with live foods from natural sources and they may introduce pests and diseases to the pond. **A.B.**

Koi**herons . . .**

Having lost all my Koi to herons for the second year in succession I am anxious to know if there are any answers to this problem. I dislike nets over ponds.



Heron

I think many ponds present an open invitation to marauding herons who will soon empty any number of fishponds especially if they have young to feed.

If your pond has gently sloping sides, or shelves for marginal plants and the water level is high, or the pond

too shallow, then these are ideal conditions for herons. They prefer to wade into ponds and will not stand in water any deeper than about 25-26 in.

By fixing two strands of fishing-line around the edge, about 10 or 12 ins. from the ground, you can prevent herons from fishing in your ponds. In extreme cases electric cattle fencing can prove an effective deterrent without being dangerous.

The real answer is to have a deep pond with sheer, straight sides and the level at least 10 ins. below the edge, thereby keeping the fish safely beyond the reach of the predators.

Yes, nets can be unsightly but if they are draped over a raised bar across the pond, giving a tent-effect, then the obstruction in seeing the fish below is largely removed. I found this out several years ago when a couple of Kingfishers decided to dine on our young koi and that pond had to be swiftly netted.

H.A.

Plants



tropical plants for coldwater tanks . . .

I have an aquarium measuring 39 in. x 12 in. x 13 1/2 in. Lighting is supplied by two grolux tubes rated at 30 watts each. Filtration is shortly to be changed from internal box filters to an external power filter. A heater/thermostat maintains temperature at about 70°F. In this tank I keep fancy goldfish.

The aquarium up to now has been stocked with coldwater plants such as Vallisneria, Cabomba and Egeria densa. I have noticed on my visits to various aquarist shops the colourful variety of plants available for tropical aquaria. I would appreciate it if you could advise me if there are any tropical varieties that would be suitable for the conditions of my aquarium.

There are indeed several tropical varieties which will tolerate temperatures of around 70°F (some even lower),



Limnophila is suitable for a coldwater tank

notably the plants of Aponogeton species and some of the hardy Cryptocorynes. *Aponogeton crispus*, *undulatus* and *nataus* are very sturdy plants grown from bulbs. *Cryptocorynes affinis*, *balanatae*, *beckertii*, *lucens*, *lutea*, *necillii* (the dwarf *Cryptocoryne*), *patchii*, *walkerii* and *willisii* are all hardy. You could also try some of the *Echinodorus* species, such as *E. brevipedicellatus*, *cordifolius*, *martii*, etc., *Heteranthera* sp., *Hydrilla*, *Hygrophila*, *Limnophila*, *Lobelia*, *Ludwigia*, *Myriophyllum*, *Potamogeton crispus*, *Sagittaria* and *Synanisma*.

V.T.

Marine



breeding damsels . . .

I write in the hope that you can offer some advice on identifying and breeding Yellow Tailed Blue Damsels. I am sure my fish are in fact Damsels but an uncertain which species. I purchased them two months ago under the name quoted above. They are just over one inch in length, their coloration is a deep cobalt blue with the exception of their tails which are a bright yellow. I have them housed in a 36 in. x 15 in. x 12 in. tank which they share with a

Copper Band Butterfly. The Damsels spawned on 8th December and the eggs hatched successfully, but unfortunately the female ate the fry. However, she now looks as if she will spawn again and I would be grateful for any advice on how to separate the fry from the female and what to feed the fry on. Would a nylon mesh breeding trap be suitable? Also would newly hatched brine shrimp be the right kind of food for the fry which are only 2-3 mm long. I would also like to know if these fish have been successfully reared before?

First let me say that there are a number of species of Yellow Tail Blue Damsel Fish. But the very fact that the pair you have are spawning really makes it irrelevant what species they are, in that it is highly unlikely that in the home aquarium two different species of Yellow Tail Blue Damsels would hybridize.



Pomacentrus melanochir, a species of Yellow-tailed Damselfish

Currently in the United States there are two or three commercial operations breeding and rearing a variety of coral fish and the Yellow Tail Blue Damsels of varying species have been successfully bred and reared. The normal practice is to allow the parents to spawn and shortly before the eggs are hatched to either remove the eggs or the parents from the aquarium. It is, however, necessary to have in preparation two types of plankton in culture. The newly hatched fry will feed directly on a very small zoo plankton (brackinous). However, the only successful food in the zoo plankton is a phyto or rock plankton and the easiest to culture is *Dunaliella*. Although this all sounds rather complicated, be assured it is extremely simple and culture kits are

readily available from New Aquaculture, P.O. Box 15, Oban, Scotland OA34 4LA. May I also suggest that you purchase yourself a copy of *The Marine Aquarium Handbook—Beginner to Breeder*, by Martin Moe. In his last chapter entitled "Breeding Coral Fishes," it will clearly show you a step by step process of how to successfully rear your Yellow Tail Blue Damselfish.

On a recent visit to the United States I was amazed at the number of schoolboys rearing a variety of species of coral fishes in the home environment. So please do not be put off by what has in the past been written about the impossibility of rearing coral fishes.

R.S.

Discus



starting up . . .

I am considering setting up my own Discus fish tank in the near future and in preparation I have read several books including 'All about Discus' by H. Axelrod. However, I have a number of questions which I hope you can answer for me.

- (1) How many fish could I keep in a 48 in. tank?
- (2) Is a Eheim power filter model 2009 or 2011 appropriate for this size of Discus tank?
- (3) How long should one leave the light on each day and what size/sort of light would you suggest, given that I also want to have a number of plants in the tank?
- (4) Is it possible to keep some large plants in the Discus fish tank or will the fish dig them up?
- (5) How often do you really have to change the water?
- (6) Is it possible to place natural bogwood in a Discus fish tank—I wonder whether the wood releases any natural acids into the water which would prove harmful to the Discus fish?
- (7) How much cover/hiding places should I provide for the fish

in the tank?

I would be grateful if you could give me any advice before I begin, given that my main object is to have a presentable tank with Discus fish as a focal point in a living room.

I am pleased to welcome you to the elite of fishkeepers and very much hope that you will make a success of it; it is no longer an impossible task and with the knowledge we have gained over the last 10 or 20 years many more hobbyists have joined the Club and found that Discus fish can even be kept in a furnished aquarium as a centre piece in a living room. Another book dealing with the subject is a book by G. Keller, 'Discus' and published by TFH. It will give you all the basic information you will need.

In an aquarium measuring 48 in. you can keep at least six fully grown Discus, but if you start with young fish you will probably keep more than you could afford. As young fish are happier in a shoal I would certainly keep at least 10 or 12.

An Eheim power filter model No. 2009 or 2011 would only really be big enough if you were also to install one of the new Oxydators. This would give you a biological filter and the Eheim could then operate only as a mechanical filter removing from the water any suspended matter. If you were to go for the 2011, the turnover of water would be the same but the filtering container could be used to create many different water qualities by either using peat/ for softening or Optima/ to remove all the harmful substances from the water, etc.

As far as the Discus fish are concerned, light will make very little difference, if you want to grow certain plants you will have to choose a suitable light source and plants grow best with a Truelite, Northlight or Aquarilux tube. At the high temperature of the water a Growlux tube would just not be good enough and the plants would not do very well. A 'white' type of tube is a must and should be kept on for about 12 hours a day. With the addition of an Iron-based plant fertiliser, like Ferrogan, you will be able to grow beautiful Amazon Sword

plants. However, you must also remember to change the tubes every 10 months or so since they lose 60% of their output in the first five months or so. Discus fish, unlike many other cichlids are no plant diggers and any aquarium can be well furnished with plants without having to use plastic ones.



The frequency and amount of water changes really depend on the general maintenance of the aquarium, the amount of food given, the state of the plants and the filtration. It is common practise to change something like 25 to 30% per week and many breeders of Discus fish will change at least 10 to 15% per day.

Bogwood has for many years been used as decoration in aquaria and if it was bought in an aquarium shop it will be safe. The little humic acid released will in fact be good for your fish and will often lower the pH values of the water.

Cover or hiding places for the Discus fish should only be provided once the fish have settled in. It is often a better idea to let them get used to their new environment before planting the aquarium out and decorating it with pieces of bogwood. If you were to provide them with any hiding places before they are used to their surroundings they will certainly make use of them but will take much longer to settle down. Once the fish have settled in, which normally takes about a week or two, you can put your plants and bogwood in and the fish will take little notice of the change.

Discus fish are not normally shy, they will only hide away in corners if something is not quite right either with their environment or with the fish themselves. They are, on the whole, very easy to keep as long as you provide for them what they need.

E.S.

WHAT IS YOUR OPINION?



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

AMERICAN READER Mr. D. Martin Moore is a 20-years-old student who lives at 1354 S. Lumpkin Street, Athens, GA, U.S.A., 30605, and says: "I am an American student studying mathematics and, naturally, ichthyology. I became aware of your magazine through the university's science library, which boasts of a periodicals department which subscribes to over 10,000 magazines and professional journals, including two aquarium hobbyist magazines, one of which is, of course, yours. I find both magazines of comparable quality, except that in one sense I prefer your publication over *Tropical Fish Hobbyist* in that you don't insult your readers when they write in asking for advice. I also enjoy your column because it encompasses a wide variety of experiences, many of which I have found to be unique. I may not always agree with the opinions expressed, which is as it should be, but in pondering the issues I feel I increase my understanding of the hobby.

"I have some experiences of my own which some of your readers may find interesting. It appears that breeding behaviour in fishes is to some extent linked to food availability or, more accurately, changes thereof. Over a period of time which was roughly two weeks, I was obliged to pay less than usual attention to the feeding of my

fishes due to the necessity for intense concentration on my school work. About a week ago, I resumed normal feeding, which consists of several feedings of frozen brine shrimp, *tubifex* worms, etc. (rarely, though occasionally, flake food). At this time, intense breeding activity has been observed in my tanks. My white clouds are spawning frequently in my community tank, while my jewel fish have adopted their courting colours, which I expect to culminate in caviar within a week. No efforts were made to induce spawning in any of my aquaria. Now, there are obvious problems with my hypothesis; for example, these observations coincide with the onset of Spring here (although it's been a damnably cold spring so far!) and various other factors which are beyond my control (or my desire to control them). But since I don't recall similar activity among the fishes during the course of the year when they were on a normal feeding schedule, I tentatively conclude that the change in diet was responsible. This would coincide with the food supply in nature; it is low during the winter, and increases as the weather gets warm, which is when a number of species begin their reproductive cycle in nature.

Gary Hodge feeding his fish



Stephen McCrindle beside his community tank of tropicals and goldfish

"I am also investigating a hypothesis about fish hiding behaviour, which basically asserts that if a shy fish is kept in an aquarium which does not contain adequate cover, the fish will get used to staying in the open and will continue to do so when refuge is provided. I can easily see where many readers will disagree with this. The hypothesis, however, can be very easily tested. My conclusion was formed from observing the behaviour of a spiny eel which I keep, but I am unwilling to invest in more spiny eels and aquariums in order to prove (or disprove) my guess. Hopefully somebody out there will see fit to take up the investigation. It is of course probable that my hypothesis holds for only some fish and cannot be generalised.

"My latest aquarium project is to construct a fairly large tank (100 gal. or so) for the purpose of keeping native sunfish (*Lepomis sp.*). These can be collected with great ease in my area, and hence great cheapness. It is worth mentioning that aquaria are not at all difficult to construct, nor are the accessory items such as stands and hoods, and the cost saving is considerable, a prime motivation for a poor student.

Even so, I find it necessary to keep a part-time job in order to support my various fish projects.

"I hope to hear from some of your readers, and thank you for airing my humble opinion."

"First, thanks for your plugs for the Anabantoid Association in the past, and commiserations on the shortening of your column," writes Mr. David Armitage, of 2 Close End, Robert Road, Hedgerley, Bucks. He goes on to say

conditioned fish and a temperature in the low to mid 80s should take most of the guessing out of the process, he tells us. He reminds us that gouramies are aggressive, territorial fish and that even small species require the territory of a 24 in. tank, so keeping several pairs in a 36 in. tank is just inviting damage and death due to fighting.

On the question of heater/stats Mr. Armitage has the following to say: "To my mind the reliability of these

market new technology has resulted in what seems inadequate development, and models being marketed without adequate testing. (I think I agree with some of the things Mr. Armitage has to say. Years ago one bought a new heater and a new thermostat when one bought a new tank; and one fitted them into the tank and forgot about them for many years. I have a box containing numbers of broken/useless modern units; I also have some very old ones that still work. B.W.)

Two young aquarists visited me recently and asked if I'd permit them to see my fish. In return I received an invitation to visit their homes to photograph their fish. Photograph 1 shows 16-years-old Gary Hodge feeding the fish in his community tank—which is sited on a beautiful cabinet built especially by his father. Gary left school recently and was lucky enough to obtain an apprenticeship. He has a second, much smaller tank in an outdoor shed and it houses a host of baby platies. Some of Gary's earnings go on fish, foods, etc. Gary is trying to grow some samples of Java moss and Java fern that I gave him. I discovered that I taught Gary's elder brother about a decade ago.

Photograph 2 shows Gary's pal 15-years-old Stephen McCrindle, who is still at school but who hopes to leave in May when he will be 16 years old. Stephen's interesting community tank contains a couple of his younger brother's goldfish as well as a variety of tropicals. A lot of Stephen's pocket-money goes on fish and foods, etc., and he is also trying to grow Java moss and Java fern. Stephen was particularly pleased by the photographs I took of his fish and is keen to take up photography himself. He asked about the prices of cameras and lenses. When we checked a photographic magazine I was amazed to find that one can now buy a new camera and lens exactly like mine—with which I took the photographs illustrating this feature—for only £39.95. That's a lot less than I paid for mine several years ago. I was going to say that I could thoroughly recommend the MTL 3 camera and Tessar lens to any youngster; but I can



Stephen McCrindle's coolie loach

has a recent correspondent to my feature made mention of aggressive gourami behaviour in his community tank. For the information of the correspondent, Master Simon Grandidge (12), Mr. Armitage states that it is unfortunately too common to read that gouramies are peaceful. He says that it would be more accurate to state that they share many of the behavioural traits of the cichlids. He says that this inaccuracy appears in numbers of books and can only be attributed to lack of personal experience in the case of such authors. Even quite small gouramies, such as the sparkling or honey, can cause havoc in a community tank when in breeding mood. For breeding gouramies Mr. Armitage recommends containers no smaller than a 24 in. tank, and that only one pair of fish be placed in it. Soft, acidic water, well-

has fallen since the new electrical regulations came into force." He names one well-known brand and states that three all failed inside six months. He says that a different brand has an inadequate thermostat, while its older model failed if the thermostat was regularly adjusted as the plastic mount would sheer. He tells us that a different model by the same manufacturer has "held up so far" with excellent steadiness, although he doubts whether or not we need such accuracy. He cites a foreign brand as being reliable; and states that an old British model seemed the best value because it was cheap, reliable and worked! Mr. Armitage states that new models from the same firm proved unreliable: a dealer told him that every one of his first batch was returned by customers. Mr. Armitage says that the race to

equally recommend it to teenager or adult. It may not be the lightest on the market but it is excellent value, in my opinion, and very sturdy. Recently I used my camera to take a set of slides of English university colleges and was delighted with the results; and a couple of days ago I was as happy to use it to photograph a World Cup football star who attended the school in which I teach.

It's encouraging to find young enthusiasts such as Gary and Stephen devoting a lot of their spare time and money to their fish. When I read about teenagers engaging in vandalism and indulging in glue-sniffing I often think how lucky some young people are to have got hooked on the fish-keeping hobby instead.

Photograph 3 shows one of Stephen's coolie loaches, *Acanthopthalmus khuli*; and Photograph 4 shows a weather loach belonging to Gary. Have you kept either? Drop me a line if you have.

Master Peregrine Rand is 13, and lives at St. Saviour, Jersey. He writes: "I have been keeping fish for just over a year now, and have been reading *The Aquarist* for about the same length of time. I enjoy the magazine very much and look forward to the beginning of

every month, when my mother posts it to me at school. I have three tanks. One is a 30 in. x 12 in. x 15 in. all-glass, tropical, freshwater, community tank. In this, I have fish ranging from small tetras to a large red-finned shark. I also have a 24 in. x 10 in. x 10 in. coldwater tank. In this I have one red-cap, one comet and two English goldfish. I also have a small, plastic tank which I use for a quarantine and hospital tank. At the moment, it contains one albino catfish and a golden gourami, which are going through the week of quarantine before being introduced to the community tank. The most brightly coloured fish that I have is the cardinal tetra. I think that its beautiful blues and reds add no end of colour to the average tank. I have 10 cardinals which do very well in my tank. I think this is probably because we have soft water in my area. I also get very good growth from my *Vallisneria* plants."

Peregrine goes on to say that he heats his main tank with a combined heater/thermostat of 150 watts. He thinks it a very reliable form of heating and it keeps his tank at a steady 26°C. Two books that he recommends are *The Complete Aquarium Encyclopedia of Tropical Freshwater Fish*; and *The*

Complete Aquarist's Guide to Freshwater Tropical Fish.

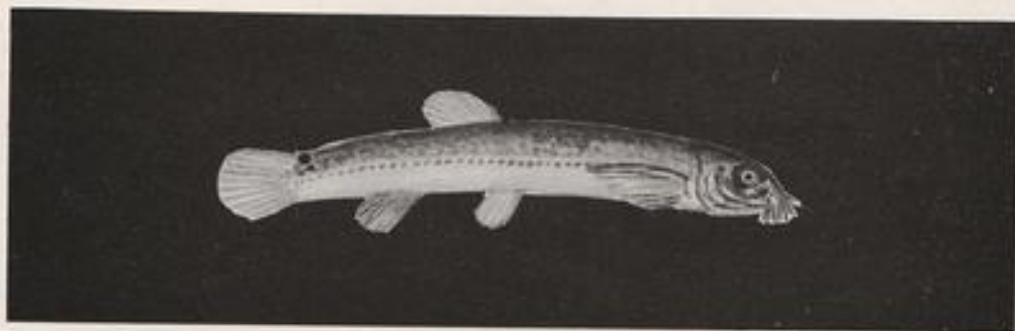
A Woolworth's bulb has just expired after a very useful 181 days above an aquarium. Lack of space prevents my including letters from readers praising Woolworth's bulbs for value and good plant growth.

Sadly the space is filled, whereas many letters remain unused. Although I'm typing this in early May it is still very cold and there is little growth in the garden. Please drop me a line about your garden pond. The pond water and the weather should be warmer when you read this. I should also like your opinions on: (a) freeze-dried foods—if you use them; (b) inexpensive plants that flourish in your tanks and ponds; and (c) breeding livebearers—especially the less common kinds. I receive plenty of letters from teenage boys. Don't the young ladies keep fish? If you do, please drop me a line and tell me about your experiences as an aquarist. Good-bye until next month—and good luck if you await C.S.E. or G.C.E. examination results. I've just finished marking an encouraging batch of the former. Happy fishkeeping.

Gary Hodge's weather loach



The Japanese Weatherfish



by
Jack Hems

Few FISHES are so adaptable temperaturewise as the loach popularly known as the Japanese Weatherfish or Dojo. This is a bottom-living species of the family Cobinidae and it is, indeed, as much at home in a coldwater aquarium as in a tropical tank maintained in the seventies or eighties (°F). Another point worthy of emphasis is that, by and large, it calls for nothing special in the way of tank set up. For all that, in order to preclude injury to the small cycloid scales with which its elongated and slimy body (for the most part cylindrical in shape) is invested, it is recommended to carpet the floor of its tank with rounded pebbles as a substrate rather than anything abrasive such as sharp sand or granite chippings.

Miogobius aeglefinus—to give

the loach its technical name—is a compulsive burrower. Its burrowing activities may remove it from sight for short or quite protracted periods of the day—except for several occasions during daytime or night time—when it pokes its head above the substrate as if to take stock of what is going on.

Yet the Japanese weatherfish can hardly be described as an inactive or noticeably retiring fish; for, when it shows no inclination to torpedo like a mad thing about its aquarium, the aquarist cannot fail to hear the shuffling movements it makes under the substrate, or see it lying on top of the substrate in what seems to be deep contemplation.

The fish, like the rest of its congeners, is sensitive to changes in barometric

pressure and sometimes reacts to it in a remarkable way. In short, it will swim about in a very excited manner and, every so often, assume a vertical position as it bobs up and down at the surface as though starved of dissolved oxygen or assailed by some urge to leave the water for the land. For this reason it, and its larger relative or member of a geographical race, *M. fossilis*, from central and eastern Europe (commonly sold over here as the thunderfish) is sometimes confined in a glass bowl or large jar (chiefly on the continent), and used as a sort of weather indicator or weather prophet. (Stormy weather has a very disturbing effect on it).

For the most part loaches breathe through their gills, but here it must be mentioned that, if the water they are living in becomes at all foul, the fish survive the bad conditions by taking in and breathing atmospheric air. Nature has provided them with an accessory organ of respiration situated in the intestines. This organ, specifically a modification of the air-bladder, extracts the oxygen from the air taken in and expels poisonous carbon dioxide gas through the vent. Even in healthy water loaches, like some other species of fish of different genera and family, they often visit the surface for a gulp of air.

M. anguillicaudatus is not only native to Japan but is found in the natural state over a large part of eastern Asia as far as central China. It attains a length of about 8 in. against the 12 in. or more of *M. fossilis*. (Incidentally, large specimens of weatherfish are served at table in Japan).

Coloration varies slightly—nothing to be wondered at in a fish distributed over a wide range. In general, however, the back is a dingy blue-grey shading down to the middle of the body where it is enlivened with a dense

speckling of darker blue-grey intermingled here and there with a hint of olivaceous brown. This colour pattern halts abruptly in a horizontal line below which the lower side and belly are silvery white faintly touched with yellow. Just below the main body colour there is a long line of grey-blue spots or flecks. There is a dark brown to blackish spot in the upper half of the caudal base. The caudal fin is rounded posteriorly. The dorsal fin is rounded along the upper edge and is placed slightly to the rear of the middle of the body. The ventrals are situated in line with the beginning of the dorsal fin and the anal fin is placed halfway between the ventrals and the root of the tail. The fins are semi-translucent grey, or silver, touched here and there with brownish spots. There are 10 spiky barbels around the mouth and unlike most of the other well known loaches, the genus *Misgonyx* lacks the short spine below and in front of the eye. The pupil of the eye is black rimmed with shining gold.

The Japanese weatherfish is easy to feed: it takes anything alive (swallowable) or fleshy such as shredded raw red meat, or dried food. The fish becomes very lively when food is introduced, and because it rakes over and busies itself on the bottom it does keep the floor covering open and clean. Which leads one to the question of plants. Shallow-rooting plants are no use at all: they are uprooted in the space of a few hours. Deep rooting plants (or plants with plenty of long roots, which amounts to the same thing) lose their hold in a matter of days and drift about the aquarium so, all in all, the aquarist is advised to rely on plants such as *Egeria densa* or *Lagarosiphon major*. These two plants grow well if left floating and throw down long roots which, despite the movements of the fish, gradually find

anchorage in the compost. Clearly, then *M. anguillicaudatus* is not advised for the artistically planted tank. This is, however, such a fascinating and interesting and knowing fish (it is easily tamed once it has got used to its surroundings and its owner's movements near the tank) that it does merit an aquarium to itself. A tank about 12 in. x 8 in. x 8 in. will suit a couple very well. It is of supreme importance, however, to keep the top covered with a sheet of glass: apart from its gymnastics in the water, the Japanese weatherfish is a great leaper.

Sexing

A female *M. anguillicaudatus* has smaller and more rounded pectoral fins than the male. Then again, her body is fuller in the sides. This would follow the natural order of things if by any stroke of luck she happened to be filling up with eggs. The above, of course, applies only to well-grown fish.

All told, though, there is not much information available—detailed information, that is—about the breeding habits of *M. anguillicaudatus*. Seemingly the amorous couple chase about the aquarium, the male taking the role of driver. When the driving reaches a high pitch of sexual excitement, the couple draw together in drifts of sediment or loose stones or roots of plants and there deposit a goodly number of eggs. This act is repeated over and over again until the female is spawned out. The eggs, it is stated by no less an authority than the late Wilhelm Schreitmüller, hatch in about 10 days, and the fry stay out of sight and find sustenance (microscopic live food and broken down vegetation) among the sediment or camouflaging stones. After they have made some headway, they strike out, now and again, from their cover and emulate the habits of their parents.



of the Aquarium

Gobies

The term "Goby" is, in some ways, similar to the term "Gourami" (i.e.) it is often used quite loosely to refer to a number of (mostly) closely-related fishes which belong to separate Families. In one instance, at least, the relationship is not even close. The fish in question here is the Bullhead or Miller's Thumb, considered by some aquarists to be a Goby whereas, in reality, it is a Sculpin (Family Cottidae) belonging to the Order Scorpaeniformes which includes the Stonefishes and Scorpionfishes.

As far as the "true" Gobies are concerned, they form the largest Family of marine fishes, the Gobiidae, with about 170 genera and 800 species. They also form the second largest Family of all fishes, the largest being the Cyprinidae (Minnows and Carps,

with approximately 275 genera and 1600 species). As might be suspected from such a large Family, the Gobiidae are widely distributed in most tropical and sub-tropical seas, occupying marine, brackish and freshwater habitats. A few species can, in fact, live out of water for periods of a few days as long as the substratum is moist. One such Goby is the unusual, and very interesting, Mudskipper (*Periophthalmus vulgaris*) in which the gill chambers serve as air-stores where respiration can occur directly from the atmosphere.

Pandaka pygmaea enjoys a rather unique distinction in that it is the smallest living vertebrate (back-boned animal) known to science. It is sexually mature at 0.6cm and can grow to the impressive(!) size of 1.2cm in length. It comes from freshwater streams in the Philippines and, probably because it is virtually colourless, has never been introduced into the hobby.



The Bumblebee Fish (*Brachygnathus* sp.)

In fact, very few Gobies have ever become popular among hobbyists. Notable exceptions are the various Bumblebees, *Brachygnathus* spp., which, despite their small size, make very colourful and interesting additions to the brackish aquarium. These Gobies are also "unique" in that they are the only ones that have been bred in aquaria.

Other Families of "Gobies" are the Sandfishes or Sand Gobies (*Kraemeridae*), the Loach Gobies (*Rhyacichthyidae*), the Eel Gobies (*Gobioididae*), the Burrowing Gobies (*Trypauchenidae*), the Wormfishes (*Microdremidae*) and the Sleeper Gobies (*Eleotridae*).

Hatchetfishes

The Hatchetfishes that most aquarists are familiar with are members of a small Family, the Gasteropelecidae, consisting of three genera, *Carnegiella*, *Gasteropelecus* and *Thoracocharax* with nine species. The Family itself is one of 20 which, together, form the Suborder Characoidei (see A-Z, May 1983 for further discussion of this point).

A second, and less well-known, group is represented by the Family Sternoptychidae, the Marine Hatchetfishes. Again, there are only three genera but these are made up of 27 species.

Marine Hatchetfishes are found in depths ranging from 50 to 1500 metres. These fish have extremely compressed deep bodies with upward pointing mouths just like their freshwater counterparts. However, the pectoral fins are placed quite low on the body and the eyes may be telescopic in the

Sternoptychidae.

In freshwater Hatchetfishes, the body is compressed, with a rounded breast region which houses large pectoral muscles. These are attached to long, wing-like pectoral fins which originate just behind the head. The eye is situated near the top of the head and the mouth is directed upwards. A straight line may be drawn from the tip of the snout backwards until it reaches an indentation situated well back along the body, near the tail. The dorsal and adipose ("second" dorsal) fins are located in this depression.

All these features put together give vital clues as to the biology of these fish. They indicate that Hatchetfishes are surface swimmers which prey upon insects and other small organisms that either live in this region or fall into it from above.

The large pectoral muscles come into play when these fish are, themselves, threatened by a predator. At such times, the tremendous power that these muscles generate is used to

flap the long pectoral fins which, added to the propulsion generated by the strong caudal (tail) fin, actually allows the fish to take off and, literally, fly away from danger. The word "fly" (as opposed to "glide") is used quite intentionally here since the Gasteropelecidae are the only fish known to fly in the true sense of the word (i.e.) involving flapping of the "wings," while in the air.



The Common Hatchetfish, *Gasteropelecus sternicla*

Goodeids

EVERY aquarist is familiar with the two-way "splitting" of aquarium fish into egglayers and livebearers. Equally, every aquarist has come into contact with the more common live-bearing species such as the Guppy (*Poecilia reticulata*), the various Mollies (*P. sphenops*, *velifera*, etc.), the Swordtail (*Xiphophorus helleri*) and the Platy (*X. maculatus* and *variatus*). However,



An *Ameca splendens* pair. The male's notch is clearly visible

Hybrids

A HYBRID is an animal (or a plant) resulting from a cross between genetically different parents. This definition embraces such a wide range of possibilities that, for practical purposes, it is probably best to subdivide it.

First, there are hybrids that result from the crossing of two distinctly separate species. Such organisms are referred to as INTERSPECIFIC hybrids. Then, there are those that result from crossing genetically different individuals of the same species. These are known as INTRASPECIFIC hybrids.

Hybrids may exhibit characteristics of both parents, one parent, or completely new features. This is governed by the relationship between, and relative compatibility of, the genes concerned. For example, some combinations may result in hybrid sterility if the genes involved are not compatible enough—this happens more often among interspecific hybrids. On the other hand, the new genetic combinations may lead to hybrid vigour, also

there are a few other "kinds" of live-bearers, prominent among which are the Goodeids (also known as Mexican Livebearers and, rarely and inappropriately, Highland Carp).

These fish have been known to science since the middle of last century but have only really come into their own since the early 1970s. There are now nearly 40 recognised species, belonging to around 17 genera. The term Goodeid is derived from the name of the Family to which these fish belong, the Goodeidae. This name, in turn, was coined in honour of one of the early Directors of the U.S. National Museum, Professor George B. Goode.

As one of the common names suggests, Goodeids are restricted to Mexico and, more particularly, to the Rio Lerma fluvial area. Further, some species are restricted to single (or a few) streams, making their continued existence in the wild a highly precarious one. In fact, one species, *Skiffia francesae*, is reportedly already extinct in its original habitat, only eight years or so after it was officially described in the scientific literature.

known as heterosis. This may be reflected in a faster rate of growth, better survival, increased fertility, heightened aggression, etc. Single, or combinations of, characteristics are possible as is a combination of heterosis and hybrid sterility.

Within the aquarium hobby, hybrids have long been known and have been used to meet existing market demands or create new ones.

The best-known example can be found in Swordtails where interspecific hybridisations between true Swordtails (*Xiphophorus helleri*) and their close relatives, the Platies (*X. maculatus* and *X. variatus*), followed by a long succession of intraspecific hybridisations between the various types of Swords, Platies and the wide range of fertile



A sterile hybrid between *Colisa labiosa* and *Colisa lalia*

Fortunately, this and other endangered species are being bred in aquaria so their survival is, at least, receiving the level of attention that these unique fish deserve.

As mentioned above, Goodeids are livebearing fish. However, they differ significantly from "normal" livebearers in a number of ways, the most distinctive being:

- the lack of a gonopodium in the males; instead, the anterior rays of the anal fin are modified into a notch;
- sperm are produced "singly" instead of packets (spermatophores). Females cannot store these sperm and each brood, therefore, requires a separate insemination;
- the females "ovulate" after the eggs are fertilised;
- the embryos develop feeding structures called *Trophotaemias* from their vent and thus absorb nourishment from the mother;
- at birth, the embryos, therefore, weigh many thousands of times more than the eggs from which they develop.



A fertile hybrid between *Colisa labiosa* and *Colisa fasciata*

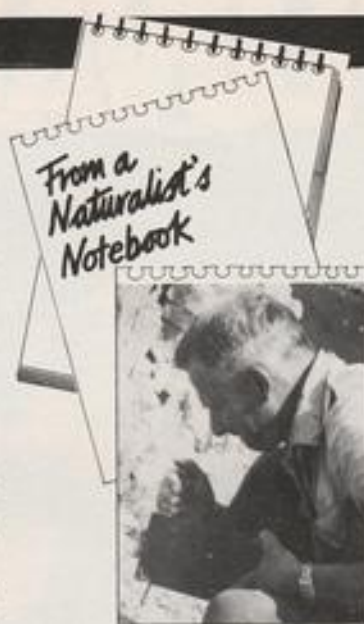
hybrids, have resulted in a magnificent and almost bewildering array of colours, patterns and fin configurations.

In Gouramis of the genus *Colisa*, the situation is extremely interesting indeed and illustrates many of the characteristics mentioned above. Hybrids between the Dwarf and Thicklipped Gouramis (*C. lalia* and *C. labiosa*) invariably end up as males which exhibit characteristics of both parents, a marked degree of heterosis in courtship and nesting behaviour but are completely sterile. Hybrids between Giants and Thicklips (*C. fasciata* × *C. labiosa*) show all the above but are fertile. Such crosses help scientists to establish the evolutionary/genetic "closeness" between species.

BERD-WATCHING has become highly commercialised in organised holidays, fund-raising, bird-counts and ex-egg-collectors employed by rich conservation societies. Pigeon fanciers spend long periods just watching their birds in the loft to assess their merits. But these are all very different from fish watching, that is studying their habits and behaviour in a tank.

Their eyes turn upward or down like a pike watching its prey according to which object is under their somewhat flattened observation, owing to the construction of the lens in their eyes. Sense of smell (taste) and hearing (vibration) are equally observed. Pre-war Merseyside had a one o'clock gun fired as a time signal at Birkenhead docks and a friend observed regularly his garden goldfish respond. Professor J. P. Frolov, who studied conditioned reflexes under the Russian Pavlov, adapted a complex electrical equipment to find if carp or goldfish were capable of forming complex associations in their simple brains when confronted with a complex task. Like other people, he attracted them to food with a bell. In a special electrified aquarium he set up various sound signals, soldering ordinary telephone membranes into a thin metal sheet and lowering it up and down in the water.

Even when small instruments were attached to the fish, they soon grew used to their new surroundings and remained calm. He was trying to find what provokes movement in fish to obtain food or escape predators. A moderate electronic current passed through the aquarium and by a light metallic hoop to the head (brain) of the fish caused it to make an instinctive defensive movement, naturally. When the sound of the telephone, produced under water, was linked to a brief



by Eric Hardy

electric shock, the fish learned to respond to the telephone alone. Soon it responded with the same sharp movement as it saw the membrane of the telephone vibrate.

Then the telephone was raised gradually from the bottom of the aquarium to the surface, from time to time accompanied by an electric shock. It was then taken out of the water and hung in the air above. The fish continued to respond with the same movement when the telephone rang there, though it cannot detect sounds as a vibration of the air, but as they vibrate the surface of the water with very small and rapid oscillations.

The same reactions were obtained from the fish when food was substituted for the linking electrical shock.

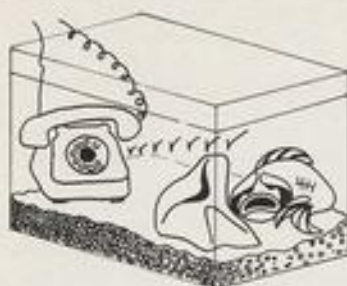
Fish may be cold-blooded (changing temperature to their surroundings warm or cold), but they distinguish differences of 0.1°C, as they respond to minute changes in its saltiness.

Frogs

Most of us began our interest in aquaria through frogs and tadpoles. Last year's organised national 'frog-watch' brought details of nearly 2,000 spawning dates from over 1,300 people in a very cold start to the season. I found it interesting to compare the map showing the spread of spawning time over Britain with a similar pre-war scheme when we recorded spawning dates for the Royal Meteorological Society's phenological survey. Last year it was earliest (before 11th February) in Cornwall, South Wales, Somerset, Hampshire, North Kent, Thames marshes, South-west Scotland, Anglesey and around Belfast Lough. Then from 12th-28th February came the rest of southern England and County Down; from 1st-12th March came the rest of Wales, English Midlands and the North and the Scottish lowlands.

Finally, after 12th March, came eastern England and northern Scotland. The first spawning in 1982, found 18th January at Swansea, was 12 days later than the first reported in 1981. In 1930, the earliest average was S.W. England, with 10th February; then the Isle of Man, 13th February; southern Ireland and South Wales, 24th February; Northern Ireland and S.E. England 5th March; then North Wales, N.W. England and West Midlands, followed by Midlands and East Scotland, with the latest, East Midlands. But all these surveys suffer from the variable skill and time out (week-enders only) of observers, which creates a bias.

In mild 1943 the earliest was 16th January at Widacomb, but not until 16th March did a Groombridge, S.E. England, recorder find any and the latest that year, Thetford in Norfolk, wasn't found until 8 April. First



spawnings found in S.W. England ranged over 34 days from 16th January to 3rd February, while the district sequence followed with South Wales, South Ireland, S.E. England, East Midlands, West Midlands, and East England, N.E. England, Northern Ireland, N.W. England, East Scotland

and North Midlands. I consider it a better record of recorders than of frog-spawn!

Research

A lot of highly-funded professional research into fish-behaviour may seem of limited interest and value; but it is now more extensive than ever it was. At Bangor University College, Dr. T. J. Pitcher is finishing his four years research on a £64,321 government grant to find the rules obeyed in anti-predator moves by schools of fish. At Hull, Prof. Goldspink is in a two year, £62,162 grant-aided study on the effect of temperature on the efficiency of muscles at different swimming speeds, while other zoologists at the same university study the trout's

adaptation to salinity and the regulation of mucous-production by the skin of fish. The effect on salinity on the growth and reproduction of rainbow-trout is being researched at Liverpool and of brook-trout at Nottingham; the chemical basis of fish taste-receptors at Aberdeen; visually mediated predator—and prey reaction of perch at Manchester; the feeding biology of non-salmonid freshwater fish at Liverpool and colour-vision at Bristol. The National Environment Research Council is also supporting research on the feeding of snapper fish of the Virgin Isles, and of the common goby by Bristol University, while the Ministry of Agriculture & Fisheries' laboratory is researching the imprinting (learning) mechanism of homing and feeding in marine fish.

In appreciation of Dave Cheswright

THE sudden unexpected death of Dave Cheswright on the 6th April deprived the tropical fish hobby of an outstanding aquarist. His efforts over the years have contributed to the knowledge, particularly of the rarer and lesser known species of livebearers. He was a founder member of the Southern Livebearers Aquarist Group and successfully bred and distributed many of the species brought into this country. His interest in livebearers went back a long time as for many years he maintained his own strain of Moon Platies.

Dave was always willing to help and advise fellow aquarists; he was always available to give talks to Southend, Leigh and District

Aquarist Society, or indeed, any club within a reasonable distance of his home in Wickford. He was also a familiar sight at shows around the South.

The writer first met Dave in August 1960 after answering an advertisement in the Aquarist in which Dave suggested a Society to serve the Billericay/Wickford area of Essex. Although this attempt was unsuccessful, Dave soon after joined the Southend Club and was almost immediately co-opted onto the committee as treasurer. He occupied this post continuously until November 1972 when he was elected president. From November 1974 until July 1979 he was club secretary when he again took on the presidency. At the 1981 annual general meeting, at his own request, he relinquished the presidents job for the post of librarian to enable him to put all his efforts into organising the 1982 open show. This year he again took on the task of open show secretary but also was elected to the general committee as club secretary.

Prior to the writers first acquaintance with Dave he had been keeping fish for a considerable time. He was a junior member of East London Aquarist and Pond-keepers Association and in 1948 took first prize in their open show in the class for *Macropodus opercularis*. In the first East London all breeders show in 1951 he won the first and second prizes in the Dwarf Gourami class. Daves' more recent show successes are, of course, common knowledge.

David was S.L.A.D.A.S delegate to the F.B.A.S; a leading light in the Association of Essex and East London Aquatic Societies and also a member of the Southern Livebearers Aquatic Group, British Aquatic Study Society and Newcastle Guppy and Livebearer Society.

His many friends in Societies around the country will, I know, wish to join S.L.A.D.A.S members in extending their heartfelt condolences to his wife Audrey, and his children Christopher and Ann on their sad loss.

Peter Capon.

Snail Eater



By William Ross

SCHISTOSOMIASIS or Bilharziasis is a disease recorded as early as 1,500 B.C. in Egypt. The disease is an infestation of the human body by specific blood flukes of the genus *Schistosoma*. Data obtained by the World Health Organisation from 15 countries in Africa and the Middle East show that approximately 26 million out of the total population of 107 million suffer from this dreadful disease. Many areas where Bilharziasis occurs are more or less under-developed and there the disease is found frequently amongst agricultural workers on irrigated land. The life cycle of all Schistosome worms includes a phase where aquatic and amphibious snails play host to the creature, it is at this stage that control of the disease has been attempted by using chemicals and ducks and geese to destroy the snails. My observations on *Rhabdosargus sarba* (Forsk. 1775) may add another member to

the fight against Bilharziasis; this needs further research.

Silver Bream (*Rhabdosargus sarba*): this predatory member of the Sparidae family is widespread in both the Indian and Pacific oceans and found from the Red Sea and the East African coast, around India, the East Indies, North Australia and north to Japan.

Rhabdosargus sarba has a high, compressed body with a spinous dorsal fin; the first 11 rays are well formed hard rays and the remaining 13/14 soft rays. Pectorals are large and pointed, tail forked. Anal fin 3 hard rays and 11/12 soft rays. Body colour is silver, each scale has a gold centre giving the impression of yellowish lines. Face and opercula covered in small scales. Adult specimens develop a deep yellow abdomen, pelvic and anal fins. These fish can grow to around 22 in. and I doubt if many aquarists could accommodate adult

specimens but young fish of 3 in.-4 in. make ideal aquarium inhabitants.

I collected four small Silver Bream from a tidal influenced stream at Qatif/Qatif Oasis in Saudi Arabia's Eastern Province. At low tide this fast flowing stream consists mostly of fresh water which has drained from the date and banana plantations. The water originates from deep aquifers approximately 600 feet underground making its way to the surface via artesian wells; the water has a high mineral content and is therefore very hard.

The four Bream were placed in a 36 in. x 12 in. x 15 in. aquarium filled with tap water; my domestic water supply originates from similar aquifers to the water at Qatif. Filtration was by two simple box filters. These fish are heavy messy feeders so continuous filtration is a necessity. The aquarium was planted with well established Amazon Sword plants. These fish have the bad habit of tearing pieces off the plants. Partial water changes every week is obviously appreciated by the Silver Bream.

Feeding *Rhabdosargus sarba* is no trouble. At first they accepted proprietary prepared flake food and as they grew this was replaced with pellet food. Small pieces of meat or fish add variety to their diet. I noticed that their aquarium soon became snail-free; this tank had quite a population of snails before it became home for these snail eaters. As a bit of an experiment I collected snails from my other tanks and put them in with these fish. It was quite an experience to watch them eating snails, crushing them with their teeth. One fish only eats the flesh spitting out the crushed shells but the other three eat shell and flesh. They will go around the aquarium turning over stones looking for snails.

For the aquarist with a snail problem, this fish could be worth investing in but I would advise keeping them only with fish of a similar size as they are predators. If further research is successful it may not be too long until we hear that *Rhabdosargus sarba* is being used to control Schistosome-carrying snails and also supplying food in some under-developed countries.



by
Roy Pinks

A CORRESPONDENT recently protested that the accuracy of the layman aquarist was 100% by comparison with that of the experts. If he was referring to the nonsense written by a certain individual whose books I have managed to have removed from the shelves of the local library, I have the greatest sympathy with his viewpoint, but if he had in mind the main range of authorities I think his arithmetic is a bit off. It must be said, however, that the layman who takes the trouble to record and publish actual events is of the essence of the hobby, and he should be encouraged by every means to carry on with the good work. I don't think the journals do enough to reward aspiring scribes—but that is an editorial matter! But some of these—not many—will perhaps in time get the bug to spread themselves through the pages of a book, and this is where the trouble about authenticity really begins.

There are some writers today, like Frank Orme, whose books can be bought with complete confidence because the reader knows that they are written by a practising individual with a professional outlook. Those who have

not actually experienced or practised certain operations are not always easy to detect, but they do tend to use their imagination in linking familiar happenings to those which they have not themselves explored, and hence the specialist layman will often and successfully argue against them. There is no particular crime in this habit: the writers have taken chances and come down on the wrong foot and probably correct the howlers in the later editions. Yet again you will find that respected writers like Evans, McInerney and Soderberg will have put into print the opinion that aeration is not necessary. Who can wonder that the beginner is often highly sceptical of the trade or the writers or both! And how is it that such highly contradictory statements are often published almost side by side in the same journal?

I think that what our correspondent failed to realize was that the same natural act may be possible under widely varying conditions, yet writers who have only experienced one set of them record them as though they were Gospel truth. For example, one article I read recently on the breeding of angelfish stated that rainwater was essential. Another recorded success with rather hard tapwater. All that this indicates is that some writers are dogmatic and that angels are not fussy

about water as it comes—yet it may have been a very different story if spawning had been attempted in very old and very brown tank water.

Aquarists have to bear in mind that what they see through the front panel of a tank is a mixture of infinitely varying components. The nature of water may vary considerably as between day and night, and it will certainly vary most significantly the more fish and the more plants there are within it. Some tanks have aerators or filters in them, and these will cause the in-tank conditions to vary from time to time, quite invisibly as a rule, though there are, of course, pH and hardness tests which can be applied to determine two of the constituent factors. But if you use a power filter, for example, for an hour each day the result will be quite different from that obtained by using it for several hours at a time, in that the strengths of dissolved chemicals will vary. What is the practical effect of this?

It means that you should always keep an open mind. Never write off a claim from a practising aquarist without being sure of your ground. Fish

Continued on page 53

Three young angels on the alert for food



Seaweed in the Aquarium

by
Alain Breitenstein

THE marine aquarium, sterile, bare with a decor of rock and sand, gives rise to a lot of controversy between 'freshwater diehards' and marine aquarists who are fascinated by their hobby. However, contrary to a number of prejudices, a number of species of marine plants adapt easily to living conditions in an aquarium.

Every aquarist, freshwater or marine, knows that green water plants are distributed through all the rivers and seas of the globe. Marine flora is made up of a total of 25,000 species which share a very simple vegetative system, the *Thallus*, and are very diversified as far as their reproductive systems are concerned.

In order to reproduce in the aquarium the biological conditions which are vital to the growth of marine vegetation, the first part is devoted to the natural biotopes created by the existence of different factors.

1. Marine Vegetation in Nature

Marine plants form an important link in the food chain and numerous fishes, *Acanthuridae*, *Pomacentridae* are particularly enthusiastic feeders and continually graze on the plants which grow on the coral substrate.

The second important function is the transformation of inorganic substances into soluble organic

matter which is very beneficial to the fish.

By absorbing numerous dissolved salts (nitrates, phosphates) the plants purify the medium efficiently and, in an aquarium in which there is luxuriant vegetation, the health and growth of the fish is markedly improved.

Since the botanical classification of marine plants is very complex, the different groups will be distinguished according to an ecological grouping, that is to say the conditions of life in the natural state.

Marine algae abound in all the seas and oceans of the globe from the arctic regions to the tropics and are distributed in distinct vertical zones. The development of the plant life is influenced by the environment (salinity, pH, water agitation, insulation, temperature) and each ecological characteristic possesses its particular flora and fauna. The whole of these constitute the Ecosystem.

Different algae are easily identified by the colour of their thallus which varies according to the type of pigments contained in the cells.

The first algae which develop in the aquarium are:

A—Brown algae (*Phaeophyceae*)
the *Thallus* of which, partially devoid of Chlorophyll, has a coloration ranging from yellow to dark brown.

Amongst the brown algae there are Diatoms, microscopic unicellular algae, very large in number in the aquarium, on the tank sides or on the sand.

Brown algae indicate insufficient light or poor quality lighting.

B—Red algae (*Rhodophyceae*)
the *Thallus* of which is coloured red by the presence of special pigments. Red algae are closely associated with coral reefs and encrust the rocky substrate.

C—Blue algae (*Cyanophyceae*)
This third group, very different from the others, does not have a separate nucleus or plastid. The blue colour of the thallus is the result of a special pigment, Phycocyanine, which masks the green colour of the chlorophyll.

D—Green algae (*Chlorophyceae*)
Numerous and varied microscopic and macroscopic unicellular or pluricellular, it is amongst these species that one finds most species which adapt to life in the aquarium. Green algae produce a lot of oxygen which slowly dissolves in the medium and maintains a high pH value. In order to acclimatise marine plants it is advisable that their biological type, longevity, adaptation to a particular temperature range and light intensity are known.

In the sea two types of algae have developed, the pelagic algae which make up plankton and drift with the currents, and the Benthic algae which are fixed to the substrate and the culture of which may be attempted in the aquarium.

Certain marine species, like some freshwater plants, have a very brief life span, limited to a certain time of the year. These are annual algae of little interest to the fish-keeping hobby.

The second group, the Perennial algae, the vegetative system of

which lasts for several years, are particularly useful for the decoration and biochemical purification of marine aquaria.

Temperature influences the distribution of the algae and varies considerably in tropical seas between the supralittoral zone, the Thermocline and the ocean depths.

The algae which live in shallow water are dependent upon summer warmth. They are Eurythermal organisms.



When conditions are ideal a whole field of *Caulerpa* can be created in the aquarium.

Others live at a deeper water level where there is less movement of the water and the temperature is stable throughout the year. These are Stenothermal plants. Fortunately, a few species are tolerant and can be acclimatised, either in a temperature tank in which the temperature fluctuates between 13° and 17°C, or in a tropical tank where the temperature varies between 24° and 28°C. The plants in the family of Caulerpaceae are able to tolerate without too much harm a wide range of temperatures.

To all intents and purposes, the spectral composition of light rays has no influence on the development and growth of marine vegetation. But, in order to synthesize their food, the algae need intense solar energy.

This energy is characterised by two factors:

The Intensity

The surface of the water reflects light in the same way as a mirror and suspended waste products, plankton and substances dissolved in the medium form a barrier to the penetration of light rays. The intensity and duration of the light determine the biotope of different species.

A distinction is made between biotopes which receive intense light and in which Photophilic algae abound and deeper zones where a highly restricted amount of light suits the development of Sciophytes or shade-loving vegetation.

The last important ecological factor is the distribution of algae according to the Ecosystems found at depths varying between a few centimetres and the ocean depths.

Essentially, four vertical zones of distribution are distinguished.

The Supralittoral Zone

The region of contact between the continents and the oceans, rarely submerged, moistened for the most part by spray and the rocks of which are splashed by waves, is practically devoid of flora and



A leaf or fragment of a leaf quickly reforms a



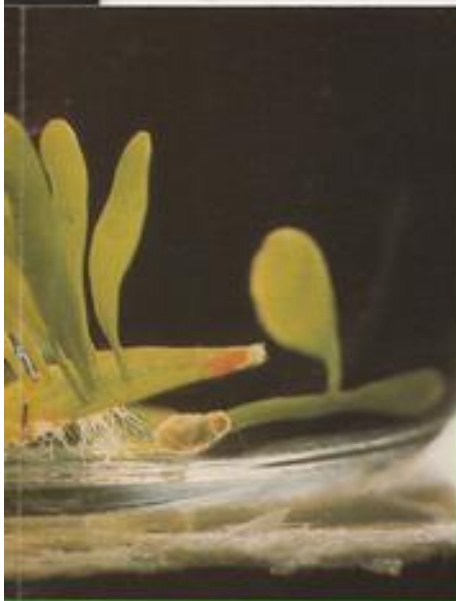
This magnificent hair-like growth is composed of so called rhizoids.

fauna; it is the domain of blue algae, which are very rare in the aquarium.

After a few fathoms of descent below the waves, one reaches the second region.

The Midlittoral Zone

This is abundant with life and is subjected to regular immersion and exposure with the rhythm of the tides. The water is violently agitated, saturated with oxygen and brightly illuminated. It is the most interesting



complete thallus

zone where the greatest number of varied algae have evolved.

In order to reach the next zone it is preferable to be able to swim, for this deeper region is constantly submerged.

The Sublittoral Zone

The light rays are filtered and red and ultra-violet rays are picked out, but the development of algae is wide and varied.

Finally, the last stage which descends to 200 metres.

The Circalittoral Zone

Deep and receiving little light, it is the start of the Aphotic zone, the light rays are very much filtered and only Sciophytes, or shade-loving plants, are able to develop.

In limpid tropical seas this zone descends as far as 200 metres. Beyond this point begins the Bathybenthic zone, a dark and cold region devoid of vegetation.

In the Intertidal zone the agitation of the water, the changing of the tides, the currents and waves have an important influence on the morphology of the algae and small animals. In this violently scoured region organisms adapted to be able to resist considerable dis-

In the case of algae oxygen is given off over the whole surface of the thallus, even on the rhizoids



lodging force and against the risks of being buried.

The algae are firmly encrusted on the uneven surface of the substrate and the animals, especially the crustaceans, are covered with a thick carapace and cling to the rocks with the aid of powerful claws.

In order to achieve good results in the aquarium, it is necessary to know the physical and chemical qualities of natural sea-water.

The protection of oxygen under very bright lighting conditions

A close-up which shows the abundance with which gas is given off (chlorophyllous assimilation)



Three factors determine these properties.

The Salinity

A number of species of algae live in waters the density of which varies between 1020 and 1030 or 30 to 40%. However, a few rare species tolerate variable densities, such as those which one can find at the mouths of rivers.

The pH

Natural sea-water is perfectly stable and variations in pH are tiny. However, in small pools containing a small amount of water and abundantly decorated with green algae, the using up of carbon dioxide, under the effect of photosynthesis, may result in the water becoming substantially more alkaline.

Dissolved Substances

Like all plants containing chlorophyll the assimilation of dissolved salts takes place over the whole surface of the Thallus.

Acclimatisation of Benthic algae in the aquarium

The second part of this article concerns the culture of algae, principally Chlorophyceae, in the restricted environment which a marine aquarium constitutes.

The best results are obtained in aquaria the balance of which approximates as closely as possible to natural conditions.

Filtration

In order to obtain crystalline water, which allows the light to penetrate, a powerful undersand filter shows an excellent return and is particularly suited to the culture of marine vegetation. Movement in the water is created by means of several spray cones fed by a powerful air pump. Very light coral sand forms an ideal substrate for the anchorage of benthic plants of the genus *Caulerpa*.

Light

Lighting is the most important aspect of acclimatising marine

plants. Although the spectral composition has no influence upon the development of algae, the best light is provided by the sun's rays.

A lot of light accelerates the process of photosynthesis, contributes to oxygen renewal in the medium and considerably reduces the carbon dioxide content;

The intensity and duration of lighting necessary varies from one species to another, but there are hardy algae which adapt to the light conditions created in aquaria;

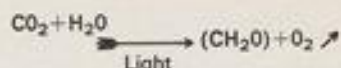
The best results are obtained with mixed lighting, using fluorescent tubes used in horticulture and direct sunlight. A few hours of sun are very beneficial for algae of the Photophilic type. The length of time they are illuminated should imitate the natural cycle, with successive periods of lighting and darkness at regular hours.

Algae, like invertebrates, are very sensitive to the presence of metallic ions and copper is particularly harmful. Precise observations have shown that the presence of ions of copper or iron, even at extremely low concentrations, inhibit totally the growth of plants. Consequently the treatment of fish with copper sulphate is impossible in an aquarium containing marine plants.

In the natural state the pH remains constant. However, in an aquarium of small capacity, illuminated by the sun for several hours each day, the oxygen produced by photosynthesis slowly dissolves in the medium and a large number of bubbles are seen to appear on the surface of the plants and subsequently burst at the surface. At the same time the plants absorb CO₂ and the concentration of the gas gradually diminishes; the medium becomes more alkaline.

At night the process is reversed. A great deal of CO₂ is given off and this, coupled with the exhaustion of a substantial part of the oxygen content, leads to the water becoming more acid.

In conditions of bright light the process is described by the following equation:



Under the effect of the light the important functions of photosynthesis are shown—absorption of carbon dioxide, production of organic matter (CH₂O) and the giving off of oxygen.

Choice of Species

The beaches of the Atlantic or the Mediterranean offer a wide choice of algae and marine vegetation, which are free and easy to obtain and the culture of which it would be interesting to experiment with in a well illuminated aquarium. The choice of algae is determined by ecological criteria, many of which are difficult to recreate in the aquarium. For example, vegetation which needs intense light and the direct rays of the sun or types of seaweed which grow in the intertidal zone, subjected to periodic immersion and non-immersion with the regular ebb and flow of the tide. It is equally important to avoid annual plants which last for only one season and the sudden demise of which on a large scale creates a grave risk of pollution.

At the present time few marine plants are available commercially, but one can obtain quite easily the green algae of the species *Caulerpa prolifera*.

These algae grow in abundance in all warm and temperate seas and are particularly suitable for decorating a tropical or Mediterranean type aquarium. Their growth is rapid in a well illuminated aquarium which receives several hours of sunlight each day, at a temperature of about 25°C.

A few specialist dealers also offer the plant *Caulerpa sertularioides* which comes from tropical seas and the shape of which is reminiscent of a feather. Growth is rapid and the temperature can be a little higher (about 26° to 28°C).

Finally, other seaweeds which

Continued on page 46

Red Labrid or Yellow-tailed Wrasse?

by David Morgan

FOR as long as I can remember seeing marine fish for sale, one of the most regular imports of the Wrasse family to grace dealers' tanks has been juvenile specimens of the yellow-tailed wrasse, *Coris gaimard* or its close relative, *C. formosa*. It is really not surprising that this juvenile form has earned its own common name of Red Labrid, for it is popular with both beginning and more experienced aquarists alike.

It is quite easy to identify these two species apart because there is a dark spot on the centre of the dorsal fin in *C. formosa*, which is absent in *C. gaimard*. These fish are both from the Pacific Ocean, *C. gaimard* being very widespread.

The genus *Coris* houses about four species which may be available

to aquarists in this country, all of them fairly expensive for so few inches but because of their hardiness, their appetite, and not least their gentle disposition, they are well worth the investment.

I think I'm right in saying that all wrasses are primarily carnivorous and certainly all manner of freeze-dried and fresh (cooked) fish products are eagerly devoured, though almost anything is taken including algae growing in the tank, particularly the red kinds. Of course it is now possible to give regular feedings of live adult brine shrimp, obtainable from most good aquatic suppliers.

Growth is not as rapid as in other species, but grow it will and a life expectancy of several years can be expected when properly

cared for. In the wild a length of some fourteen to fifteen inches is not uncommon but the largest specimen I've ever seen in an aquarium (some years ago at Dudley Zoo) was about ten inches. At this size it seemed fully adult but the front two white slashes were a little more prominent than in the photograph of the adult here. I don't remember so many blue spots either. This fish is almost as large and is definitely *C. gaimard*.

When small, it is very important to provide a reasonable depth of sand for the fish to bury itself in at night. As most systems these days are filtered by under-gravel plates and pumps, the upper layer of the filter bed is coral sand anyway, so there isn't a problem. The fish remains submerged in the sand for up to twelve hours. This is a characteristic of many wrasses. It is wise not to keep anemones in the same tank, or if possible to at least keep them off the sandy substrate, in case the wrasse emerges into an embrace of death instead of breakfast.

Sometimes juvenile specimens will exhibit another feature shared with other species, that of 'cleaning'. It is unlikely their tank mates will harbour any of the larger parasites they might do in the ocean, but that will not deter the smaller wrasses from looking. Occasionally, one will become a little too enthusiastic and nip at one of its customer's fins. If we go to have our hair cut and find our ears being trimmed we probably don't visit that barber again, we might well hit him. Fish, sometimes, are very like people.

Water conditions must be reasonably good to keep wrasses. This species is an active swimmer preferring open water and is found frequently all over the reefs and shallows. It maintains this behaviour in the aquarium.

If any change in this behaviour is noted, in this or any other species for that matter, it is worth doing a few checks on the aquarium as a whole. I take the following

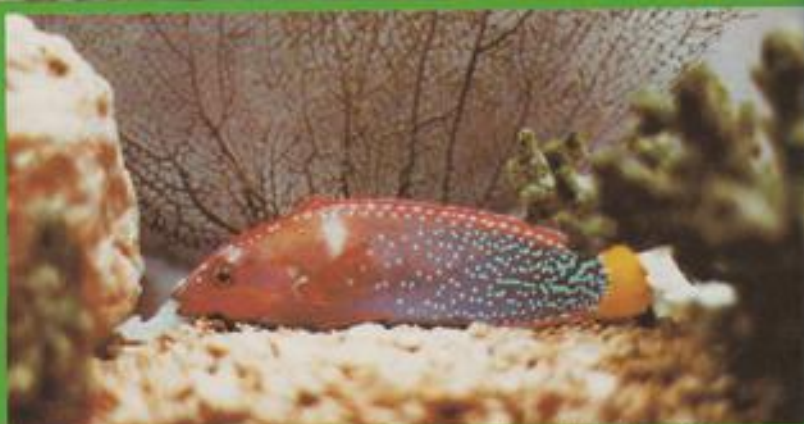


Coris formosa (juvenile) distinguished from *C. gaimard* by the presence of a black spot on the dorsal

steps when I'm puzzled about something (which I frequently am) in an attempt to find the cause by a process of elimination.

First I attempt to discover if more than one occupant is affected. If that is the case a speedy examination is necessary of water condition, possible pollutants and, of course, any signs of disease, and action taken accordingly.

There is another possibility: that of contamination. Apart from the obvious risks, various sprays and heavy smoke, etc., there is another where contiboard surrounds are used. While these are manufactured specifically for this use it is not unknown for home made cabinets to be used. I've certainly made my own in the past. It is of paramount importance to ensure that at no time does the water have a chance to come into contact with the chipboard interior of the surround. If it does the board will obviously begin to



Coris gaimard in adult colour phase which shows up best in a photograph when multiple flashes have been used

deteriorate and release the chemical preservatives it is purged with when being made. Manufacturers give this process a name, 'tanninizing' and it includes a formaldehyde injection to discourage pests. When dissolved in water it is lethal in very minimal doses.

Where contamination is suspected a complete water change must be made, and it must be remembered that the filter bed may be toxic too. This is an expensive and time consuming operation and every effort must be made to discover and remove the cause, otherwise the effort may be a sheer waste of time and money.

Where only one fish is affected we have quite a different problem.

Immediate isolation is desirable, but not always possible. It could be simply that the fish is in some kind of shock. It could be a viral disease. We each have to draw our own conclusions, and get as much advice as possible. Often a good veterinary surgeon will be able to help with treatment of unknown and obscure diseases.

It is possible to keep several specimens of either species of Red Labrid in the same tank and cosmetically very pleasing. Their strength of colour and pattern make a marvellous contrast and add to any surable collection.

Press Release



Tetra Marin, Tetra Cichlid, Guppy Food

When feeding fish—variety is important!

Constant feeding is obviously of vital importance in successful fishkeeping and today's aquarists are in a fortunate position when compared to their latter-day counterparts. It is not so long ago that aquarists had to either make their own foods or else rely upon seasonally erratic (and perhaps pest-ridden) supplies of live foods.

Nowadays, however, there is available an almost bewildering array of fish foods—in either flaked, tablet, pellet or even stick form. Naturally, aquarists should choose a range which they feel that they can depend on with regard to quality—but quality does not usually go hand-in-hand with cheapness! However, how important are the so-called 'special foods' when compared to the ubiquitous 'staple diets'?

Staple Foods

The majority of aquarium fish can be maintained in good health using a good quality staple diet. Whilst some prepared diets are based on what are (for the fish) unnatural food items (eg., offal, garden vegetables), at least one range of foods contains more natural food organisms such as plankton, shrimps, aquatic plants, seaweed and mosquito larvae. Many fish actually feed upon these in the wild, although

when they are used in the production of a high quality prepared diet, a great deal of attention has to be paid to quality control and the exclusion of any disease organisms and potentially toxic substances. The results are, however, highly nutritious prepared diets which are actually close to nature!

Special Foods

In addition to 'staple foods', most ranges also have a number of 'special foods'. These can be divided into two types—depending upon what they do or what they are for. To begin with, some special foods are designed to achieve certain results when used regularly. Thus, a colour-enhancing food will markedly improve fish coloration, and a growth food will be useful in encouraging the growth rate of young fish. Many aquarists now realise the benefits of regularly using one or more of these special foods to supplement a diet based on a staple food.

The other category of special foods are those foods which are designed to meet the nutritional demands of a certain type of fish. A balanced diet contains proteins, fats, carbohydrates, vitamins and minerals—all present in the correct amounts. Whilst a good quality staple diet will be suitable for most fish, it is obviously difficult to formulate one food which will be

suitable for the nutritional needs of all fish. Therefore, it is to the benefits of the fish if special diets for cichlids, guppies, marine fish, etc. are used when available. These can supplement a staple diet, or may themselves be used as a staple diet for the fish indicated.

Scientific Research

Some ranges of foods are based upon a great deal of scientific research and development, and aquarists are advised to utilise such ranges to their fullest extent in the correct feeding of their fish.

A full colour brochure on fish nutrition is available (free) from the Tetra Information Centre, 15 Newlay Lance Place, Leeds LS13 2BB. Trade enquires regarding the Tetra range of fish foods should be directed to W A Patterson, Warner-Lambert Pet Care, Mitchell House, Southampton Road, Eastleigh, Hampshire.



Tetra Ruby, Growth Food, Tetra Min

A chance to discuss your fishkeeping problems with Dr. Chris Andrews of Tetra

AS A RESULT of his other commitments for Tetra, Dr. Andrews cannot (unfortunately) visit as many aquatic clubs and societies as he would like. However, during 1983 Dr. Andrews will be attending the following shows or meetings, and would be only too glad to discuss any fishkeeping problems that you may have:

British Marine Aquarists Association

Seminar, 21st May 1983 in Dewsbury, Yorkshire.

Yorkshire Aquarists Festival, August 1983 in Doncaster, Yorkshire.

Pet Product Marketing Exhibition, 2nd October 1982 in London.

Trade only

West Yorkshire Marine Aquarists Group, 19th October 1983 in Dewsbury, Yorkshire.

British Aquarists Festival, 5th and 6th November 1983 in Manchester.

Further dates may be added during the year. Please note that additional information on any of the above events may be obtained from the Tetra Information Centre, 15 Newlay Lane Place, Leeds, LS13 2BB, or from the event organisers.

If you cannot get along to any of these, you can still drop Dr. Andrews a line at the Tetra Information Centre in Leeds, or in the case of urgent enquiries ring Leeds (0532) 555980 (24hr. answering machine).

Pocket Thermometer 1501

A NEW lightweight handy-sized thermometer just available from Micron is inexpensive and simple to use and easily fits into an overall or jacket pocket.

Covering a range wide enough to suit just about every need; -50° to $+1100^{\circ}$ C; the 1501 instantly displays the measured temperature on a large black Liquid Crystal Display, which can be seen in all conditions, except darkness.

Extremely well priced at £49.50 excluding VAT and Postage, the Micron 1501 is such good value for money that only 'glass' thermometers are cheaper.

With the use of computer-trace design techniques we can ensure the micro-electronics and digital circuits give high accuracy and long term repeatability without any sacrifice to price.

Automatic 'Lo Bat' and Cold Junction compensation features are built in as standard. An ordinary 9V. PP3 should give 2-4 hundred hours use.

A special inducement to enquirers

of this Press Release will be that for each and every thermometer ordered, a hand held probe from a choice of three basic types, Needle; Surface; or Immersion; will be sent entirely free of charge to accompany the thermometer. Operation and application instructions are always included along with one battery. All Micron thermometers carry a full One Year

Warranty against faulty components or workmanship.

Ideal for Professional; Amateur; Economist; Hobbyist; Commercialist or Student, in fact, suitable for almost every occupation or Industry.

For more details contact; Les Drew, Sales Office, Micron Electronics, Tel: 0582-62487 or write to the above address



Accident with Rosewood's 3½ cwt. presentation cake results in chef's 9-hour repair stint

AN IMPRESSIVE 'birthday presentation' case weighing 3½ cwt., measuring 4 ft square and made by Rosewood to mark the 21st birthday of the British Pet Industries Exhibition, was involved in a road accident en route to Harrogate Pet Trade Fair suffering damage needing nine hours of intensive repair work at the Fair by chef Alexander Hamilton.

The result of no less than 150 hours of carefully-monitored baking involving a 1 cwt. topping of icing, this super cake was travelling by trailer to Harrogate when driver Brian Woods, Managing Director of Rosewood, had to brake unexpectedly, sliding the cake off its timber pallet-base and breaking it into five pieces.

Alex. Hamilton, the chef who made the cake, skilfully re-assembled and re-iced on the Rosewood stand.

Later, the Mayor of Harrogate took

the first cut and, eventually, over 3,000 pieces were enjoyed by visitors.

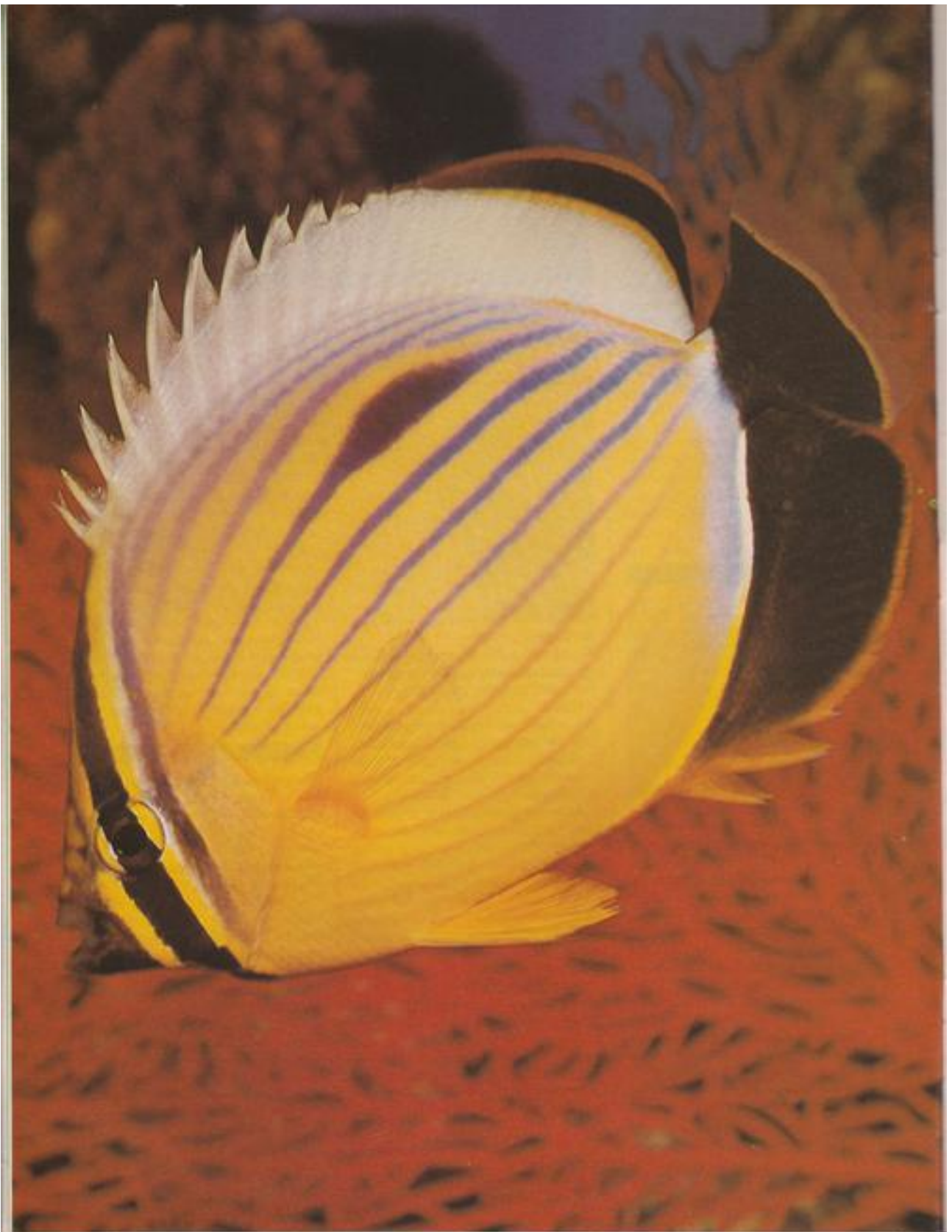
Final word? It must come from Brian Woods who comments: "It just goes to show—you can break your cake and eat it."

Interpet to distribute Peterama products

IN COMMON with many other companies, Peterama Ltd of Chelmsford has been hit badly by escalating transport and handling costs and by the weakness of Sterling.

A new Company is being formed within the Interpet Group to carry out the distribution of Peterama products and Mike Clarke, at present the Interpet Area Sales Representative, will be the Brand Manager for the products. Interpet will appoint another Southern representative.

Peterama products will be sold and distributed through Interpet's existing distribution system—the policy will be to distribute goods through wholesalers rather than direct to retailers.



SPOTLIGHT

The Red Sea Rainbow Butterflyfish

by
Martyn Haywood

Specific name: *Chaetodon austriacus*

Range: Red Sea

Size: Approx. 6 in.

Chaetodon austriacus, otherwise known as the Red Sea Rainbow Butterflyfish, is one of the most attractive marine fish ever to have been offered to the marine hobbyist. It is one of the very large, circum-tropical, family Chaetodontidae and, as the accompanying illustration shows, is one of the most magnificently coloured.

Some years ago this species was fairly regularly available to the fish-keeper but with the seemingly ever-growing tension in the Middle-East, and Israel's extremely strict conservation policies, supplies of this beauty have almost dried-up. Unfortunately for us, this species' home territory is limited to the extremely salty waters of the Red Sea and there are now only very limited and irregular imports to Britain from that region.

The Red Sea is the saltiest body of non-landlocked water in the world, having a salinity approximately fifty percent higher than other seas. The Red Sea was formed at the same geological time as the Rift Lakes of eastern Africa, when massive blocks of the earth's crust cracked and sank. This left extremely deep, sheer sided pits which over the years have evolved to produce some of the most exciting fish habitats in the world.

The Red Sea is supplied with water through a narrow, com-

paratively shallow link with the Indian Ocean. There are no major inflows of fresh-water into the Red Sea, and because of the high temperatures experienced in the region the rate of evaporation from the Red Sea is extraordinarily high. These two factors combine to produce the high salinity. Some of the fish in the Red Sea are also to be found in the Indian Ocean but many species are endemic (having evolved to cope with the higher water temperatures and salinity) that is, they are found nowhere else in the world. *Chaetodon austriacus* is one of these endemic species.

Despite the present difficulties in obtaining this species for import, it is extremely common in its natural habitat. It can be found throughout the Red Sea, wherever there is living Acroporian coral, as the polyps of these reef-forming corals constitute the major part of the fish's diet. To those who have been fortunate to dive or snorkel in the Red Sea, *C. austriacus* will have been a common sight. When small, under about two inches, small groups of them flutter

and dance among the coral-heads—hence the common name of butterflyfishes. As they mature they form apparently devoted pairs which, with partners rarely straying more than a foot or two from each other, quietly graze among the corals.

Although this species is endemic to the Red Sea there are several similar, and obviously closely related species. Of these the commonest by far is *Chaetodon trifasciatus*—the Rainbow Butterflyfish.

C. trifasciatus is found throughout most of the Indian and the western Pacific Oceans, and is quite commonly seen in the tanks of British fish dealers. Its colouring is neither as crisp nor as vivid as *C. austriacus* but it is nonetheless a beautiful fish and the two species have often been confused.

Unfortunately for the marine aquarist *C. trifasciatus* is almost impossible to maintain for any length of time. Not only does it demand perfect water conditions but, more importantly, it will only very rarely eat anything other than its natural diet of coral polyps. A few individuals will occasionally accept live *tubifex* worms but these adventurous specimens are few and far between and as a general rule the hobbyist is well advised to avoid this species. To their credit, the majority of responsible importers have advised their shippers overseas not to ex-

SPOTLIGHT



port this fish because of the difficulty in maintaining them and so now they are by no means as frequently seen in shop tanks as before.

The Red Sea Rainbow, like many Red Sea endemics with close counterparts, is often slightly easier to keep than its close relatives. This is not to say they are simple

fish to keep, and on those very few occasions when they are available, should be left strictly for the experienced marine-aquarist. Water conditions need to be perfect—no ammonia, no nitrites, a high pH (8.2-8.4), as little nitrate as humanly possible, a specific gravity of 1.030 and temperature between 80°F and 84°F. They should be housed in large, 50 gallon or more, aquaria with only a few peaceful tank-mates and the best chance of success is to keep them in with a well stocked collection of invertebrates. In that situation they may find food items to their liking during the often long and frustrating time taken to

adapt to conventional fish foods. Specimens have been known to take shellfish, Artemia, white worm, *tubifex* and bloodworm.

Despite the foregoing it must be stressed that these are extremely difficult fish to keep for any length of time and are likely to stay that way until a readily acceptable dietary substitute for living coral is found. Only a very small percentage of specimens will adapt to aquarium life and the regularly available fish foods. All things considered it is probably a good thing, for both fish and aquarist, that so few Red Sea Rainbow Butterflies are now imported.

Seaweed in the Aquarium

Continued from page 38

adapt well are to be found in the genus *Halimeda*, which is found in warm seas and the Mediterranean. It grows slowly on a rocky substrate in regions where the light is weak.

Conclusion

Algae represent a vital link in the food chain and participate actively in maintaining the biological balance of the medium. In order to maintain luxuriant plant growth it is usually necessary to carry out regular cleaning operations, which prevent the vegetation from being choked.

It is very important to ensure the well-being of marine plants, because the sudden disappearance of a large quantity of algae results in noxious effects which may destroy all the living organisms in the aquarium.

As well as preventing the plants from being choked by waste material, the regular siphoning off of old vegetation enables younger, more vigorous plants to develop.

The culture of marine plants increases considerably the well-being of the fish, maintains the biological balance and lends a touch of natural greenery to the aquarium which is so attractive.

In the years to come it would be highly desirable if the importers of marine fish and invertebrates devoted themselves more to commercial activity involving plants which are indispensable to marine life in the aquarium.

OSCAR



G. Robinson

Aqualife

Tucked away in a hidden recess of one of the Florida Keys, along a nondescript road in the protective shadow of looming pines, is the result of years of aquaculture research. On the same island with grizzled shrimpers and old-fashioned lobster trappers, there exists a modern aquaculture facility, a type of fish farm not even dreamed about when many of us were kids. It is a new kind of Florida fish farm, one not dependent on the adaptation of someone else's ideas, other technologies, or outside experts from the government or some consulting firm. It doesn't use holes in the ground, cheap labour, fancy fish from someone's laboratory, or yesterday's technology. It is, remarkably, a successful fish farm that is producing marine aquarium fishes for the U.S. market. And even more remarkably, it is operated by one of this country's pioneers in the spawning and raising of marine fishes from the world of fisheries biology, an ex-employee of the Florida Department of Natural Resources (DNR), an expert on fish migration along the Gulf and Atlantic coasts.

Perhaps it was this intense interest in why fish migrate that led Marty Moe into working with Frank Hoff at the Florida DNR many years ago, and to his tagging studies on Florida fish. Even then it was apparent that Marty Moe was no rote student of the views of other people. He studied migration with a powerful sense of "why," and years ago pointed out important ideas that were to him obvious, but not to legions of others before.

Marty separated migrations to foraging grounds from those for spawning, and further distinguished habitat separation for foraging between young of the year fish and older members of the population. If young fish were occurring where adults did not, it wasn't simply wide distribution of the spawn in a random dispersal. Rather, the very different biological require-

A Marine Fish Hatchery by B. Goldstein



Raw sea water is taken from near shore and pumped to a huge sand filter in the first stage of preparation. The filter removes particles and parasites



In the second stage of preparation, the filtered sea water is chlorinated with commercial bleach in a huge above-ground swimming pool. The final preparatory stage will be dechlorination 24 hours later with sodium thiosulphate (photographic hypo)

ments of the young led them to exploit habitats unsuitable for adults, habitats that were made to order for the youngsters and them only, among the year classes of the population. Fish, in short, were not blobs that splashed everywhere, but purposeful animals that sought out the right places to be at specific stages of their lives.

Today we know that fish which use estuaries do so in a specific way. The very tiniest fry work their way up to the shallowest and lowest salinity parts of the estuary, and move progressively "downstream" into deeper and more saline water as they grow. Many of them spend the first winter inshore, in the estuary itself, and only proceed to normal inshore-offshore migrations in the second year of life when they are becoming adults.

Marty pursued this interest with Frank Hoff at the Florida DNR where both were pioneers in the newly emerging technology of spawning and rearing marine fishes. The state was interested in increasing the fisheries of Florida for both commercial and sport purposes, and Marty and Frank worked to rear a great number of the local fishes. Among the successes were mullet, gray snapper, pompano, sheepshead, spotted sea trout, red drum, Atlantic croaker, spot, northern puffer, white grunt and porkfish.

But a technology of spawning was quite different from one for rearing the young, and here is where the Florida biologists made their contributions. Spawning, of course, could be induced by injections of hormones (human chorionic gonadotropin is most popular) macerated pituitary glands, or the fish could simply be stripped by hand. With many sport and commercial species, it was a simple matter to collect adults during the breeding season and strip them. Difficult individuals would produce eggs and milk if they were spiked with hormones a day or two in advance.

Rearing, as conducted in most parts

of the world, was accomplished by collecting wild plankton in special nets, and then sifting that plankton (much as the old German aquarists sifted rotifers and wild infusorians) to provide graded sizes of live food as the young fish grew.

Perhaps it was the lack of money for pumps, or microscopic observations of deceased fry, but somehow marine fish rearers got on the right track and sharply curtailed aeration and other kinds of rough agitation in the fry tanks. It was observed that fry not fighting a current could catch rotifers and would not be battered against the walls of the container. More important, it was noted that the fry would collect right at the surface where there was abundant oxygen, and needed no additional injections of air under pressure.

During the next several years workers in laboratories around the world developed the system used today, growth of *Brachionus plicatilis* rotifers in culture, feeding them on cultured green algae with a yeast supplement. And aquaculture facilities worldwide are today producing food fish for people in Asia, Africa, the Middle East and elsewhere. In the United States, Marty Moe and Frank Hoff started their own independent marine fish hatcheries. Frank's operation is Instant Ocean Hatcheries in Dade City, Florida and Marty's is Aqualife Research Corporation at Marathon, Florida. Two other marine fish farms, Sea World in California and Ocean Farming in Florida, are no longer producing marine fish for the aquarium market, leaving just the two operating companies to provide the entire American market for tank-reared marines.

I was in the Florida Keys to enjoy a day of snorkeling at Pennkamp State Park at Key Largo, and telephoned Marty suggesting an interview. I had never been to a marine fish farm before, and Marty graciously agreed to show me around. An hour and a half drive later, I pulled into the pine-shaded

Marty Moe stands next to racks of breeding tanks. Intense light and a long photoperiod are the keys to inducing breeding. Note that the double fluorescent reflectors are wrapped in plastic to protect them from salt drift and spray



sand and limestone road that led to Aqualife Research.

The size of the operation is what first hits the eye. Everywhere I looked, there were outdoor above-ground tanks constructed of all kinds of materials. Here was a series of concrete tanks, there a cluster of plastic-lined plywood containers, and everywhere the gentle shading of snow-fencing overhead, as in a typical agricultural nursery. There were kiddie pools and one giant plastic pool that must have come from the backyard of a pretty wealthy Floridian who refused to dig a hole. And in the middle of it all, a giant plastic container looking like a MelloRoll cookie gurgled with water from the adjacent Atlantic. Indoors, tiers of aquariums were jammed up against one another, each tank holding a pair of clownfish and one or two other residents. In another room, large vats held myriad clownfish fry, tiny neon gobies just getting their vivid blue and learning to swim level, and graceful black and yellow angelfish no larger than my pinky nail. Resisting the impulse to see it all, dashing from tank to tank, I forced myself to sit down with Marty and



The bulk of the outdoor tanks are constructed of plywood, lined with black construction plastic, and set off the ground on cinder blocks. These tanks are used to grow algae, algae-rotifer mixtures, or young fish that have passed the larval stage



Cement tanks with wire inserts are used to handle small numbers of specialised stock, such as hybrid angelfish

get the facts home aquarists would want to know. I must have made a terrific impression as a journalist, for the first thing I discovered was that I had come without a notepad! Finally, however, we got started.

goby production is currently about 20,000 fish per year, and angelfish production is just getting underway at about 10,000 per year. He also rears several other marine fishes, but not in sufficient numbers to impact the market

hormone injections.

"Most aquarium fishes, clowns in particular, are too small to inject without the risk of damaging their internal organs," he says. "I can get them to spawn using just the correct



Outdoors, feeding is heavy, three times a day, with alternating dry flake foods and prepared mash. Heavy feeding requires almost continual water changes, here accomplished with a pump and overflow system

Aqualife Research Corporation began in St. Petersburg in 1973. Two years later, it moved to Marathon in the Florida Keys where a year round supply of warmth and perfect sea water from the Florida Straits enabled Marty to expand operations, increasing both production and the number of species of marine fishes he is able to offer the American market. At present, Aqualife is spawning and rearing nine to eleven species of clownfish with an output of from 50,000 to 100,000 fish per year, depending on weather. Neon

in wild fish. The fish he has reared or is producing in small numbers are greenhead and sharpnose gobies, royal grammas, hog snappers, sea horses (not profitable to rear), jewelfish, dragonet, and yellowhead jawfish. He also works with hybrids between the hi-hat and jack-knife fish. His angelfish production consists of hybrids between black and French angels, also spawned, but not yet reared are rock beauties, queen angels, spotfin butterflyfish and banded butterflyfish. Marty is increasing production of royal grammas, following the discovery that these fish produce large, demersal eggs in caves, quite unlike their egg-scattering relatives.

If what he does is striking, then how he does it is pretty amazing. First of all, he has little need for the use of

light cycle and good aquarium conditions."

"What about big fish like marine angels," I asked, wondering how he would go about keeping twelve inch high fish in good health in fish tanks.

"Angels are a special case," he replied. "I collect them from the reef during their protracted breeding season, and strip them here at Aqualife. Once in a while I have to help them along with an injection, but often they will produce eggs and milt with simple handling. After they've been stripped, I take them back to the reef and release them."

Marty Moe has two systems, one for spawning and the other for rearing. We talked about how he does it and how these procedures could be adapted by the home aquarist. A lot of Marty's



Inspecting some grow-out tanks. Marty checks feeding activity, and watches carefully for listlessness, shimmying or irregular growth

ideas would shock marine aquarists raised on the notion of almost sterile conditions, but what he does works. And when you see it work, the logic and beauty of it is striking.

Take light. Most aquarists were raised to limit the light intensity in order to prevent the production of green water. We were also raised to search out special plant stimulating spectrums to stimulate the right kind of algal growth and retard the wrong kind. Forget all that.

At Aqualife, the indoor breeding tanks are lit by pairs of 40W daylight fluorescents, with about 80W per 80 gallons of water. That is about double the wattage provided by standard fluorescent hoods. The intense use of daylight fluorescent results in the growth of red, brown and green algae on all the surfaces, but not noxious blue-green algae which thrive in heavily

loaded tanks with dim light. Clownfish are given a photoperiod of about 14 hours light and 10 hours dark, because they are summer spawners in nature. For winter spawners, the opposite cycle would be used.

Temperature is maintained indoors at the upper 70s and low 80s using room heaters. Marty uses filtered natural sea water (more about that later) and supplies each pair of fish with at least two to three cubic feet of space. Tank sizes are 15 to 50 gallons, depending on the size of the adult fish. The important part of the set-up is the depth. Marty insists that the breeders be given 14 to 20 inches water depth to simulate their natural spawning habitat. He uses only pairs of fish rather than colonies, but also throws in a hermit crab to keep the undergravel filter bed nicely turned over. Hermit crabs won't attack clownfish eggs, unlike other kinds of crabs. Many tanks also had a jewel fish or angel, and Marty pointed out that seldom are the parent fish bothered by an unrelated extra fish.

Organic loading could be severe

were it not for Marty's rigorous water changes. He feeds two to three times a day, and changes 50 to 80 per cent of the water every week, using a flowing system. The diet consists of a combination flake food and mash. The home-made mash consists of shrimp (without the shell) or conch as a protein base, algae, and a vitamin and mineral supplement. The flake food is a standard commercial brand.

All tanks are filtered with undergravel filters only, with a two inch substrate of silica sand, limestone gravel or crushed coral. A fiberglass screen divides the gravel layer and prevents the hermit crab from digging all the way to the filter plate.

Every tank has a Pacific anemone and a cave for security. The cave might be a flowerpot or a lean-to of slate or tile. Marty suggests that home aquarists use a 29 gallon high tank per pair of fish, or divide a 50 gallon with a partition for two pairs. Because home aquarists can't use Marty's water changing regimen, he recommends power filters with carbon.

AQUALIFE

For neon gobies, Marty uses five gallon tanks, and the fish breed freely in them. Gobies get twelve hours of light, a temperature in the mid-seventies and above, and a variety of shells and rocks for breeding. The five gallon tank is also filtered with an undergravel filter.

For raising the fry, the key is raising the fry food. Marty begins with outdoor pools and vats of green water. He doesn't bother with pure cultures of a single species under sterile conditions. He runs sufficient vats that, should one or two be taken over by a noxious organism, they can be quickly emptied and new cultures begun from other vats. It is the Japanese green water technique, requires little labour and is usually successful. The vats are inoculated with old green water culture and fed yeast and plant foods. When the water gets good and green, he adds a culture of rotifers. The combination

of rotifers, algae, yeast and sunlight results in heavy food production. Various things can kill a culture, including organic build-up, ciliates, copepods or insects. In the summer, a culture might last for three weeks.

Marty suggests that home aquarists use a 90-gal. kiddie pool in the backyard during the summer, or a fifteen gallon long tank indoors the rest of the year. Either container will grow enough rotifers for one spawn of clownfish.

With both firms offering all culture stages to shops and the home aquarist, there is no reason not to see an increase in home raised clown and other marine fishes. Algae will last for weeks, but rotifers don't last long, and Marty prefers to ship them under oxygen, just like fish.

Marty's water system uses ocean intake pipes. The water is filtered through sand, and then chlorinated with commercial bleach. After a day it is dechlorinated, the levels monitored using a swimming pool chlorimeter. Used water is pumped into the ground, but aquarists might re-use their water by storing it outdoors after chlorination-dechlorination.

For initial feeding of the fry, Marty removes the rock with eggs attached on the day before they're due to hatch, and inverts the rock over gentle aeration in a large tank containing rotifers. The fry hatch out into the container, obviating the need for collecting and moving them. Additional rotifers are provided by filtering rotifer culture through a handkerchief (home system) or special filters. A hatch of 200 fish can be raised in a 20-gal. container for the first two weeks (on rotifers), and then placed in smaller tanks with undergravel filtration for intensive feeding and growth. Baby brine shrimp feeding is initiated after the first week, but long before *Brachionus* feeding is discontinued. For neon gobies, with a much longer larval period, four weeks of rotifer feeding may be necessary, which is twice as long as clownfish require.

Much of what Marty has learned, and has to teach, is provided in his recently published *Marine Aquarium Handbook*. For information on ordering the book, cultures or tank-reared marine fishes, contact Marty Moe at P.O. Box 1172, Marathon, Florida 33050.



New books from Tetra

Available in English for the first time are the following extremely high quality books, published by Tetra and written by three of the world's foremost experts in their own fields.

'*Tropical Aquarium Fish*' by Dr Ulrich Baensch. Over 180 tropical freshwater fish are described and featur-

ed in full colour, with complete details on their care and maintenance.

'*Coldwater Fish in the Home and Garden*' by Professor Werner Ladiges. A complete guide to the coldwater aquarium and the garden pond, featuring (in addition to koi and goldfish) the care and feeding of other, less common coldwater fish.

'*Marine Aquarist's Manual*' by Hans Baensch. A new book on the setting up and maintenance of the marine aquarium, with full details on the care and feeding of 60 of the most popular marine fish.

Each book is packed with colour photographs, many of which British hobbyists will not have seen before. These books are available from all Tetra stockists and the recommended selling prices are *Tropical Aquarium Fish* £5.25, *Coldwater Fish* £4.75 and *Marine Aquarist's Manual* £5.95.

APOLOGY

We regret that due to a typographical error on page 40 of our June issue we deprived the wife of the FSAS President, of her marital status! Our sincere apologies to both Mr and Mrs Sinclair.

Tomorrow's AQUARIST



TOMORROW'S AQUARIST is aimed at developing the skills and knowledge of aquarists of all ages. It is a Mixed Bag of activities, facts, ideas, opinions, anecdotes, competitions, advice and experiences that we get to hear about on any facet of fishkeeping that will make the aquarist of today a better one tomorrow. We, therefore, welcome information from any and every quarter. Please send your contributions to: Tomorrow's Aquarist, The Consultant Editor, *Aquarist & Pondkeeper*, The Butts, Half Acre, Brentford, Middlesex, TW8 8BN.

★ ★ ★ ★ ★ ★ ★ ★

Swindon poser

There are some very unusual fish swimming around in Swindon! The route through which these remarkable fish came to our notice is a mixture of coincidences, half-chances, and a good creative approach to Biology teaching.

The story (briefly) goes something like this:

A Postgraduate Student Teacher attending the Biology course being run at Bath University by our Consultant Editor, spent six weeks on Teaching Practice at Hreed Burna, a comprehensive school in Swindon. During his time there, he organised the setting up of a tropical community tank in the school entrance hall. To do this, he acquired the enthusiastic assistance of a few 4th year pupils who formed part of a larger group following the Animals and Plants option offered by the Biology Department.

The idea proved a great success, so much so that two permanent members of staff, Mr John Leonard and Mr John Smith, decided to take things a stage further. They approached the next intake of fourth formers with the idea of setting up a number of coldwater tanks in the science laboratories. The

challenge was eagerly taken up by twelve pupils who undertook, not only to set up a tank in each laboratory, but also to stock and maintain them throughout the year. The tanks have, therefore, become the responsibility of these pupils who, so far, have provided the school with Catfish, Goldfish, Common and Crucian Carp, Crayfish, Sticklebacks, Perch and a "Carp-like fish of dubious parentage".



Note the spot on the caudal peduncle of the smaller (lower) fish

The fish, as can be seen, has undoubtedly Carp characteristics but, how do we account for the spot on the caudal peduncle? Some very experienced coldwater aquarists who have seen these fish can go only so far, and no further, with their identification. This is particularly so when it is mentioned to them that some of the larger (2 in.) fish are only now developing the spot while, in other instances, even 1 in. individuals have had it for several months.

The pupils who collected these fish from a local gravel pit containing Carps, Roach, Tench and Perch would, of course, like to know what they have in their tanks—so would the teachers involved—and so would we! Is it a hybrid? Have any of our readers come across similar fish before? The address of the school should anyone wish to contact the teachers or pupils is: Hreed Burna School, Aker's Way, Moreton, Swindon, Wiltshire.

★ ★ ★ ★ ★ ★ ★ ★

Reluctant frogs

We stay in Swindon for our second item this month. The Head of Biology at Park School, Marlowe Avenue, Walcot, Swindon, Wiltshire, has been rearing various species of frog for several years and, by now, has a small population of healthy three/four-year-old Common Frogs, *Rana temporaria*, in the laboratories. (All the surplus froglets are, of course, returned to the wild each year). The specimens in the laboratory have excellent coloration, are very active and are in superb condition, a major feat as anyone who has kept these beautiful and interesting amphibians in tanks will confirm.

However, there is a problem (of sorts) with these, otherwise, perfect specimens. Although they are now of breeding age, not a single specimen has shown the merest sign of coming into condition. This, of course, means that, notwithstanding their undoubted usefulness as teaching aids, their true potential remains unexploited. Is it the fact that laboratory conditions do not provide the low temperatures that, in the wild, force frogs into hibernation? If so, is a period of low temperature a prime requisite for the sex hormones to do their jobs in the spring? If you have any suggestions, answers or direct experience of this, please get in touch with us and/or Miss Mary Trickett, the Head of Biology at Park School.



Female Common Frog with spawn

COMMENTARY

Continued from page 34

and plants are always doing the oddest and least characteristic of things, and all these deviations should be recorded. I noticed V de T recently ascribing Cryptocoryne Disease to a Fusarium virus and stating that it is incurable, but alongside this I recall Evans drawing attention to the danger of old "rich" water, much beloved by some aquarists, causing what he described as "scorch" on Crypts. I have certainly experienced this phenomenon

and recorded that after I had trimmed the damaged leaves down to base and carried out a pretty fundamental water change, slow regeneration did take place and some quite impressive plants ultimately established themselves.

These constantly and infinitely changing features of water present the ultimate challenge to the fishkeeper, and he who interprets the signs accurately will always come out on top. In the age of the microchip I suppose that it is possible that some sort of black box could be put together with a number of probes linked to a visual display unit which would show in hard figures what all the factors of a

container of water were. This should pretty well guarantee success over a wide field and further indicate to the operator what corrective measures needed to be taken for this or that objective. But what a dull thing the hobby would have become when so much was predictable with such accuracy! But I don't think that there is much to worry about in that direction because it just isn't worthwhile to researchers to develop such technology for this purpose alone. It could, of course, result as a by-product from some other line of activity, but I cannot see the unit cost falling within the pockets of most of us.

PRESS RELEASE

An Orchid for a special lady!

A PROMOTION originally organised for a trade exhibition will give pleasure to hundreds of senior ladies and ladies in hospital.

Interpet Ltd of Dorking are deeply

involved in the care of animals and aquarium fishes. The Company thought that it would be a nice gesture to give an orchid to all the ladies visiting the British Pet Industry Exhibition in Harrogate on the 24th and 25th April.

Then Director Maurice Martin had another idea—Why not extend the gifts to brighten the lives of ladies in hospital?

He approached the New Royal Surrey Hospital, who were enthusiastic about this idea and have arranged for him and his wife to present orchids specially flown in from Singapore to each lady in a specially produced sleeve saying "For a Special Lady".

At the same time, the other Director, Dr. Neville Carrington, is presenting orchids to old folk at the Dorking Day Centre.

The picture shows Assistant Managing Director, Mr Maurice Martin, presenting an orchid at the New Royal Surrey Hospital in Guildford



July, 1983

NEXT MONTH DON'T MISS OUR SPECIAL CICHLID ISSUE

Our SPOTLIGHT will focus on the **ELECTRIC BLUE** *Haplochromis*

FISHES OF THE DARIEN. Exclusive feature by Ian Sellick on his visit to the Darien region of Panama.


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**Coldwater
Jottings** by Frank W. Orme

Most fishkeepers are aware of the potential danger which exists when having electricity and water in close association, but often familiarity tends to make one forget and become complacent in the belief that the system will always be safe. I had fallen into this trap until quite recently, when the possible danger was, unexpectedly, brought home to me.

With the intention of sorting a batch of young goldfish I had cleaned out a larger tank, refilled it with water, and placed the heaters in position. All was set, and the water temperature had risen to the required level. It was then that, for some reason, I placed my hand into the tank water—a quick buzz, which stopped almost at once, made me withdraw my hand in double-quick time. It was obvious that I had been 'bitten' by a very mild electrical shock. Seeking the cause, after switching off the electric supply, the fault was soon found. If I had been a little more observant I would have noticed that one of the heaters had blown its case, allowing water to make contact with the live heating element. Fortunately a small gadget, supplied by Stapeley Water Gardens Limited, had prevented a potentially nasty accident—especially as I have a problem with my heart.

A little larger than an ordinary 3-pin 13 Amp plug, the gadget is called "Power Breaker" and is, in fact,

an earth leakage circuit breaker. Circuit breakers, as a rule, are expensive and require expert installation; however, this small unit is comparatively inexpensive and requires no particular skills to install it—other than the ability to connect any ordinary plug to a cable. Neatly housed in a white plastic case, the Power Breaker provides various safety features which provide protection against electrocution and fire risks. If any equipment, to which the Power Breaker is connected, becomes faulty or the cables frayed or cut the unit will cut off the electric supply within 30 milliseconds, and so prevent the chances of a severe shock, or even possible electrocution. If the unit 'trips' or repeatedly cuts off the supply, the equipment, cable and all

connections should be inspected and, when found, the offending fault rectified. The Power Breaker will continue to trip as long as any fault exists. If the unit trips it must be removed from the supply socket and be reset. Apart from the re-set button there is also a 'test' button to check that the unit is operating correctly. Should the 'live' and 'neutral' of the supply be reversed a warning neon light will glow. Replacement of the fuse is very easily attended to, and does not require the unit to be taken apart.

In view of my recent experience, I can recommend the Power Breaker as a very useful—indeed, essential—safety device which will provide protection wherever electricity is used in or near water, or anywhere else where there may be a risk of an electric shock occurring. The Power Breaker is available, at a cost of £19.55 plus £1.60 postage and packing, from Stapeley Water Gardens Limited, Stapeley, Nantwich, Cheshire, CW5 7LH.

The remark to end all stupid remarks was recently made by the manager of a large city centre pet store. Studying the exceedingly overcrowded tanks of sick, dying and dead fishes—and thinking to myself what a disgusting state they were in—I was approached by a man who introduced himself as the manager, and enquired whether I could be interested in purchasing some of the fishes. To my rejoinder that, even had I been contemplating buying, I would most certainly not select



Coldwater Jottings

anything which he had on display he expressed surprise, and asked why not. Having informed him of my reasons—rather bluntly—he smiled and replied: "They arrive like that, but once they are placed in an aquarium by themselves they will soon be alright." "Rubbish, and you know it", I said. He looked at me, then remarked: "Other people are not so fussy, and, anyway, the live fish will eat the dead ones so why should I go to the trouble of taking them out—and nobody has ever come back to complain!" Hopefully, my parting comments may have registered, but I very much doubt it. Fortunately such ill-managed establishments are in the minority; and very few would be foolish enough to make such a stupid remark as this man's. The great pity is that many would-be fishkeepers will have been quickly disillusioned, by the loss of

their fish, and so lost to the hobby.

The beginner is often at a loss to know what points to look for when selecting fish from a dealer's tank. I do not mean show points, but those indications which suggest a healthy fish. Essentially, the fish should be swimming actively in an uncrowded tank, where the inmates also appear to be active. Avoid any specimen which is sulking by itself; has difficulty in rising from the bottom of the tank or, conversely, floats at the water surface like a cork. A fish which carries itself well, in a balanced manner, with fins erect and well spread is likely to be in a reasonably healthy condition. Avoid like the plague all fish that share a dirty tank with dead and dying stock; fish with very thin 'starved-looking' bodies which make the head seem over-large; fish with any white spots, or flecks of blood on the body or fins; fish with any cottonwool-like fungus growth; fish with any sort of damage to the mouth or eyes,

and any specimen with very ragged fins. Exercise caution at all times and, if in any doubt, look elsewhere.

Having acquired an apparently healthy fish, treat it with some suspicion. All new stock should, as a matter of routine precaution, be subjected to a period of not less than fourteen days quarantine before being allowed to join any other healthy stock. During the period of quarantine it is hoped that any unsuspected problem will reveal itself, and appropriate action taken to remedy the complaint. It is all too easy to introduce disease by unthinkingly placing some new acquisition amongst healthy fishes—but may prove more difficult to cure. Care in the selection of any new fish, plus a period of quarantine, could avoid a great deal of subsequent heartache. Unfortunately, these words are unlikely to be read by the absolute novice who intends purchasing fish for the first time—but you never know!

PRESS RELEASE

New promotional aids from King British

FOR some time now, King British have felt that the exotic appeal of a tropical home aquarium has been diminishing, and that something must be done to revive and revitalise interest at public level.

The hobby of fish keeping is exotic, interesting, and educational when presented in a way that highlights these facts.

King British have produced two new promotional aids which bring back some of the exotic appeal to home aquarists.

First they have produced a world map, in a beautiful tropical turquoise colour, its headed, "King British Information Sheet", "Where the most popular freshwater tropical fish were originally found". Printed on heavy artificial linen paper. The impact of this poster style map is very im-



pressive when displayed in shops, it is available for resale @ 50p each.

A companion set of self adhesive name labels is also available from King British. They are designed to be used in dealers shops for name and price information. Details shown on the label include English name, Latin name and Native Country of the fish along with a simple selling message and space for price. The set includes 150 names of the most popular regular fishes plus 40 blanks for adding names of more unusual fish. Used in shops as a complete tank information aid, the set creates a truly international flavour. Impressing even the most casual visitor with the extent of variety and location of their stocks. Making the dealer more respected, more talked about, and above all more appreciated for his skill and wide reaching lines of communication, the complete set cost £4.75 from King British.

To Breed or not to Breed?

by Roy Pinks

INEXPERIENCED aquarists are all too often talked into the processes of breeding fish long before they are properly briefed on the subject and adequately equipped to cope with the consequences. As a result many thousands of young are produced for which there is no demand, and a high proportion of these are killed off by one means or another with scant respect for the inherent dignity possessed by all living creatures. The ill-prepared novice breeder will therefore tend to give up in despair or disappointment because he has sadly underrated the practical difficulties in one of the most fascinating facets of the entire hobby. The reader should mistrust from the outset any articles headed "Breeding Made Easy" or "How to Breed Tropicals in Ten Easy Lessons". Breeding is not easy, nor is it unduly difficult, but if it were all that simple there would be hardly any need for imports: the fact that the vast majority of tropicals are brought in from overseas puts the minor rôle played by the UK breeder in true perspective.

Why do you want to breed fish? It may be because you are just interested in witnessing the many different ways

in which fish will reproduce themselves. Some are produced alive and kicking, many are laid in eggs scattered far and wide, whilst others are contained in eggs securely fastened to flat surfaces. In some cases there is parental care—often extremely ferocious dedication being shown—and certain species guard their young in their mouth cavities. Other fish build nests of bubbles and deposit the eggs therein, whilst others trail batches of eggs behind them until they are hatched. Some fish eat their eggs and young; others guard and almost seem to play with them. The fancier who finds his desires pulsing from these attractions should read on, for he will certainly be rewarded.

Prize cards

Then there is the aquarist who enjoys his shows and looks for the prize cards now and then, and he will almost certainly want to try his hand at breeding specimen fish capable of taking the judges' eyes. If he understands the mysteries of heredity he will have a head start by being able to plan a programme, but even if he is out of his depth on this subject, he will still be

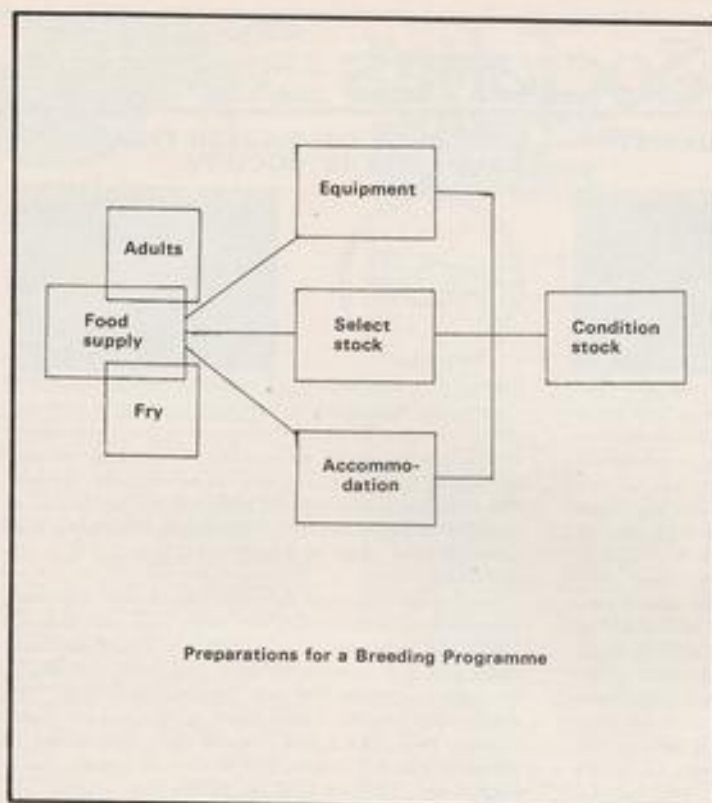
able to produce good results by careful selection of offspring and by bringing in good outside specimens every generation just to liven up the strain. He, too, should read on, because he is almost certain to achieve results in keeping with his outlay in effort.

A third category of would-be breeder is he who hopes to make it pay. There is one sense in which this will prove to be worthwhile, namely the fancier who would like to produce some decent specimens for display in his own collection, and who is content to give away or exchange his surpluses. This is an excellent ploy in and around the clubs, as members can divide up the field between them and include plants etc in the list of media of exchange. It helps to keep some clubs together and certainly spreads the expertise around most effectively. The other aspect of breeding for profit is where the individual hopes to sell to the trade, thus covering his personal outlay. He should certainly read no further if this is his sole purpose, as it is simply not worth it. Better to try and identify oneself with one of the other categories above—and like it!

Having got your motives sorted out, the next step is to consider what you are likely to need in terms of tank accommodation and equipment, and to translate this into available space within your home or fish house. At the same time calculate what this will entail in terms of electricity or gas heating and then ponder whether you or somebody else will be present several times each day after fry have appeared, in order that their insatiable appetites may be attended to. The latter is a most important factor, and many aquarist have lost valuable batches of young because their domestic arrangements have kept them away from the scene of action for the greater part of the day. There is no such thing as latchkey fry!

Into reverse

At this point you must go into reverse temporarily and forget about the fish and their requirements and think hard about food for fish and their requirements—I refer specifically to the wide range of live food which is essential to any successful breeding project, and which must be largely guaranteed before



Preparations for a Breeding Programme

a single stock fish is even considered. Times without number inexperienced breeders are presented with promising batches of eggs or fry, only to lose them from starvation within a few hours. I think that some practice in the maintenance of live food is an excellent foundation for any production programme because the foods can be used not only in the necessary conditioning of the parents, but also in the ensuing weeks when the young have ever-open mouths. It is not simply a matter of knowing how to produce white worm or *infusoria* or micro worm, but being able to produce it consistently and in quantity. You will find it useful to include the space required for this in your initial sums of tanks and equipment. This will be dealt with in greater detail later.

It goes without saying that most of the livebearers and some of the egg-layers will reproduce themselves in mixed collections without intervention by the aquarist. This will provide a lot of interest and even a few fully grown specimens, with some luck. Though a hit-or-miss affair, this can be most entertaining, and one can be sure that the survivors will all be "Natural Selection" qualified! However, the following articles will sketch some of the processes less likely to let you down.

READERS WRITE

The Public Aquarium, Canal Gardens, Roundhay Park, Leeds.

As a Sales Manager I travel all over the country and, needless to say, take every opportunity to visit any and every fish establishment that I can, time allowing.

The average aquarium shop does a great job in providing fish, headware and advice but seldom seems able to create well laid out display tanks to show new or even old devotees of the hobby how beautiful a tank can look in their homes. The main reason for this lack of well laid out tanks is that the fish have to be caught, and

if the tanks were full of hiding places it would prove very difficult. Nevertheless, I feel that hobbyists would benefit if more effort was made in stores and would no doubt result in more money being spent anyway.

Travel as I may countryside, the best 'advert' I have seen anywhere to promote the hobby of fishkeeping is no more than a half mile from where I live in North Leeds... The Public Aquarium at Canal Gardens, Roundhay Park. The huge display tanks are a sight to be seen. There are 13 tanks in total, four Marine including a 9ft. invertebrate tank, eight freshwater tropical and a very unusual selection of freshwater fish, in a 7 ft. tank, from the very large lake in Roundhay Park. The Aquarium is reached via a beautiful walled rose garden, two raised terraced ponds of trout and

goldfish, two aviaries stocked with parrots, finches and many other birds, a most beautiful old style hot-house complete with thousands of plants and a superb Koi pond. You then enter the pine panelled Aquarium, open 365 days a year till sunset.

All that beauty and interest and yet it is free. The tanks and contents were all sponsored by local businesses and the 'Lake' tank by Jimmy Saville.

I write this letter to advise hobbyists of this 'FREE' day out for the family, a good excuse to see some really good tanks and fish and to thank Leeds City Council for providing this excellent example of what can be provided for the public 'FREE'.

19 Kingswood Gardens,
Roundhay, P. D. JORDAN
Leeds LS8 2BT,
West Yorkshire.

Meet the Societies



STROUD AND DISTRICT AQUARIST SOCIETY



The S. & D.A.S. logo



Gymnocorymbus ternetzi

If you live within travelling distance of Stroud, then here's a good piece of advice—join the Stroud and District Aquarist Society. You will be struck by the efficiency with which the Society is run, the level of hospitality shown to one and all and the relaxed, friendly atmosphere that permeates their get-togethers. We speak from direct experience of this, having established regular contact with S. & D.A.S. during the months leading up to this article.

The Society was founded in 1952 with the aims of providing "mutual aid and the development of the hobby of fishkeeping." Over the years, a nucleus of loyal members has developed who have involved the whole membership in a wide range of activities concerned with the fulfilment of the Society's stated aims. For example, there has been regular involvement with the general public through the setting up of furnished aquaria in local schools, Children's Homes, nurseries and Health Centres. In addition, exhibitions have been arranged in local Shows, Building Society windows and Public Libraries. At one point in its history, the Society formed a close association with the Aquarists' Club of Leyhill Open Prison with whom they enjoyed many joint meetings.

Although S. & D.A.S. was predominantly "tropically-biased" at the beginning, other areas of fishkeeping have gradually developed over the years so that, today, pond, coldwater and marine enthusiasts all have their interests catered for in one way or another, with awards being presented for Best All Rounder, Best Coldwater Tank, Best Furnished Home Aquarium, Best Special Purpose Tank, Pond Competition and others.

The Society meets on the second Tuesday of every month at 7.30 p.m. in the Sunday School Hall of Uplands Church in Stroud, the Committee having met the previous Tuesday evening. At these meetings, there is a regular speaker and a "Club Shop" where surplus equipment is sold at favourable prices to members. Discussions are also held concerning all sorts of activities such as coach trips to various establishments, major Fish Shows and other places of interest.

Subscription Rates: Adults, £3.00; Juniors (Under 14) and O.A.P's., £1.00.

Apply to: Mrs. P. A. Houghton, Highfield House, Paganhill Lane, Stroud GL5 4AW. Tel: Stroud 2970.

NORTHERN COLDWATER FISH AND PONDKEEPERS' SOCIETY



The N.C.F. & P.S. logo



Rutilus rutilus, the Roach

COLDWATER fishkeeping is currently enjoying a new and welcome surge of interest. Perhaps the depressing economic climate has something to do with this (bearing in mind the soaring costs of maintaining tropical aquaria); perhaps it is a gradual realisation that coldwater fish can be just as beautiful as tropicals; perhaps the greater availability of an ever-increasing range of Fancy Goldfish and Koi is the real reason.

Despite all this, most Societies still tend to lean more towards tropical than coldwater fishkeeping. In order to rectify the imbalance to an extent, a group of coldwater enthusiasts got together in April 1982 and formed the Northern Coldwater Fish and Pondkeepers' Society. Its membership includes a good blend of ages and experience ranging from N.E.F.A.S. (North East Federation of Aquarist Societies) Judges, to Koi keepers, anglers, pondkeepers and beginners from ten to fifty years of age.

The enthusiasm generated by the founder members was such that, within six months of its formation, the Society held its first Open Show which, incidentally, was the first Coldwater Open Show to be held in the North-East of England. This meant that, at last, local coldwater enthusiasts had the choice of fifteen Classes instead of the usual three or four which is the norm for Open Shows. The second of these Shows is planned for October 1983 and will include Classes for Coldwater (Marine) and Coldwater (Fresh) Furnished Aquaria.

One of the aims of the Society is to build up a library on all aspects of coldwater fishkeeping. This will include slides, films and a comprehensive reference section designed to provide a service to individuals and other Societies. Another venture currently being undertaken is the production of a booklet on British Coldwater Fish in collaboration with N.E.F.A.S. and the Association of Aquarists (A of A). On 16th July, a Convention is also being held with N.E.F.A.S. in Newcastle.

Members meet fortnightly (on Fridays) at St. Marks Mission, Gloucester Terrace, Newcastle-upon-Tyne, at 8.00 p.m. All are welcome.

Subscription Rates: £1.50 plus 50p membership of St. Marks Mission Social Club.

Apply to: Jack English, Henderson Filters, Throckley, Newcastle-upon-Tyne. Tel: N/C 644980.

NEWS...

SOUTH WEST



CLIFF and David Spence entertained Bristol A.S. with a series of colour films depicting many scenes of the build up of a Bristol Show and of the winners in the various classes. They were accorded a hearty vote of thanks for an excellent evening. Table Show Results: Bristol Shubunkins (29): 1 and 3, Graham Bell, who won the Terry Bell-Jim Whiting Trophy, 2, V. Capaldi, 4, Vic Cole. Fantails (4): 1, 2, 3, 4, Vic Capaldi. Details of Bristol Show for Goldwater Fish on 10th September from Show Sec. V. Capaldi, 7A Wellingborough Road, Bristol BS6 5BT. (Tel: 0272-426231).

THE north NALSIA D.A.S. open show was held on 11th June and attracted 364 entries. Our thanks go to the judges who officiated and to the Bristol Aquarist Society who ran the Goldwater Section of the Show. Results are as follows:

Special Awards: Best Fish in Show: V. Capaldi. Best Livebearer: J. and K. Corbett. Highest Pointed Individual: C. Tonna. Highest Pointed Nalissa Club Member: M. J. Elick. Highest Pointed Visiting Club: Bristol Aquarist Society. Best Coloured Livebearer: C. H. Amey.

Top Tank Awards: Best Fish: V. Capaldi. Best Pair: C. Tonna. Best Breeders Team: G. Bell.

Guppies (Male): 1, N. Lashcum; 2, W. Grove (Brecknell); 3, D. Ford (Brecknell); 4, M. Elick (Nalissa). Guppies (Female): 1 and 3, D. Cox (Yeovil); 2, M. Elick; 4, D. Ford. Platies: 1 and 3, C. H. Amey (Dorchester); 2 and 4, N. Bending (Cheltenham). Swordtails: 1, P. Taylor (North Wilt.); 2, P. Andrews (Reading); 3, C. Tonna (Reading); 4, P. Cripps (Newbury). mollies: 1, S. Norris (Brecknell); 2, E. and C. Billinger (Nalissa); 3, D. Cox. Adara, Crenatodon, Jemynia, Pristella, Girardinus: P. Cook (Nalissa). Neobrasilia, Caribubbia, Gambusia, Phallochthys: C. Tonna. Phallochthys, Poochia, Xiphophorus: 1, M. Strange (Basingstoke); 2, D. Barrett (BRC); 3, B. and C. Billinger (Nalissa); 4, C. Tonna. Goodside, Ameca, Goodia, Limnoria, Xenophorus, Xenocora: 1 and 3, J. and K. Corbett (Merseyville); 2, D. Barrett; 4, P. Andrews. Solenostoma, Hemistampides, Brachygraphis and A.O.V.: 1, C. Tonna; 2, D. Barrett; 3, P. Andrews. Barbs, Barbodes: 1, D. Ford; 2, C. Tonna; 3, P. Cripps (Newbury); 4, Mr. and Mrs. N. Stevenson. Barbs, Capota and Punties: 1, C. Tonna; 2, A. Russell (Nalissa); 3, D. Ford; 4, D. Cox. Heterostichus and Hyporhamphus, Cheilodactylus and Parachanna: 1, B. Paer (Oldham); 2, C. H. Amey; 3, S. Norris; 4, G. Tanner (North Avon). A.O.V. Characins: 1, Mr. and Mrs. M. Griffiths; 2, B. Parr; 3, Mr. and Mrs. N. Stevenson; 4, P. Taylor (North Wilt.). Siamese Fighters: 1, M. Elick; 2, 3 and 4, P. Johnson (Dudley). A.O.V. Arabantids: 1, C. H. Amey; 2, C. Tonna; 3, L. Williams (Bristol); 4, P. Taylor (Swindon). Catfish, Corydoras and Brochis: 1, J. and K. Corbett; 2 and 3, D. Ford; 4, S. Norris. A.O.V. Catfish: 1, C. Tonna; 2, W. Grove; 3, D. Lilly (Nalissa); 4, S. Norris. Botas and Loaches: 1, C. Tonna; 2, W. Grove (Brecknell); 3, P. Johnson (Dudley); 4, P. Cripps. Barboras: 1, H. A. Miller (Brecknell); 2, F. Codd (Brecknell); 3 and 4, Mr. and Mrs. Stevenson (Oldham). Danios and Minnows: 1 and 2, B. and C. Billinger (Nalissa); 3, P. Cook; 4, A. Barrett (Nalissa). Labret and

From Aquarists' Societies

Sharks: 1, C. H. Amey; 2, P. Cripps; 3, D. Killworth (Dudley); 4, D. Cox. Dwarf Cichlids: 1, C. H. Amey; 2, D. Ford. Anguils and Elacans: 1, P. Cripps; 2, M. Elick; 3, C. H. Amey; 4, D. Cox (Yeovil). Rift Valley Cichlids: 1, D. Ford; 2, W. Brown (LCAS); 3, J. Bridge (North Avon); 4, C. H. Amey. A.O.V. Cichlids: 1, P. Taylor (North Avon); 2, P. Armstrong (Brecknell); 3, J. and K. Corbett; 4, D. Ford. Toothcarps: 1, P. Johnson; 2, D. Ford; 3, P. Cripps. A.V. Pales (Livebearers): 1, C. Tonna; 2, J. and K. Corbett; 3, D. Barrett; 4, P. Andrews (Reading). A.V. Pales (Egglayers): 1, S. Norris; 2, P. Andrews; 3, P. Cook; 4, J. and K. Corbett. Breeders (Livebearers) Tropical: 1, D. Barrett; 2, J. and K. Corbett; 3, W. Grove (Brecknell); 4, P. Cook. Breeders (Egglayers) Tropical: 1, D. Ford; 2, J. Bridge; 3, A. J. Brown (LCAS); 4, H. A. Miller (Chard). A.V. Fish, Junior: 1 and 2, R. Cook; 3, J. Belcher (Nalissa); 4, Maria Belcher (Nalissa). A.O.V. Tropical Freshwater: 1 and 4, D. Cox; 2, S. Norris; 3, C. H. Amey. Ass. Aquatic Plant: 1, D. V. Capaldi (Bristol); 4, M. Dibble. Veilfish: 1, 2, 3 and 4, J. Day (Bristol). Orandas: 1, Mr. and Mrs. P. Arnold (North Avon); 2, 3 and 4, J. Day. Lionheads, Bubble Eyes, Celestials, A.O.V. Goldfish: 1, 2 and 4, V. Capaldi; 2, R. Pincock. Common Goldfish and London Shubunkins: 1 and 2, M. Dibble; 3, A. Hughes (Bristol); 4, Mrs. C. Johnson (Dudley). Comets: 1, S. Storey (Nalissa). A.V. Pond and River Fish: 1, A. J. Brown; 2, J. Day; 3, W. Brown (LCAS); 4, D. McDonald (Bristol). Matched Pairs A.V. Goldfish: 1 and 4, G. Bell; 2, J. Day; 3, D. Garland (Bristol).

SOUTH EAST



Sudbury A.S. 1983 open show results: Class B: 1, 2 and 4, Doris Cruickshank; 3, J. Richards (Leicester); C: 1, M. and B. Cox (Wellingborough); 2, P. Moye (Houghton Regis); 3, J. Richards (Leicester); 4, J. Part (London Transport). G: 1, A. Gale (Sudbury); 2, M. Paxon (Basingstoke); 3, H. Smith (Sudbury); 4, P. Moye. Ck: 1, Doris Winder (E. Dulwich); 2 and 4, K. Sheriffe (Wellingborough); 3, N. Brown (SELAS). D: 1 and 3, H. Irons (Kettering); 2, P. Wilson (Sudbury); 4, N. Brown (SELAS). Da: 1 and 3, C. Smith (E. Dulwich); 2, P. Wilson (Sudbury); 4, N. Brown. Db: 1, Doris Winder; 2, J. Jackson (Basingstoke); 3, N. Brown; 4, W. Chapman (CADAS). E: 1 and 2, Dave Winder (E. Dulwich); 3, P. Lomborne (Hendon); 4, C. Smith. Ec: 1, N. Craddock (Wellingborough); 2, L. Adams (WDAS). F: 1, J. Part (London Transport); 2, N. Brown (SELAS); 3, C. Wainwright (Leicester); 4, M. Smith (Rusfold). G: 1, N. Brown; 2, D. Winder; 3, A. Ponggan (Leicester); 4, D. Wright (Hastings). H: 1, M. and B. Cox; 2, D. Winder; 3, M. Paxton; 4, P. Moye. I: 1, M. Smith (Rusfold); 2, A. Gale; 3, P. Moye; 4, T. Gibson (Sudbury). K: 1, M.

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.

Clark (Brecknell); 2, Doris Winder; 3, R. Smith (Leicester); 4, A. Dempsey (Sudbury). L: 1, D. Winder; 2, C. Richards (Sudbury); 3, R. Smith (Leicester); 4, A. Dempsey. M: 1, P. Wilson; 2, N. Brown; 3, Doris Winder; 4, T. Gibson. N-bm: 1 and 4, C. Wainwright (Leicester); 2, M. and B. Cox; 3, A. Gale. Nc: 1, N. Craddock; 2, M. Clark; 3, S. Benjamin (W.D.A.S.); 4, N. Brown. O: 1 and 2, W. Chapman; 3, T. Laughton (Haringey); 4, J. Harrison (CADAS). P: 1, T. Laughton; 2, J. Part; 3, H. Smith; 4, N. Brown. Q: 1 and 3, R. Standford (Kettering); 2, N. Brown; 4, R. Smith (Sudbury). R: 1, N. Brown; 2, J. Jackson; 3, C. Smith; 4, J. Part. S: 1 and 3, S. Benjamin (WDAS); 2, C. Smith; 4, S. Roberts (Sudbury). T: 1 and 4, N. Craddock (Wellingborough); 2, J. Jackson; 3, J. Richards (Leicester). X-bm: 1, N. Macpherson (Wellingborough); 2 and 3, D. Ridgwell (SLADAS); 4, M. and B. Cox. X-1 and 2, M. and B. Cox; 3, J. Part; 4, R. Orr (Sudbury). U: 1, M. Dursley (E. Dulwich); 2, J. Taylor (Haringey); 3, N. Brown; 4, R. Orr. V: 1, T. Laughton; 2, V. Cronan (E. Dulwich); 3, J. Jackson. W: 1 and 3, J. Taylor (Haringey); 2, N. Craddock. Best Fish in Show: Doris Cruickshank (Hendon). Best Egglayer: Doris Cruickshank. Championship Class Br: Doris Cruickshank. Best Livebearer: N. Craddock (Wellingborough). Highest Pointed Visiting Society: Wellingborough.

THE East Kent Aquatic Study Group held their monthly meeting at the Memorial Hall, Baitings, Heron Bay on the second Tuesday in May. There were sixty-four members and guests present who enjoyed a first class talk and film show presented by Mr. Dave Alison. The film was on the subject of Breeding Catfish and included excellent Micro Photography of the development of the eggs and fry of this family of fish. Table show results this month were: Killers: 1 and 2, L. Scurr; 3, B. Marsh; 4, T. Wobell. Plates: 1, B. Wobell; 2, P. Edwards; 3, T. Wobell; 4, A. Neaves. Medals: 1, T. Wobell; 2, D. Bridgeman; 3, G. Neaves. Guest judge was Mr. Keith Beadle who also presented the cards. At an Inter-Club competition held on 16th May, the home team, East Kent Aquatic Study Group defeated Deal Aquarist Society by 41 points to 19. A return match has been arranged for November.

ON 28th April, Bexleyheath and District A.S. invaded (by request) Northfleet Aquarists and Pet centre, which is owned by one of our members. The object of the visit was a quiz around the shop's tanks. The winner of which took home the goods of his choice. Well done John A!

Fish were also shown by the members. Classes that evening were G and Oa which were judged by our host Dave Goovin. Well done to all the people that took fish along, also to those that took home a card or two. Many thanks go to Dave for making it a most enjoyable evening!

12 May saw us back at the scout hall, Christchurch, Erith, our normal meeting place, for a talk on the antics of an F.B.A.S. judge! How you become one and what you have to do when you see one. Thanks to P. Cottle for a very entertaining talk and also for standing-in for the judge who was indisposed. The class for the table show that night was Da, Db, Dc, and Dr. Thank you all those that took fish and well done to those that took the cards.

MEET THE SOCIETIES HARINGEY A.S.

Please note that the correct telephone number for the secretary of the above society is 01-866 7722 and not as printed in our June issue. We apologise for this error.

Mrs. Marshall (Merseyside); 3, S. Whiting (North Staffs.); Mollies: 1, J. Lynch (Merseyside); 2, Mrs. Daniels (Blackpool); 3, Mr. and Mrs. Marshall (Merseyside); A.O.V. Livebearers: 1 and 3, J. and K. Corbett (Merseyside); 2, B. W. Carter (St. Helens); Characins (up to 7.5 cms.): 1, D. T. Milner (Darwen); 2, Mr. and Mrs. Bibby (Sandgrounders); 3, J. Lynch (Merseyside); Characins (over 7.5 cms.): 1, R. I. Payne (Merseyside); 2, P. Moorhouse (Ponson); 3, Mr. and Mrs. Daniels (Blackpool); Cichlids (up to 10 cms.): 1, M. Parker (Blackburn); 2, R. I. Payne (Merseyside); 3, S. Whiting (North Staffs.); Cichlids (over 10 cms.): 1, P. Moorhouse (Ponson); 2, J. and K. Corbett (Merseyside); 3, Mr. and Mrs. Daniels (Blackpool); Rift Valley Cichlids: 1, Read and Nichol (Kings Bridge); 2 and 3, J. Haworth (Blackburn); Angels: 1, H. Vigns (Preston); 2, C. A. Daniels (Blackpool); 3, J. Jenson (Blackburn); Barbs (up to 7.5 cms.): 1, Mr. and Mrs. Marshall (Merseyside); 2, D. T. Milner (Darwen); 3, J. and S. Creswell (Preston); Barbs (over 7.5 cms.): 1, J. Lynch (Merseyside); Toothcarps, Apistogrammas: 1 and 3, J. Roberts (Accrington); 2, D. Parkinson (St. Helens); Kribnas: 1 and 2, J. Roberts (Accrington); A.O.V.: 1, R. I. Payne (Merseyside); 2 and 3, D. A. Parkinson (St. Helens); Rasboras: 1, D. T. Milner (Darwen); 2, M. Parker (Blackburn); 3, R. J. Stevens (Blackburn); Danios: 1, D. Parkinson (St. Helens); 2, Mr. and Mrs. Bibby (Sandgrounders); Mollies: 1 and 3, A. M. Rodman (Blackpool); 2, D. T. Milner (Darwen); Sharks: 1, Mr. and Mrs. Hands (Accrington); 2, Mr. and Mrs. Daniels (Blackpool); 3, H. Hughes (Darwen); Foxes: 1, R. I. Payne (Merseyside); 2, L. A. Holden (Darwen); 3, C. A. Daniels (Blackpool); Fighters: 1, C. A. Daniels (Blackpool); 2, Mr. and Mrs. Marshall (Merseyside); 3, Mrs. Daniels (Blackpool); Anabantids (up to 8 cms.): 1 and 2, D. T. Milner (Darwen); 3, J. Moorhouse (Ponson); Corydoras and Brochis: 1 and 3, J. T. Morris (Sandgrounders); 2, J. Lynch (Merseyside); A.O.V.: Goldfish: 1, 2 and 3, J. T. Morris (Sandgrounders); Loaches and Bettas: 1, Mr. and Mrs. Bibby (Sandgrounders); 2, B. W. Carter (St. Helens); 3, A. Vernon (Darwen); Pairs (Livebearers): 1 and 2, J. K. Corbett (Merseyside); 3, Mr. and Mrs. Marshall (Merseyside); Pairs (Egg-layers): 1, 2 and 3, J. T. Morris (Sandgrounders); Breeders (Livebearers): A-B: 1, Mr. and Mrs. Marshall (Merseyside); Breeders (Egg-layers): C-D: 1, J. K. Corbett (Merseyside); 2, J. Lynch (Merseyside); 3, Mr. and Mrs. Marshall (Merseyside); Breeders (Egg-layers): A-B: 1, D. T. Milner (Darwen); 2, Mr. and Mrs. Marshall (Merseyside); 3, J. T. Morris (Sandgrounders); Breeders (Egg-layers): C-D: 1, 2 and 3, J. T. Morris (Sandgrounders); 2, D. T. Milner (Darwen); A.O.V. Tropical: 1, C. Tattersall (Darwen); Maries: 1 and 2, B. Leyland (St. Helens); 3, J. and S. Creswell (Preston); Juniors: 1, Miss M. Carter (St. Helens); 2, N. Morris (Sandgrounders); 3, C. Naylor (Darwen); Ladies: 1, Mrs. Bibby (Sandgrounders); 2, Mrs. Rodman (Blackpool); 3, S. Whiting (North Staffs.); Mini-Tank: 1, 2 and 3, D. T. Milner (Darwen); Common Goldfish and Comets: 1, Mr. and Mrs. Bibby (Sandgrounders); 2, A. Turner (Accrington); 3, C. A. Daniels (Blackpool); Moors: 1, 2 and 3, W. Finney (Macclesfield); Shubunkins: 1, A. Turner (Accrington); 2, S. Walsh (Accrington); 3, L. Mahoney (Accrington); Veiltails: 1 and 2, Mr. and Mrs. Hindle (Accrington); 3, W. Finney (Macclesfield); Koi: 1, C. Wallbank (Accrington); Fantails: 1, Mr. and Mrs. Bibby (Sandgrounders); 2, A. Turner (Accrington); 3, C. Wallbank (Accrington); Lionheads: 1, Mr. and Mrs. Hindle (Accrington); 2, J. Lynch (Merseyside); 3, L. Finney (Macclesfield); A.O.V. Fancy: 1, 2 and 3, Mr. and Mrs. Hindle (Accrington); Orandas: 1, A. Ratcliffe (Accrington); 2 and 3, Mr. and Mrs. Hindle (Accrington); A.O.V. Coldwater: 1, S. Walsh (Accrington); 2, A. Turner (Accrington); 3, Mr. and Mrs. Hindle (Accrington).

RESULTS of the Merseyside A.S. open show held on 24th April at Rainhill Village Hall. Number of exhibits 400. Best in Show: Polyporus Druzonosus owned by Mr. and Mrs. Baldwin of Sandgrounders. Best Pair of Fish: B. W. Carter of St. Helens. Best Breeders Team: Mr. and Mrs. Marshall of Merseyside. Guppies: 1, B. Leyland (St. Helens); 2, G. Baddock (Merseyside); 3, W. D.

Hoare (Ind.); Platies: 1, B. W. Carter; 2, D. Barrett (B.B.C.); 3, Mr. and Mrs. Riley (Leeds); Swordtails: 1 & 3, Mr. and Mrs. Marshall; 2, S. Whiting (North Staffs.); Mollies: 1, E. R. Walker (Merseyside); 2, C. McDonald (Sandgrounders); 3, Mrs. D. Price (Ellensmere Port); A.V. Goodies: 1, D. Barrett; 2, J. and K. Corbett (Merseyside); 3, Mr. and Mrs. Silk (S.J.S.); A.V. Poecilia: 1, E. W. Carter; 2, D. Barrett; 3, Mr. and Mrs. Brownlow (St. Helens); A.O.V. Livebearers: 1 & 2, J. and K. Corbett; 3, Mr. and Mrs. Goldford (Macclesfield); Small Characins: 1, Mr. and Mrs. Bibby (Sandgrounders); 2, D. Armit (Buxton); 3, Mr. and Mrs. Baldwin; Large Characins: 1, Mr. and Mrs. Batough (Sandgrounders); 2, S. Jones (St. Helens); 3, R. J. Payne (Merseyside); Rasboras: 1, D. T. Milner (Darwen); 2, D. Turner (Buxton); 3, Mr. and Mrs. Whittaker (Sandgrounders); Danios & Mosquitos: 1, D. Armit (Buxton); 2, Mr. and Mrs. Baldwin; 3, D. T. Milner (Darwen); Dwarf Cichlids: 1, Mr. and Mrs. Baldwin; 2, Mr. and Mrs. Riley; 3, Mr. and Mrs. Riley; Large Cichlids: 1, M. Pritchard (St. Helens); 2, Mr. and Mrs. Brownlow; 3, E. I. Payne (Merseyside); Angels: 1 & 2, W. and D. Hoare (Ind.); Rift Valley: 1, Mr. and Mrs. Williams (Ellensmere Port); 2, Mr. and Mrs. Brownlow; 3, Mr. and Mrs. Batough; Fighters: 1, R. I. Payne; 2, M. Agnes (Buxton); 3, C. A. Daniels (Blackpool); Small Anabantids: 1 & 3, D. T. Milner; 2, R. I. Payne; Large Anabantids: 1, M. and D. Hartley (Sandgrounders); 2, D. T. Armour (Ellensmere Port); 3, M. and D. Hartley; Killies: 1, Mr. Parkinson (St. Helens); 2, G. Crisley (Ind.); 3, Mr. Parkinson; Loaches & Bettas: 1 & 3, Mr. and Mrs. Baldwin; 2, Mr. and Mrs. Batough; Corydoras & Brochis: 1, Mr. and Mrs. Baldwin; 2, B. W. Carter; 3, Mr. and Mrs. Riley; A.O.V. Catfish: 1, Mr. and Mrs. Walsh; 2, B. W. Carter; 3, D. T. Armour; Pairs Egg-layers: 1, B. W. Carter; 2, M. and D. Hartley; 3, L. Bowman (Ellensmere Port); Pairs Livebearers: 1, Mr. and Mrs. Marshall; 2, J. and K. Corbett; 3, P. Edwards (Ellensmere Port); A.O.V. Tropical: 1, Mr. and Mrs. Baldwin; 2, Mr. and Mrs. Riley; 3, B. Leyland; Junior Egg-layers: 1 & 2, D. Hartley (Sandgrounders); 3, Miss J. Baldwin (Sandgrounders); Junior Livebearers: 1, Miss J. Baldwin; 2, L. Readman (Merseyside); 3, M. Baddock (Merseyside); Breeders Livebearers: 1, Mr. and Mrs. Marshall; 2, J. Lynch (Merseyside); 3, Mr. and Mrs. Silk; Breeders Egg-layers (Ops. 1 & 2): 1, R. I. Payne; Breeders Egg-layers (Ops. 3 & 4): 1, R. I. Payne; 2 & 3, D. T. Milner; Goldfish & Comets: 1, Mr. and Mrs. Bibby; 2, S. Walsh (Accrington); 3, C. Wallbank (Accrington); Shubunkins: 1, M. J. Ragan (Merseyside); 2, Mr. and Mrs. Newport (Ramsden); 3, D. Middleton (Buxton); A.O.V. Fancy Goldfish: 1, Mr. and Mrs. Bibby; 2, C. Wallbank; 3, Mr. and Mrs. Silk; A.O.V. Coldwater: 1, Mr. and Mrs. Baldwin; 2, Mr. and Mrs. Silk; 3, D. Armit; Mini-Tank: 1 & 3, D. T. Milner; 2, R. S. Walker.

RESULTS of Redcar A.S. open show held on 5th June are as follows: Best Fish: A. Mason. Best Pairs: Mr. and Mrs. Roe. Best Breeders: Mr. and Mrs. Roe. Best Coldwater: D. Clark. Large Barbs: 1 and 2, R. Ashcroft; 3 and 4, D. Clark. Small Barbs: 1, Mr. and Mrs. Slavin; 2, D. Wilson; 3, L. Burdus; 4, N. M. Scott. Small Characins: 1, J. Goldhart; 2, W. Sowerby; 3, Mr. and Mrs. Roe; 4, J. Clark. Med. Characins: 1, R. A. Collier; 2, J. Middlemass; 3, J. and P. Duffell; 4, S. Kelly. Large Characins: 1, J. Middlemass; 2, Robertson; Angels: 1, L. Burdus; 2, A. Brown; 3, Mr. and Mrs. Rodway; 4, Mr. and Mrs. Slavin; Dwarf Cichlids: 1, D. P. Robson; 2, W. Sibbey; 3, J. and L. Wilson; 4, S. King. Rift Valley: 1, C. Parry; 2, C. Marsh; 3, Mr. and Mrs. Roe; 4, J. Corner. A.O.V. Goldfish: 1, A. Mason; 2, Mr. and Mrs. Rodway; 3, J. and L. Wilson; 4, Mr. and Mrs. Rodway; Bettas: 1, S. King; 2, J. and L. Wilson; 3, Mr. and Mrs. Baddley; 4, W. Sowerby; Labyrinth: 1, S. Tupper; 2, W. Sowerby; 3, R. A. Collier; 4, H. Lake. A.O.V. Labyrinth: 1, D. P. Robson; 2 and 3, S. Ives. B.L.T.C.: 1, P. Riley; 2, S. Wilson; 3, F. Tolomeo; 4, J. Zamit; Trop. Cat.: 1, A. Mason; 2, D. P. Robson; 3, Mr. and Mrs.

Rodway; 4, D. Clark. Cory. and Bettas: 1 and 2, G. R. Sayers; 3, S. Kelly; 4, R. S. Kirkup; Rasboras: 1, A. Richardson; 2 and 3, E. Clark; 4, R. Brogden; Danio and W.C.M.M.: 1, C. Clark; 2, Mr. and Mrs. T. Clark; 3, J. A. Chapman; 4, D. Wilson; Loach: 1, J. and P. Duffell; 2, S. Tupper; 3, D. Wheatley; 4, A. Brown; Sharks and Foxes: 1, Mr. and Mrs. Rodway; 2, J. and L. Wilson; 3, J. A. Brown; 4, P. H. Bishop. A.O.S. Tropy Egg-layers: 1, S. King; 2, Mr. and Mrs. T. Clark; 3, Mr. and Mrs. Baddley; Pairs (Egg-layers): 1, J. Corner; 2, Mr. and Mrs. Roe; 3, Mr. and Mrs. Baddley; 4, Mr. and Mrs. Roe; Pairs (Livebearers): 1, Mr. and Mrs. Roe; 2, P. Tolomeo; 3, L. Burdus; 4, W. Sowerby; Guppy (Male): 1, H. Lake; 2, Mr. and Mrs. Roe; 3 and 4, D. Clark; Guppy (Female): 1, S. King; 2, S. Ives; 3 and 4, R. Brogden; Swords: 1, D. Wheatley; 2, Mr. and Mrs. Baddley; 3, S. and N. Suggan; 4, W. Freeman; Pairs: 1, R. A. Collier; 2, Mr. and Mrs. Roe; 3, and 4, S. and N. Burgess; Molly: 1, S. Kelly; 2 and 4, Mr. and Mrs. Baddley; 3, S. King; A. O. S. Live: 1 and 2, L. A. Chapman; 3, S. and N. Burgess; 4, W. Sowerby; Single Tail Goldfish: 1 and 2, Mr. and Mrs. Roe; 3, Mrs. Woodruff; 4, M. Lewthwaite; Twin Tail Goldfish: 1, D. Clark; 2, Mrs. S. Sowersby; 3, R. Scott; 4, Mr. and Mrs. Roe; Koi: 1, E. B. Bradley; 2, D. Clark; 3, Mr. and Mrs. Roe; 4, R. Scott; A.O.S. Coldwater: 1, 2 and 3, J. P. Kane; Breeders (Egg-layers): 1, Mr. and Mrs. Roe; 2, J. A. Chapman; 3, J. Robertson; 4, H. Lake; Breeders (Livebearers): 1, H. Lake; 2, L. Burdus; 3, J. A. Chapman; 4, R. and S. Kirkup; Breeders (Coldwater): Mr. and Mrs. Roe; Maries: C. Herbat.

SCOTLAND



Paisley & District A.S. held its last meeting on Tuesday 3rd May, when the club spotted a tableshow of Barbs and Marine Fish. The results are as follows: Barbs (Senior): 1-2, Ian Lindsay (Junior); 3, Richard Brookings; 2-3, Alan Paterson; 4, Richard Brookings; Marine (Senior): 1-2, Ian Lindsay; 3, Stuart Hamilton Sr.; Junior: 1, Alan Paterson 158; 2, Richard Brookings 125; 3, Dylan Lafferty 121. The cups will be awarded at the a.g.m. on 26th June 1983. Further details about the club can be obtained from the Secretary, Mrs. E. Lindsay, 71 Wright Street, Renfrew. Phone: 041-889 5772.

Dates for the diary

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

JULY

3rd July: The Norwich Section of the BRITISH KOI KEEPERS' SOCIETY monthly meeting in Norwich at the home of Mr. D. Goose. For further details contact the Secretary, Mrs. O. Crosby on Norwich 412095.

2nd July: CHARD & DISTRICT A.S. open show at Parkham School, Chard. Further details from D. Shepherd, 30 Forton Road, Chard. (Tel: Chard 2985).

2nd July: LYTHAM AQUARIST SOCIETY annual open fish show at Arndell Institute, Woodlands Road, Arndell, Lytham St. Anne's, Lancs. Schedules available from Peter Ham, Show Secretary, 1 Wyndeshe Grove, Freckleton, Preston, PR4 1DE. (Tel: Freckleton 633182 or 635221).

2nd July: N.E. YORKSHIRE GROUP BRITISH KILLFISH ASSOCIATION open show, Wigginton Recreation Hall. Enquiries: Howard Atkin, BKA 537, 63 Leemoor Lane, Stanley, Wakefield WF3 4BS.

10th July: DUDLEY & DISTRICT A.S. 2nd open show at the Blind Institute, Wolverhampton Road, Sedgley, West Midlands. For further information contact Show Secretary, K. Wheatley, c/o 36 Westgate, Lion Farm Estate, Oldbury, Walsley, West Midlands B59 1BA or c/o G. Brockhouse (Sodgley) 77645.

10th July: BILLINGHAM A.S. open show, Billingham Community Centre, Billingham. Schedules from Mr. G. McGeorge, 59 Claxson Avenue, Billingham or Mr. D. Resham, 1 Lovat Avenue, Redcar, Cleveland. (Please enclose S.A.).

10th July: SCARBOROUGH & DISTRICT A.S. open show at Frisarge County Primary School, Longwestgate, Scarborough. Further details from Mrs. G. Gray, 112 Osprey Lane, Scarborough.

17th July: SANDGROUNTERS A.S. open show at Meale Cop School, Meale Cop Road, Southampton. Show Secretary, Bernice Baldwin, 19 Olive Grove, Southampton, Merseydale PA8 6BG. Tel: 0704 43394.

17th July: CAISTON & DISTRICT A.S. open show, Caistor Town Hall, 2 p.m. Details from V. R. Black, 16 Caistor Lane, Teffaly. (Tel: Teffaly 554).

21st July: MIDLAND KOI ASSOCIATION open show, Baginbun Village Hall, Coventry (near Coventry Airport off A45). Further details from R. Claver, 59 Kensington Road, Earlsdon, Coventry. (Tel: Cov. 79891).

AUGUST

6th August: NORTHERN GOLDFISH AND PONDKEEPERS SOCIETY 7th open show at the Sports Centre, Silverwell Street, Bolton, Greater Manchester. Details and entry forms from R. Hodgkinson, 9 Sunford Close, Farnworth, Bolton BL4 6LZ. S.A.s. with application please. (Tel: 0204 75251).

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

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

7th August: The Norwich Section of the BRITISH KOI KEEPERS' SOCIETY monthly meeting in Banham at the home of Mr. M. J. Cranke. 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 Huggart Close, Rushey Mead, Leicester. (Tel: Leicester 666154).

7th August: BLACKPOOL AND FYLDE AQUARIUM SOCIETY open show to be held at St. John Vianney School, Glastonbury Avenue, Blackpool. Enquiries to show secretary, Mrs. Sily Barrett, 175 Devonshire Road, Blackpool. (Tel: 0253 32353).

14th August: DORCHESTER TROPICAL FISH SOCIETY 3rd open show at the Boys Brigade Hall, Severnside Lane, Weymouth Avenue, Dorchester, Dorset. Schedules from Mr. E. Sykes, 3 Ashburn Green, Poundbury, Dorchester, Dorset or phone Dorchester 6797.

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

14th August: PRESTON & DISTRICT A.S. 1st open show at Preston North End Supporters' Club, Duddale 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. Rolton, 11 Sherburngate Drive, Pocklington, Yorkshire. Tel: 07592 3177.

28th August: NUNEATON AQUARIUM SOCIETY open M.A.L. show at the Trinity Centre, Arlborough Road, Nuneaton.

28th August: LONG EATON A.S. open show at Gregory's Rose Gardens, Tolon. For details send S.A. to Mr. D. Burton, 21 Lancaster Avenue, Stapleford, Notts NG9 8DL.

29th August: (Angus Bank Holiday Monday), 7TH YORKSHIRE KOI FESTIVAL, incorporating the Society's National open show, at Haswood House, near Leeds. For entry forms and trade stand details contact: The Show Manager, Stuart Bent, 58 Broom Crescent, Rothham, S. Yorks.

SEPTEMBER

4th September: The Norwich Section of the BRITISH KOI KEEPERS' SOCIETY monthly meeting in Solham 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, Wilton Road, Salisbury. Schedules and further information from Mr. D. Hildinton, 35 Somerset Road, Salisbury. (Tel: 0722 26216).

4th September: ANFIELD AQUARIST ASSOCIATION open show, New Venue Leasing Cricket Ground, Near Consett. Further information from secretary Mrs. E. Embleton, Anfield, Aquatics, Front, St. Anfield Place, Co. Durham.

4th September: WELLINGBOROUGH & DISTRICT A.S. open show at Westfield School for Boys, Brickhill Road, Wellingborough, Northants. Further information from Andrew Barton, 66 Rocheway, Wellingborough, Northants NN8 3YE. (Tel: Wellingborough 675662).

10th September: HOUNSLOW & DISTRICT A.S. open show at the Hounslow Youth Centre, Kingsley Road, Hounslow. Details from show secretary, T. Bolingbroke, 2 Holmwood Close, Addlestone, Surrey (telephone: Waybridge 54978).

10th September: BRISTOL A.S. Colwater Fish Show at St. Ambrose Church Hall, Stratford Road, Whitehall, Bristol from 8.5.30 p.m. Details and Schedules from Show Secretary, V. Capaldi, 7A Walsingham Road, Bristol BS6 5HT. (Tel: 0272-626323).

11th September: LEAMINGTON & DISTRICT open show.

11th September: DUNFERMLINE & DISTRICT A.S. annual open show at Nicholson Institute, Dunfermline. Any Enquiries, Telephone Mr. Derek Long, Isewkeithing (413275).

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

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

17th September: KINGSTON & DISTRICT open show at Raynes Park Methodist Church Hall, Worples Road, Raynes 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 9ES.

18th September: NORTH WILTS A.S. open show. For further information contact Mrs. J. A. Quinn, 9 Northton Close, Park South, Swindon, Wilts. SN3 2AN.

25th September: WOLVERHAMPTON A.S. open show. The venue will be Pundford High School, Marsh Lane, Poodhouses Wolverhampton. Show Secretary Les Crook, 18 Binnington Way, Wolverhampton. (Tel: Wolverhampton 5316).

29 September: 1st and 2nd October: BRITISH KILLFISH ASSOCIATION International Convention and a.g.m., York University. Enquiries: Howard Atkin, BKA 537, 63 Lee Moor Lane, Stanley, Wakefield WF3 4BS.

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 Penswell Community Centre, Sunderland. Schedules can be obtained from the Show Secretary, Mrs. M. Hayton, 3 Hume Street, Millfield, Sunderland, Tyne and Wear SR4 4BU.

9th October: READING & DISTRICT A.S. open show at the Youth Club in Northumberland Avenue, Reading. Schedules from chairman, C. Trema, 51a Shirley Avenue, Reading.

9th October: BETHNAL GREEN & INDEPENDENT A.S. 3rd open show at Windsor Road School, Manor Way, East Ham, London E8 4ED. Bunching from 6.30 p.m., Sunday, 9th October to 11.30 a.m., Sunday, 9th October. Schedules and further information from Mr. and Mrs. B. Randall, 18 Tibury Road, East Ham, London E8 4ED. (Tel: 01-477 7921).

16th October: BEXLEYHEATH & DISTRICT A.S. open show at Lessness Heath Primary School, Bexleyheath, Kent. Further details from Show Secretary, John Rowsey (Tel: 01-304 5756).

16th October: BRACKNELL A.S. open show at Penswell Community Centre, Pinstwood, Bracknell, Berkshire. Show Secretary: S. Barnes (Bracknell 0344 50491); Assistant Show Secretary, C. Kaye (Bracknell 0344 81586).

22nd October: BRITISH MARINE AQUARISTS' ASSOCIATION hold their AGM/Marine Seminar at Drebary Club and Institute, Dares Street, Dewsbury, commencing at 10.30 a.m. Guest speakers include Mr. Richard Sankey and Mr. Graham Lundegard. For further detail write to Mr. S. Preston, 16 Poushan Drive, Roberttown, Livestock, West Yorkshire, WF15 7PX, enclosing a S.A.

22nd October: EAST LONDON AQUARIST AND PONDKEEPERS ASSOCIATION 3th annual open Breeders Show at the General Hall, Cecil Road, Chadwell Heath, Essex. Further details are available from Show Secretary Mr. M. Howells, 80 Kingham Road, Goodmayes, Essex. (Tel: 01-590 1824).

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