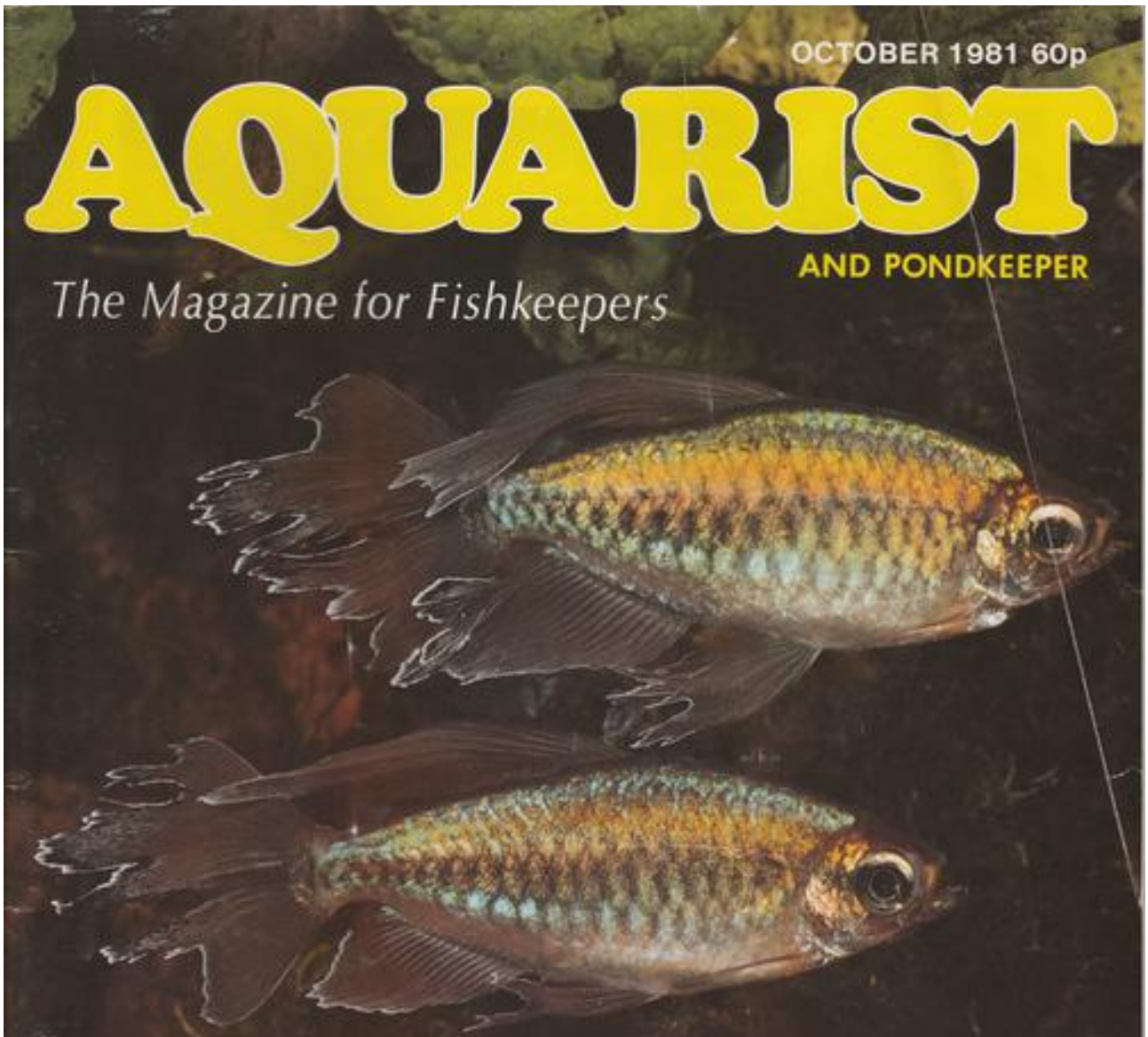
OCTOBER 1981 60p

AQUARIST

AND PONDKEEPER

The Magazine for Fishkeepers



Darters in colour

Butterflies of the sea

The Yorkshire Aquarists Festival 1981 – special report

THE AQUARIST AND POND KEEPER

Britain's Leading Magazine for Fishkeeping

Published Monthly 60p

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

Subscriptions:
Renewable 31st December annually Magazine (Surface mail). November-December 1981 £1.70. Airmail quoted on request.

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

Founded 1924
as "The Amateur Aquarist"

Vol. XLVI No. 7. 1981

Editor: Laurence E. Perkins

Advertisement Manager:
J. E. Young

Cover Plate:
Congo Tetra
(*Phenacogrammus interuptus*)
Photo by
A. van den Nieuwenhuizen

CONTENTS

SPOTLIGHT

Betta imbellis

by Jack Hems

SEVERAL characteristics determine the value of a fish (acquired for a decorative freshwater tropical aquarium) apart from a non-quarrelsome or anti-social nature, striking coloration, and moderate size: characteristics of supreme importance if everything is to look and go well as, for example, the importance of a catholic taste in food and a constitution resilient enough to withstand a gradual, but not too protracted drop in temperature. Then again, it is an added advantage if a fish requires nothing special in the way of water (hard, soft or neutral) or furnishings other than a carefully selected assortment of plants.

Betta imbellis, which was first made known to ichthyologists and hobbyists alike in 1970, is found in the wild state in Malaya. It is a member of the family *Anabantidae* and, on account of its reduced gill-respiration (see details about this in Sterba's Freshwater Fishes of the World and similar publications), is obliged to make excursions to the surface every so often for a gulp of life-sustaining warm air.

Returning for a moment or two to the species' country of origin, it is probable that the fish is rather limited in its geographical range and may very well be confined to an area of no great size and at no great distance from Kuala Lumpur. Yet even if I suppose this, it is only a guess.

But back once more to the desirable qualities possessed by some, if not all, of our deservedly popular fishes, and state right away that, *B. imbellis* has them all. Named in order: it will eat any small living animals such as flies (concussed by dashing onto the surface of the water) and other insects, tiny wood-lice, whiteworms, gnat-larvae, etc., not too miniscule fragments of raw red meat, and all suitable grades of dried food (a first class flake is recommended. Flakes do not disintegrate in a few moments and cloud the water).

B. imbellis thrives best at a temperature of about 75°F (24°C) to 80°F (27°C), but is not liable to succumb to any serious or temporary disorder if the thermometer reads 68°F (20°C) or thereabouts for a short time. For the rest, ordinary matured tapwater (not drawn from newly installed copper pipes unless the water is left to run for a few minutes to flush away accumulated traces of lethal salts) or a water that is neither markedly soft or markedly hard. In terms of pH rather than hardness, the advised pH is about neutral. But why all this about such an adaptable fish. *B. imbellis* should settle down all right in any well-established tank stocked with inoffensive, and certainly no over-large and perhaps nerve-sapping fishes.

B. imbellis does not stay still for long periods at a stretch. It does, however, like to take advantage of the security offered by plants and comes and goes (from its shelter of greenery) when and as the mood moves it: which is often.

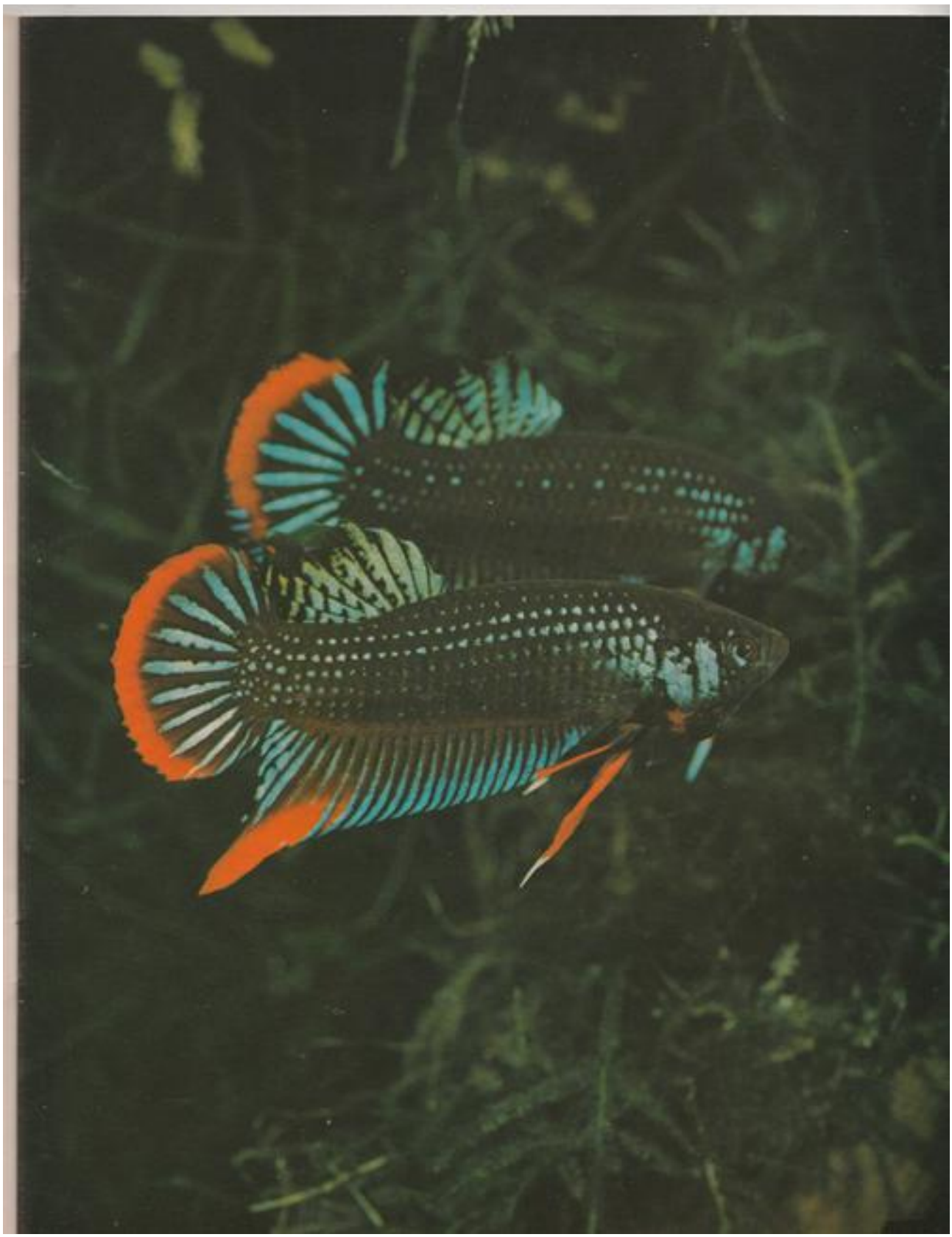
The male is the most handsomely coloured of the two. In the main the back is dark brown, the sides are lighter, with some faint to pronounced barring over a fugitive or bright blue. The caudal fin is dark brown (in parts) with an orange to scarlet margin along the posterior edge. The posterior tip of the anal fin and the extended rays of the pelvic fins are orange to scarlet, too. There is plenty of blue or blue-green flashing off the small scales and the dorsal fin and anterior section of the spread caudal fin are coloured shades of blue emphasized by dark rays. The female is less robust in build except when she is full of roe—preparatory to spawning—and her sides, at such times, show much barring and faint stripings of red. Her major fins are not so well developed as those of the male and she is more retiring, or timid, in mood. Both sexes attain a length of about 2 in.

Breeding follows the usual pattern of the bubble-building (nest-providing) fighting fish of the genus *Betta*. The male dons his most spectacular garb and seeks to impress the female with his impressive array of colours and excited cavortings. He seldom fails to win her attention—and sexual response. This is denoted by her increase in girth and a change in her mood. She ventures out of her haven of plants at ever shortening intervals and becomes flirtatious and coy by turns.

The male does not have much time for courtly dalliance and gets on with blowing a bubble nest near or under floating vegetation as quickly as possible. When the time arrives for mating, the two fish get together under the nest, and there the male embraces the female many times, that is until she is spawned out. As soon as spawning is over, the female should be separated from the male, and the eggs. He makes a caring father, and tends to the hatched fry night and day. When the fry begin to break free from the nest, and the nest starts to break up, then it is time to remove the male also. The fry should be started on *infusoria* as their first food.

After the lapse of a week or two, larger live food such as brine shrimp *nauplii*, followed by microworms, can be placed on the menu. Commonsense will inform the aquarist what to offer next, say, powdered flake, or whiteworms or Grindal worms reduced to a pulp. More than anything, the temperature of the water must be kept even and no cool air must be permitted to flow across the top of the water. All reaching into the aquarium must be conducted with extreme care.

Until the fry become regular air breathers they are very sensitive to an abrupt change of temperature and humidity. While raising a family is going on, a temperature of about 80°F (27°C) should be maintained.



Editorial

PREVENTION IS BETTER THAN NO CURE

A COMMONLY suggested cure for ridding fish of fish-lice (*Argulus*) along with other parasites, involves the use of potassium permanganate. It is recommended that a solution should be made which is of a deep pink colour or that the aquarium should be treated adding ½ to ¾ grain of potassium permanganate to each gallon of water which, one can be assured, will have as much effect as lashing the little pests with cotton wool.

Recently a neighbour delivered a young hedgehog found on the road and thought to have been hit by a vehicle because of a prickleless messy patch behind the head. Examination showed wriggling movement at the base of the surrounding spines. A teaspoon of potassium permanganate was dissolved in about an eggcup of water and the strong solution poured on to the affected area. Within minutes there emerged with alacrity fly maggots and ten in all were removed with tweezers and squashed since they showed no ill effects whatsoever from their contact with the alkaline.

The occurrence was reminding of an infestation of fish lice in the garden pond some years ago. A ten inch Hi-goi was obviously ailing and when netted and scrutinised was found to be covered with *Argulus*. A handful of potassium permanganate was dissolved in a tumbler of water and, one by one, fifty-eight fish-lice were removed from the fish and dropped into what was supposedly the lethal liquorice black solution where they remained for fifteen minutes or more while convalescent quarters were prepared for the fish. This done, the tumbler and its occupants were tipped into a fine net, drained and the net then swished in a bowl of clear water and there, scudding around happily and seemingly none the worse for their experience, was the total assembly of fish-lice. No fish would have survived immersion in that bath and this operation and that involving the hedgehog serve to underline the fact that parasites are tenacious of life to such a degree that any treatment innocuous to the fish patient will have little effect on the parasite.

The infestation of *Argulus* in the pond referred to was eradicated by the removal of all the fish and by subsequent laborious nightly scrutiny of the pond and the netting of free swimming lice until no more were seen and for some nights after the last one was caught. With no real belief that all had been caught there was little else to be done but a year later, when the pond was cleaned and all the fish examined, none was carrying *Argulus* passengers.

All parasites are difficult to eradicate and the only real defence is to make absolutely certain of the cleanliness of new plants and fish before introducing them to pond or aquarium.

OSCAR **G. Robinson**

MAGNIFICENT SPECIMENS

by Alan Darby

WHICH ORDINARY dealer, with a limited amount of space, can display such a wide variety of fish, to such high standards, as can be inspected annually in the scores of tanks housing the different species entered for the much-coveted title of "Champion of Champions".

These fish, which are usually at their maximum size and in a state of perfection have already proved themselves worthy of the title "Best Fish" at Open Shows throughout the country.

The "Champion of Champions" is a competition of its own, a special class organised and sponsored by the "Aquarist & Pondkeeper", within the "British Aquarists' Festival".

The fish entered in the "Champion of Champions" contest are of eye-rivetting appearance, their bodies radiant with rainbow tints or bizarre in outline or finnage, with gracious movements as they swim around their tanks. They can only be better described as truly—"*MAGNIFICENT SPECIMENS*".

Some recent "Champions" have been:—*Lemon-finned Barb*, owned by V. Davison (1975): *Pumkinseed sunbass*, Mr. and Mrs. K. Blades of Bassetlaw A.S. (1976) *Clarius Catfish*, Mr. and Mrs. H. Gough of Wynnstay A.S. (1977) *Mylossoma argenteum*, J. K. Alder of Hartlepool A.S. (1978) *Distichodus sexfasciatus*, R. Atherton of Hartlepool A.S. (1979) *Haplochromis ovatus*, M. A. Hollingworth of Sherwood A.S. (1980).

Magnificent Tableaux

Apart from the "Champion of Champions" class there are numerous tableaux containing hundreds of fish, competing in over sixty classes, all aiming to take the next major award of the "Best Fish of the Show".

The Tableaux themselves are in another competitive class and the numerous idea's for their design seems to be never ending, as each year produces a new batch of amusing and novel displays. The societies who enter the tableaux must have some extremely dedicated members, who put many long hours of work into the planning and construction of the stands.

With over forty major trophies and hundreds of pounds in prize monies, the 1981 British Aquarist's Festival is a show not to be missed.

New Classes

Two new classes in this years B.A.F. are "INDIVIDUAL FURNISHED AQUARIA" for members of societies who cannot display a tableau or have insufficient space on their tableau for more than the one furnished aquarium required. Also "AQUATIC PAINTINGS" which is in two age groups; under 11 years old and 11-16 years old inclusive. The entries for the paintings should be through societies, schools, or other organised bodies. The use of oils, water colours, inks, etc. is optional although the overall size of the painting should not exceed 24 in. × 12 in. (600 mm. × 300 mm.) and the theme must be aquatic.

Dozens of Trade Stands

The traders will also be well represented, with thousands of fish from around the world, and all the different varieties of food, equipment and accessories that you could wish for, all for sale at competitive prices.

The traders travel from all over the country and this year we may well see some from overseas.

With the amount of fish and goods that are expected this year, all under one roof, the exhibition can only be described as the "Aladdin's Cave" of the aquarists world.

The "British Aquarists' Festival" where all this takes place is to be held in the Exhibition Hall of Belle Vue, Redgate Lane, Hyde Road, Longsight, Manchester on the 7th and 8th November 1981.

For further details of the Champion of Champions contest write direct to the Aquarist & Pondkeeper, The Butts, Half Acre, Brentford, Middlesex.

Further details of the British Aquarists' Festival can be obtained from Mr. J. U. Hall, 54a Carr Road, Calverley, Pudsey, Yorkshire or Telephone Leeds. 574609.

'Champion of Champions' 1979 Distachodus sexfasciatus' owned by Mr R. Atherton of Hartlepool AS.

Coldwater Jottings

by Frank W. Orme

LIKE MANY other aquarists, I cannot resist wayside pools and streams; nor can I resist the temptation to visit water-gardens. It was, therefore, natural that I should visit Mill Lane, Romsey in Hampshire in order to browse around the Mill Water Garden whilst I was spending a few days in the county.

I arrived during a warm, sunny day to find plenty of space in which to park the car and pleasantly landscaped gardens, through which the River Test ran. Apart from myself there were one or two small groups of people around, some busily taking photographs of the well kept grounds and ornamental ponds, and inspecting the many various statuettes which were displayed. Having enjoyed a leisurely, and uninterrupted, inspection of the different ponds I retraced my steps to the sales area where, a sign informed me, both fish and plants were on show.

Passing through the well-stocked sales-room, I came to a paved open air section where large fibreglass containers held the various fishes and plants. At the time of my visit various Koi varieties were being offered, together with Moors, Fantails, Orandas, Celestials, Lionheads and various other types of goldfish. There were also some nice young Orfe and Rudd on display. All were swimming actively in very clean conditions and there was no obvious signs of any ailments being present.

Although I make a point of not drawing attention to myself when visiting these commercial establishments I was, nevertheless, recognised by Mr. Terry Tucker from whom I subsequently purchased a very nice waterlily, and spent a little time in pleasant conversation. I was informed that during most weekends they are quite busy, and that many of their customers are the result of recommendation from fellow aquarists. This I can well believe for these attractive gardens are certainly worth visiting, and the stock, although imported, was housed in very good conditions. If any reader happens to be in the vicinity of Romsey and wishes to idle away an hour or two, I suggest that they try to pay a visit to these water gardens, which is very near to the home of the late Lord Mountbatten.

A little earlier in the year I spent another pleasant day in Lancashire, visiting Lytham. Sunday the 21st of June was the day that the Lytham Aquarist Society staged their 15th Annual Open Show at the Lytham Baths. This excellent little show is ably staged under the secretaryship of Mr. Peter Ham, and occupies an ideal location. The Baths are situated on the front, just across the road from the sea and beach and, being only a short drive from Blackpool, offer an ideal venue for fishkeepers who wish to combine their interests with a day at the coast.

Hungry Fish

The observant coldwater fishkeeper may have noticed that the appetite of the fish has become somewhat greater than it has been. This is an instinctive response to the cooler temperatures and shorter hours of daylight; an instinct which prompts the fish to consume more food than normal, and so spread itself for the coming winter months. By seeking a greater intake of food the fish builds up the essential body fats which are required if it is to stand a reasonable chance of surviving the cold, harsh conditions that may well lie ahead.

This need of the coldwater fish for extra nourishment should be satisfied by increasing the number of feeds accordingly. Allow as much food as the fish will accept and eat within a few minutes, repeating the feed as often as possible without overfeeding. In other words, feed frequently but make sure that none of the food is being left uneaten—little and often is the rule. As the temperature falls so will the appetite of the fish become less keen, and the amount of feeding must be reduced until, eventually, the stage is reached when food no longer holds any attraction to the fish. By that time they should have accumulated sufficient body fats to ensure that it will pass safely through the winter; providing it is in good health and has an unpolluted environment in which to spend its semi-dormant period of winter-rest.

The condition of a pond will depend upon a number of factors, the biggest factor being the care which has been exercised in its management during the previous months. If there is the slightest doubt it will be sensible to give the pond an autumn clean-out. In fact, as a matter of routine I always clean my pond and change the water at this time of the year. Although it may not be necessary—and some would insist that it is not—I feel that it can do no harm to make sure that there is not the slightest possiblity of a risk of pollution arising during the winter months or, at least, ensure that the risk is substantially reduced.

Fish Farming

Reading the Birmingham Evening Mail, during last July, my eye was attracted by the headline 'Seeing fish from a new angle.' The report read as follows: 'Dr. Niall Bromage, head of the biggest indoor fish farming unit in Europe, reflected ruefully on the University Grants Committee.

"When you look at the possible consequences, you wonder if you'd have been better off sticking with goldfish" he said.

'The UGC has recommended that Aston close the whole of its Department of Biological Sciences which would signal the end of some of its most exciting and original research.

'Aston remains the only English university which has been invited to attend the research and development body of Britain's fast-expanding fish farming industry.

'There are estimated to be at least 350 commercial fish farms in the country today and the numbers are increasing at the rate of 30 per cent per annum.

'Aston has always led the way in the advancement of this exciting new form of agriculture, properly termed aquaculture.

'An indication of this was the invitation earlier this month to exhibit at the prestigious Royal Show where the Aston team was almost overwhelmed by the interest shown among farmers.

'More than 300 people, entirely unsolicited, came forward to sign a letter of protest about the threatened cuts to the department.

'Funding of research in projects like the use of waste materials for fish feed and the artificial control of trout spawning to produce eggs, and thus fish, all the year round, has never been a serious problem.

'The National Environment Research Council has already put up £30,000 towards the spawning project and a further £50,000-plus has been promised by the council and the industry towards research into waste materials for feed.

'Among the other projects the Aston team is working on is one for the Highlands and Island Development Board in Scotland, looking into the possibility of using silage for fish feed and a £30,000 large-scale trial project in salmon farming also in Scotland.

'All of which, it must be said, cannot be achieved with goldfish.' This last sentance is, I think, an apt one upon which to finish this months "Jottings."

Discover the Fish **BY PISCES**

My first is in Sun but not in Moon
My second is in March but not in June
My third is in Iris but not in Rose
My fourth is in Friends and also in Foes
My fifth is in Cushion but not in Chair
My sixth is in Round but not in Square
My seventh is in Butter and also in Bread
My eighth is in Tyre and also in Tread
My ninth is in Strawberries and also in Cream
My tenth is in River but not in Stream
My last is in Letter and as you will agree
It has to be found when looking for me.

Answer on page 43

National Aquarium Pondkeeping and Fishbreeding Exhibition NAPFEX '82.

THE NATIONAL Aquarium, Pondkeeping and Fishbreeders Exhibition will be held on 29th, 30th and 31st of May 1982 in the Queens Hall at Bingley Hall Exhibition Centre. It will be organized by Broadway Exhibitions Ltd. Bingley Hall, Broad Street, Birmingham B1 2EL. Telephone 021-643 1775/1593.

The Exhibition is sponsored by 'The Aquarist' magazine and it is envisaged that this will be the first time that all leading Federations will have the opportunity of participating together in a National Exhibition designed specifically to promote the Fishkeeping Hobby.

This full scale event which will be well advertised, is directed at Manufacturers, Traders, Societies, Clubs, Suppliers, Buyers, etc., and will range across the entire field of Aquaria, Pondkeeping and Fishbreeding in all its aspects.

A variety of special features are being planned to attract the general public whose visit may also form an introduction to the hobby on an occasion when everything they require is at hand for immediate purchase.

Provision will also be made for simple discussions, lectures, question and answer periods and interesting films to run concurrently with the Exhibition.

All enquiries should be sent direct to the organisers—Broadway Exhibitions Ltd. at the address given above.

Further details will be published in future issues of this magazine.

An inexpensive minnow seine, fitted with poles at the ends, will invariably take darters from rocky bottomed creeks with swift currents

DARTERS

by Dr. Robert J. Galdstein

If you are an avid freshwater angler, then you undoubtedly have caught yellow perch and its relatives. In the U.S.A., the walleye, yellow perch and sauger are fishermen's fish, and are the only true perches of which most anglers are aware. Other true perches occur in northern Europe and Asia.

In North America, however, there is an additional group of perches, a group so large and so completely unknown to fisherman and aquarist alike, as to be virtually unexploited. That is not to say that these fishes abound in joyous numbers, stretching the creek banks with their bodies. On the contrary, many of them are so precise in their environmental requirements that any significant deviation from normal water quality threatens the entire population, and in many cases the population is the entire species.

The perch family (Percidae) contains two sub-families, the Luciopercinae and the Percinae. Within the sub-family Luciopercinae we have two tribes. These tribes contain the genera *Stizostedion*, *Zingel* and *Romanichthys*. The Izaak Waltons among you will recognize many of these as sport fish in the British Isles and Europe in general. The other subfamily, the Percinae, contains an additional two tribes. The first tribe contains the genera *Perca* (with the perch, among others), *Gymnocephalus* and *Percarina*. It

is the fourth and final tribe with which we are concerned, the tribe Etheostomatini. These are the darters.

The darters are all North American, and there appear to be 146 species of them, all but a few of them named. Furthermore, several of the species can be distinguished as consisting of numerous sub-species, and some of them can also be recognized as existing in distinct races. Thus, there are quite a few distinct populations of darters, a few widely-scattered and many with very circumscribed ranges often not exceeding a few square miles.

The darters are classified into three genera, known as *Ammocrypta*, *Percina* and *Etheostoma*. The fewest and least pretty darters are within *Ammocrypta*, and the prettiest and most numerous darters are in *Etheostoma*. That is a happy circumstance, and could only have come about as a result of the government not being in the business of evolution! Left to their own devices, the darters have chosen a most gratifying method of explosive speciation.

Darters occur all over the eastern half of the United States, extending northward into parts of Canada and southward into portions of Mexico. For all practical purposes, however, they may be thought of as American fishes (in the U.S.A. sense), and have all the characteristics of Americans except that they don't carry handguns.

In order to learn something about darters, one has to work at it. In order to have some darters in one's own aquaria, one has to work even harder.

Darters, being a temperate group preferring cool to cold water, are not found in pet stores, are not bred in Florida or Hong Kong, cannot be imported into the United States from the United States (nobody will work that cheaply), and occupy just about no space at all in American or other aquarium literature. To the average American, a darter is an ugly little fish that blocked the completion of a dam for a while. Americans have visions of a southern Attorney General of the United States coming into court with a vial containing a couple of demised snail darters, smirking about their importance *vis-a-vis* the dam project, and all but putting the weight of the federal government against the fundamentals of the U.S. Endangered Species Act, kicking it in the behind.

But darters are not all ugly and not all endangered. Most Americans live in the eastern half of the country, and that is where the darters may be found. It is said that civilization declines as one extends away from Great Britain, and that is certainly true in the United States. About halfway through the country, darters disappear, just as the first aberrant Californians come into view on their motorcycles, flattening cactus plants and shattering the sounds of the countryside with four cylinder engines (with pollution devices). It is just as well.

Those of us living in the east have access to a myriad of species of darters, with different river systems and often different streams within these systems, containing different species of darters. The joy is that just about everyone living anywhere has a river nearby, and that river will have darters that someone else would like to have. Thus, all of us can go out to our local creeks and rivers, collect our native darters, and trade them to people in other parts of the country for the kinds of darters that occur elsewhere.

Actually, it is not quite that simple, and again the reason has nothing to do with the fish, but with the government.

Each state in the U.S.A. has an independent fish and game agency responsible for maintaining habitats and sport fishing opportunities within its jurisdiction. Thus, each state requires people to have fishing licenses, and these licenses specify who may exploit the stream, and in what ways. Special licenses may be required to collect bait, and special collecting devices may be illegal in one state, but not another. In some states, one cannot collect native minnows (or darters) without a fishing license, whether or not one is a fisherman. In most states, no special collecting devices may be used without a state scientific collector's permit. I leave it to your imagination how easy it is to get one.

There are generally ways around this state of affairs. For example, in most states, no special permit is needed if a seine net is less than so many feet in length (so we all use short nets). In the State of Georgia, on the other hand, it is against the law to collect fishes for aquarium purposes, but not for bait purposes. Thus, there are a great many Georgians with lovely bait-holding aquariums at home, complete with plants, pretty lights, etc. While they never fish, someday they *might*. And if they do, why then they will already have some bait on hand, in some very unusual bait buckets.

Collecting darters is not difficult for most species. While some kinds only occur in the swiftest and deepest portions of big rivers, the vast majority of darters occur in small streams, easily waded, easily collected from, and easily reached from roadsides and bridges.

Darters occupy the same kinds of general habitats in the United States as do the sculpins, which you also have in England. They are generally found in small, clear, swift flowing streams with rocky bottoms. Here, the darters feed upon larvae of insects and other invertebrates associated with cold, clear water. To collect in such a habitat, a small minnow seine is all that is required. I personally prefer a seine of six feet in length, four feet in depth, and quarter to eighth inch mesh size. Many streams may be only three to four feet in width, and the seine is simply shortened to accommodate such narrow spaces. I always fit the ends of the seine with stout poles, drilling holes to accept the strings at the four corners of the seine. This prevents the strings (and seine) from riding up or down the pole during a day's work.

It is generally fruitless to try dragging a seine through fast moving water over a rocky or rubble-strewn bottom, for the net will ride up off the bottom in the current, or hang up on the high relief rocks. A better method is to set the net in one place, and to drive or herd the fishes into the net by kicking over rocks and debris from six feet out toward the net in a downstream direction. I assume that this is the way many bottom-loving African riverine cichlids are captured by those in the know, although I have never done that myself. It is important not to try to drive the darters too far. Six feet is about as far as one can

expect to keep the darters moving and confused. They very quickly learn that they are being manipulated, and will shortly dive under your feet to find a rock you have already passed. Don't underestimate darters! Every darter I have ever met has been an intellectual challenge (although I try not to advertise the fact).

In deep water, the same principles are used, but with considerably less success. Dip-netting is rather ineffective, and cast-netting is a complete waste of time and effort. Electric shocking is effective, but not all darters recover, and in any case this is not a method of widespread use. I do manage an occasional shocking trip, in my work as an environmental consultant. I find that the best way to collect darters in deep water is to take along a large friend who doesn't think too far ahead, such as how deep the river might be. Fortunately, America is full of large friends.

Identifying darters is, or can be, a nightmare. With so many species and sub-species and races, and with such frequently precisely circumscribed (that refers to geography, and is not a religious term) ranges, it is most important to know precisely where, and in what part of what stream system, the collection was made. Professional biologists solve that problem by getting detailed maps from the local road department, and marking the locality by its grid on the map, as well as by indicating the number of tenths of a mile from point A to point B in this direction or that. It is essential that points A and B be constant, such as intersections of major highways, bridge overpasses, or other such timeless unvariables.

Armed with precise locality information, most aquarists will take the easy route and send some of the fish to a local university for identification, but only if they are certain that they do not have an endangered species in the collection. Just about all states have such species, listed by federal or state agencies as endangered or threatened, and thus protected by law. Because the number of such species would be low in any one state, it is a simple matter of learning those few kinds of fishes, as well as where they occur, so that those locales might be avoided.

The local university zoologist, if he is an ichthyologist, will generally provide the identification if approached respectfully and appreciatively. But not all places have such experts, and one then must send the specimens off to a distant laboratory or university. One does not always get a reply, or even the return of the specimens.

Earlier I mentioned the responsibilities of the local fish and game agencies in maintaining sport-fishing habitats and populations. They do other things. In many states, these agencies conduct studies of the fishes of various water basins, often making collections over the years of every creek in every county. Some of the long range studies are remarkable for their thoroughness and quality. And many states have produced books on the fishes of the state.

Unlike commercially available aquarium books sold in pet stores, these books have little of any colour photography, but are a wealth of habitat information, information on feeding habits, spawning habits, growth rates, and geographic range, down to a creek by creek analysis of distribution. And they are remarkably inexpensive for such large books. That is because the books are published by the state out of reserved funds, and the prices neither reflect the cost of production nor any attempt to make a profit. They are a form of public information only.

While that is a wonderful advantage to American aquarists interested in darters and other native fishes, it is also a problem. For, you see, there is no centralised source of obtaining such books. They cannot be ordered through most bookstores, or most pet stores, since there is no opportunity for a merchant to make a profit on their sale. One must find out which agency in each state (among those states that have produced such books) to approach for the book, the cost, the address of the agency, and whether the book is, in fact, still available. Thus, most American aquarists rely on their colleagues living in the various states to come up with the appropriate information. After many years of collecting literature, for example, I see on my bookshelf fish books for the states of New Hampshire, Indiana, Illinois, Missouri, Louisiana, Kentucky, Arkansas, Georgia, Washington State, California, Alabama, Connecticut, Mississippi, Arizona, Wyoming, Kansas, Florida, and Idaho. They vary in quality, price and, most of all, in value. Some are little more than keys to the species, while others are a wealth of natural history information and photographs.

Between the books and the precise locality information, most darters can be indentified by any reasonably hard-working aquarist. All he needs to learn are technical terms (like ventral scalation), and all he needs in the way of equipment is an inexpensive microscope. Identifying darters from their scale patterns and the pores on the heads is great fun, and probably an excellent way to bring on cataracts or other forms of premature vision defects. Only occasionally is colour and pattern of use in darter identifications, but we all grab at every opportunity to take the simple route.

Keeping darters is quite another matter than catching them. Most darters prefer cool, fast flowing water and will succumb rapidly to high temperatures or low dissolved oxygen concentrations.

For most darters, the best aquarium is long and low, fitted with an over-sized power filter containing no filtration materials. The idea is to provide a strong current, and any filtration material might clog with debris and prevent adequate circulation. The way to deal with debris and wastes is to change portions of the water, not to clog up one's only available current.

The aquarium is placed in a cold part of the house, and sometimes outdoors. While many darters, particularly those of the southern states, can adjust to warmer waters (and indeed, I have kept some in communities with tropicals) even they should be acclimated to warm water very slowly, if it is necessary, and not at all if it is not necessary. Most of my darter aquaria are in the basement, on the lowest racks or directly on the floor. Naturally, no heaters are inserted into any darter aquarium.

While living foods are preferred, and probably essential

Natural traps in the course of a creek can be used to herd darters for eventual capture within the seine

E. caeruleum—A rainbow darter getting used to his new aquarium home—This one is from the Osage River in Missouri

for spawning success, most darters will quickly learn to take frozen and thawed (washed) adult brine shrimp (*Artemia*), chironomid worms, or the newly available freeze-dried Euphausids sold as krill or plankton. The latter is probably the most nutritious new food around among all prepared foods.

Darters have three fundamental spawning modes, according to species. The predominant type of spawning is undergravel. Here, a female dives into the sand or gravel or rocks, and comes up with only her head showing. The male then leaps upon her, often triggering an orgy of all the other darters in the tank jumping into the pile like so many football players. A relatively uncommon mode of spawning is cave spawning, like many cichlids. In this method, the species involved are generally not colorful, but the male gets a black head during spawning season as he protects his cave (made of rocks or, in aquaria, a piece of plastic plumber's pipe). Eggs are spawned in a great patch on the roof of a flat rock cave, and guarded by the male until hatching.

The least common (downright rare) type of spawning is plant spawning. In some species, the fish ascend twigs or grasses or creekside submerged rootlets and deposit their eggs in these locations, sometimes in neat rows, often helter skelter.

In all cases, the fry are tiny when they hatch, are unattended, and generally (in nature) float downstream from the shallow regions in which spawning occurred (usually a riffle segment of the stream) into some quiet pools, where they will grow during their first season. Growth is rapid,

E. variatum—This is a variegated darter from the Red River of Kentucky

Slough darters are named for the muddy backwaters of rivers which they inhabit

In several states the bluebreast darter is an endangered or threatened species. The fish pictured is a so far unnamed species related and similar in appearance to *E. camurum*

and in several species maturity might be reached after but one year. Even in those cases, however, it is generally the two or three year old males that dominate the spawning territories. Few darters live longer than three years.

In aquaria, baby darters can be raised on green water for the first week or two, followed by newly hatched brine shrimp nauplii and microworms.

I know several people who have spawned darters, although my own successes are yet to come. In all cases, the fish were either stuffed on a constant live food supply, or were captured during the breeding season when they were too far advanced toward breeding for anything to turn them off.

My own success is based on finding egg covered rocks in nature, taking them home, and then hatching and raising the young.

In the United States, many of us belong to a group of native fish aquarists who have banded together in the belief that ignorance loves company. Together we wade our local creeks and the creeks of other members, visiting all over the U.S.A. just to sample the collecting at all times of the year (even when ice is on the water), to swap fish and stories, and generally to lie to one another about spawning successes. The group is called the North American Native Fishes Association (NANFA). Our dues per year for people outside the U.S.A., Canada and Mexico are $12.50 American, mailed to Mr. G. G. Corcoran, 1650 East Beach Boulevard, Biloxi, Mississippi, 39530, U.S.A.

Gerry Corcoran is one of the founders of NANFA, which is understandable, living as he does in a warm part of the country. As you might expect, the farther north one looks in the U.S.A., the fewer NANFA members one finds.

Darters are only one family (or part of a family) of native American fishes suitable for aquaria, challenging to keep, beautiful, intelligent, diverse, and accessible. Next to the minnows, there are more darters in our waters than any other group of freshwater fishes.

One day, perhaps I will attempt to make an overseas shipment of darters to a colleague in England. There are, of course, no guarantees that such a shipment would be successful.

COMMENTARY

by
Roy Pinks

I HOPE that my notes about Bitterling will not have given readers the impression that I am in any way an expert in their culture and breeding: they remain somewhat baffling but highly interesting fish as a consequence of the odd behaviour of the pair I experimented with last autumn. It may be recalled that I had at last put together a pair, which occupied a shallow 36 in. tank in the company of two allegedly Painters' mussels. Although I had conditioned the fish as best I could with high quality flake food, chopped earthworm and whiteworm, the male did not reach the giddy heights of coloration usually associated with the breeding season, and I had the impression that he was not really trying!

At least, that was how it looked at first, but he soon began to chase the female and after about a week both began to show some interest in the mussels, which were inspected, and "dummy runs" were made over them by both fish, almost as though they had white spot and were flicking their undersides to dislodge the parasites. But the female did not look particularly plump, and one might have concluded that these were merely out of season antics rather than the real thing. On the other hand the ovipositor was extended to about an inch, supposedly the prelude to a spawning. The presence of the ovipositor is generally recorded as a spawning season phenomenon.

Male and female (right) Bitterling inspecting mussel's siphons. Female's well developed ovipositor is clearly shown.

Anyone taking up Bitterling from scratch would expect to buy two similar looking fish, with the male rather more colourful than the female. As spawning approached the ovipositor would be extruded by the female, and it would gradually be recovered afterwards. And that would be that until next time.

However, as one will discover in many dealers' tanks, many females will be swimming around with very long ovipositors in April, and mine certainly had them well into November: and the circumstances are such that in most cases spawning is about the last thing in their minds—males are sometimes absent altogether and it is rare indeed to find a suitable mussel in the whole shop, let alone the tank.

So when my fish began to swim together I thought that a mating was unlikely so late in the year, but they decided otherwise. One evening I noticed greatly enhanced activity, but still no unusual male colour, and it became evident that something unusual was afoot. The male gradually enticed the female first to one mussel, then to the other, as though they were selecting a new home. Then, after much quivering, came the first of what I took to be genuine spawning runs, where the male indicated the mussel by hovering over it, and the female then inserted the ovipositor into the inhalent siphon after a sort of "sawing" motion with the body.

The tube was very briefly within the siphon and then the male made a run across it. This went on for an hour or more, and the female looked much the same thickness afterwards as before. In other words, she did not seem to be "spent" in the usual exhausted way when fish get after the egglaying act. The mussel closed up after each run, though briefly, and I saw no evidence whatever of spawn.

The following evening much the same sort of thing happened, and this time both of the mussels were visited. If anything, the efforts were rather more vigorous, though it was noticeable that the male continued to look no more gorgeous than he usually did after a feed of whiteworm. On the following day there was no activity—almost as though the fish had forgotten about the mussels altogether, and there the excitement ended. At this point I noted that the ovipositor was markedly shorter than it had been, and concluded that it was being retracted into the body of the female. However, after a few more days I saw that she was becoming plump, and I began to wonder whether there was a real spawning in prospect. Then I spotted a fungussed object on the tank floor which I initially took to be a rejected piece of earthworm (a rare enough occurrence, indeed), but which, gruesomely, proved to be a portion of ovipositor.

Meanwhile the female continued to swell, and I began to suspect that she was not at all well, as she tended to skulk and gave up the hunt for food. Then, quite suddenly she began to exhibit all the signs of dropsy—protruding scales and excessive bulk—and the rate of breathing was greatly accelerated. As dropsy is a condition one can rarely correct, I felt I could do little to alleviate the situation: she was grossly swollen, and nature took its inevitable course. I removed the male, in case there had been a viable spawning, but the complete absence of any fry after a month completed the sorry episode. I have read other accounts of damaged or excised ovipositors, and add the above to the evidence.

Male Bitterling poised over mussel's siphons prior to his milting dive. The exhalent siphon is on the left of the fringed inhalent siphon.

There was nothing, so far as I could see, suggesting undue violence during the mating period, and the male could not have been classed as other than moderate during the whole association. I did ask the question earlier on in these notes as to what happens if the wrong mussel is used, and this rather suggests that maybe I have got the wrong ones.

I just don't know the answer to this, but I still have the same mussels and I have acquired some new fish, which are being conditioned at the time of writing. The main actors have not yet been put together, but I will live in hope that when I set up the experiment again it will have a different ending. There is one additional ray of hope—an alternative source of mussels—and I will try this as a variable if the worst does, in the event, come to the worst.

WHAT IS YOUR OPINION?

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

ANYONE WHO HAS kept tropical fish for over forty years should know what he is talking about. One such person is reader Mr. Lorenzo Porrelli, of 174 Pappert, Bonhill, Alexandria, Dunbartonshire G83 9LG. He writes: **"I read your column every month. I find the wide variety of subjects discussed very interesting and informative. I have been keeping tropical fish since my early twenties; I am now a ripe sixty-four. Over these years I have seen many changes in this very fascinating hobby of ours—including (changes in) equipment, foods, fish and plants now available. May I say that even after all these years my interest is still as it was in the early days.**

"I note in *W.Y.O.* **from time to time (details of) some readers' experience in their attempt to spawn fish. They do not always state the type of water they used to spawn their fish. I think that for the serious amateur who would like to breed fishes, an elementary knowledge of water chemistry would be a great help to him. A minimum of equipment is needed to adjust the water and make it suitable for the species of fish he wishes to spawn: pH test kit, water hardness test kit, etc. I find that the water obtained when de-frosting the fridge is a good source of fairly soft water; and if you have good neighbours they will save it for you when de-frosting their fridges. I find that most of the tetras and the smaller barbs will readily spawn in this water.**

"Another subject that crops up in *W.Y.O.* **is live food versus prepared foods. The only live food I use these days is brine shrimps. The freshly hatched nauplii I use to feed fry, after a few days on Liquifry, Biol and a variety of baby fish food powders available. I also raise brine shrimps to adulthood: this is easy to accomplish now with the special brine shrimp food on the market. The adult stage is reached in 10 to 12 days. I find the foregoing range of foods sufficient to raise a healthy batch of fry to adulthood. I also feed a range of Aquarian and Tetra flake foods. These modern flake foods are an excellent source of nourishment, containing everything to keep fish healthy; and, most important, there are no risks of introducing diseases or any predators into the aquarium. I am not saying that this is the only way to succeed in rearing fry, or in keeping adult fish healthy; but I find that this system of feeding has worked well for me.**

"Over the years I have bred, and raised the fry to adult fish, the following: angels, kribensis, blue acara (photograph 1), most of the smaller gouramies, neons, *Corydoras paleatus*, *C. aeneus*, *C. hastatus*, *Cichlasoma festivum* **(flag or festive cichlid—picture 2),** *C. meeki* **(firemouth—see photograph 3), glowlight tetra, tiger barbs and** *Brachydanio rerio* **(zebra danio)."** (*C. paleatus* is the peppered corydoras, *C. aeneus* is the bronze catfish and *C. hastatus* the dwarf or pigmy *Corydoras*. B.W.)

Mr. Porrelli continues: **"I kept the above species until I knew their needs and tried to provide the ideal conditions for them, paying attention to the water quality—pH and DH—and temperature. You need a lot of time and patience; but this is what makes fishkeeping worthwhile and interesting. If it were too easy it would become boring and interest would die.**

"I am also keen on growing plants. The best results for me were obtained in tanks without fish. I have two 30 in. × 15 in. × 12 in. tanks for plants only. This allows me to have a mixture of ½ in. of sterilized garden soil, 1 in. of (boiled) peat and, 4 in. of fine (2 mm. size) gravel—rather difficult to come by—on top. In this tank I restrict the number of plants to six species; these plants must require similar pH and DH conditions. The other tank contains eight species of *Cryptocoryne*, **at a pH of 6.5 and DH 10° and they seem to grow well in the same mixture as above. The lighting levels are found by trial and error; and the type of lighting that works for you is correct. I use 30 watts of fluorescent tube for 10 hours daily for one tank; and only six hours in the** *Cryptocoryne* **tank with 30 watts. Both these tanks are side on to a south-facing window, the window side being blanked off. Under these conditions the plants do really well, and I have a ready supply at hand when I require them. I must say that I have never tried to grow any of the more difficult species.**

"I have used all types of filters in my time; and I now use only outside box filters, or in my larger tanks of, say 48 in. × 15 in. × 15 in., I use outside power filters. I find these types of filters are favoured by most plants: they seem to grow better.

"My community tanks are also planted. The

Aequidens pulcher—blue acara.

Cichlasoma festivum—flag or festive cichlid.

Cichlasoma meeki—firemouth.

plants grow reasonably well; but the growth is never as lush as that of the plants grown on their own. Of course I use only gravel in my community tanks, depending on fish droppings and a liquid plant food once a month. A well-stocked tank gives the plants a better chance of food in the form of fish droppings.

"I feel that I have been rambling on long enough, and in conclusion may I say that I would be pleased to hear from other aquarists who are not within easy reach of other aquarists, like myself. As you can see from my address, I am two miles from Balloch, and about eight from Loch Lomond. Last year I had to give up my car; I can no longer afford this luxury. I find this rather restricting in my area, the nearest aquarium shop being about 18 miles away; and not very good at that.

"I really do look forward to the *Aquarist & Pondkeeper* every month and, of course, *W. Y. O.*, I have never written to your column before and I thought, 'It's later than you think!' I do hope I have not bored you too much."

I found your letter most interesting, Mr. Porrelli. We agree about a number of things—especially prepared, bought foods, outside filters and the use of water from de-frosted fridges. When I de-frost my fridge I always use the water to top up any tank needing to be topped up. Occasionally, when the lumps of 'de-frosted' ice have fallen off the ice box into the drip tray, but have not had time to melt, I simply drop chunks of the ice into a tropical tank and watch it float, like an iceberg, as it quickly melts and disappears. Obviously I would not do this with large quantities of ice but with a filter causing the aquarium water to circulate the slight drop for a short period does not seem to harm the fish; indeed many fish—such as cardinals—swim below the floating ice and develop very bright, glowing colours in the soft, cooler water. One should ensure that water from de-frosted fridges is uncontaminated, e.g. if someone has stored a block of ice-cream in the ice box it may have melted slightly and contaminated the ice formed on the ice box. Uncontaminated water obtained from de-frosting a fridge should be neutral and soft—like distilled water or de-ionized water.

Last week I spent a few pounds on a new air chamber, valves and diaphragm for my Kurier Super air pump—the only pump that I require to operate outside filters on four tanks. As expected, the replacement parts effected a pleasing change that resulted once again in a much improved air output from an excellent pump that has given and is giving me excellent, quiet service. I cannot recall when I got the pump but I do remember that Mr. Eric Small of Hillside Aquatics, sent it to me some years ago to review for this magazine. I've been using it daily ever since. I have it suspended, on a double length of knicker elastic, from a masonary nail in the wall. Where the base of the pump's two lower rubber feet touch the wall I have inserted a folded wad of soft toilet tissue to ensure that the suspended pump does not knock against the wall.

Interested readers may wish to know that I have collected a few more facts about light bulbs. Three long-lasting

ones, that cost 39p each, lasted respectively, 142 days, 100 days and 98 days. The average cost of the three is 0.0034411p per day. Of three Woolworth's (Winfield) bulbs, that cost 95p for a package of four, i.e. 23.75p each, a pearl one lasted for 71 days, and two clear ones for, respectively, 110 and 119 days, before blowing. The average cost per day of the three bulbs is 0.002375p. My brief findings would tend to suggest that for use over an aquarium, inexpensive bulbs probably give better or best value. I continue to buy packs of four Woolworth's Winfield bulbs at a special price of 95p. I opt for 40 watt, clear glass bulbs because I think they give good plant growth; and one can see the filament inside each bulb and screw the bulb-holder into a position such that the filament is most sensibly supported. Has anyone else been keeping a record of light bulbs' life, cost and effect on plant growth? If so, I should be pleased to receive details. I should also like to hear from those who have experimented with different varieties of fluorescent tubes. Which do you find gives best plant growth in your tanks?

No. 28 Aston Drive, Bulwell Hall Estate, Bulwell, Nottingham, is the home of Mr. A. J. Hay, who writes: **"In reply to your comments on the blind cave fish, *Anoptichthys jordani*, I put one in a 36 in. community tank as a talking point. I kept it for about two-and-a-half years and it grew to about 2½ in. To show its ability to catch live food I put freshwater shrimps in the tank and people were amazed at how the blind cave fish caught them.**

"I found it a very good fish in club table shows: it lost no colour because it has none; and it was not worried by goings on round it so the fish was happy to swim round a tank on a show bench. I received several prize cards for it.

"The best set up of blind cave fish I have seen was a 24 in. × 15 in. × 12 in. tank containing caves made from black slate on a black gravel base, lit overhead by a subdued light, and containing about 20 blind cave fish."

Mr. L. C. Bucklay (?) resides at 64 Cumberland Road, Urmston, Manchester, and says: **"I am writing in response to your item, in *W. Y. O.*, concerning the dwarf Egyptian mouthbrooder, *Haplochromis multicolor*. I purchased two of these fish about a month ago; they were about 1½in. long. Later I discovered that they must have been male and female because one had a much brighter scale coloration than the other, and more blue in the fins; this was the male.**

"About 10-11 days ago I noticed a small batch of eggs in the female's mouth. She was near the surface of the water in my 24 in. × 12 in. × 12 in. community tank. At feeding time I noticed that she didn't try to eat anything; but the eggs in her mouth looked white, as I could see them through her skin, and I thought they might be infertile; however, yesterday I noticed that there were then small, black eyes in her mouth; and later it looked as if the fry had hatched. I put her in a breeding net, as I had no spare aquarium, but so far she has not spat them out—although I am sure they have hatched."

About this time each year I usually throw caution to the wind and spend some of the money I've saved on a visit to an aquarium shop—where I buy a relatively large collection of fish. I usually manage to visit aquarium shops only two or three times per year and when I make such visits I probably spend more than the average aquarist who lives near a local dealer and is able to drop in, say, once per week, to buy the odd pair of fish that take his fancy. As regular readers know, I'm very fond of gouramies; and when I visited a Belfast shop last week I was pleased to see that the impressive display of fish and plants for sale included a variety of gouramies. Fortunately, for me, it was quite near closing time and few other customers appeared—which gave me time to select my fish and to talk to the gentleman who was in charge of the shop.

Two large, female, thick-lipped gouramies cost £1.25 each; a pair of young blue gouramies were £1.00; a pair of large moonlight gouramies £2.50; a pair of golds £1.60; opalines cost me £1.90 for a pair; young pearl gouramies £1.90 per pair; and four lovely, young, honey gouramies were 75p each. I also bought a pair of sunset, dwarf gouramies, a variety that I have not seen before. The female was 50p and the beautiful, red male £1.25. I could not resist four anomalus pencilfish, *Nannostomus anomalus*, at £2.25 for the quartet; or a quartet of very small, ordinary, angel fish at 36½p each.

I placed all the larger gouramies, i.e. all the gouramies except the honeys, the blues and the sunset dwarfs, into a large tank containing other adult gouramies, a half-grown angel and my beautiful pair of clown loaches. I glanced into the tank about 20 minutes later only to discover that a previous resident, a large opaline gourami, headed the pecking order and was pecking bits of the fins off most of the other gouramies in the tank. He was quickly moved to another tank, containing three adult angels, where he is now at the bottom of the pecking order and doing no harm; nor is he being harmed by the angels.

The baby angels, the honeys, the blues and the pencilfish were placed in a tank housing some cardinals, neons and guppies, and all the fish look healthy and are thriving. The sunset dwarfs were placed in a well-planted guppy tank. The male shows himself at feeding times, but the female seems rather shy and does not appear very often. Perhaps they will become bolder as time passes. I have now had the new fish for a week and they are all well.

The shop where I bought my fish is Ulster Aquatics, a business that was established by its founder, Mr. Laurie Morris, in 1948. His son, Mr Philip Morris, was in charge when I dropped in last week to make my purchases. Philip has some interesting comments to make about the present state of the hobby.

Philip answered all my questions patiently. Possibly the most interesting piece of information that I obtained from Philip is the fact that his father will be retiring from the trade later this year when he will have completed 35 years in the aquarium trade—and serving the aquarists of Ulster. I'm sure that everyone who knows Mr. Laurie

Xenotoca eiseni.

Morris will wish to join me in congratulating him on having reached retirement age. I bought—or had bought for me by my father—my first tropical fish in Mr. Morris's original shop. I've been a customer of Ulster Aquatics for more than 30 years—and a satisfied one at that! I hope I'll continue as a customer when the shop is solely in the capable hands of Mr. Philip Morris. I hope Laurie and his wife will have many happy and healthy years in retirement. Perhaps Mr. Laurie Morris will allow me to feature him in *Meet the Aquarist* as my little tribute to his contribution to the hobby in Northern Ireland.

Mr. D. Brooks writes, on behalf of his wife and himself, from 60 Maes Talcen, Brackla, Bridgend, Mid-Glamorgan. **"We are both very keen aquarists and put pen to paper to answer your request for letters about breeding cichlids. The type we managed to get to spawn are *Cichlasoma severum*, the banded cichlid. We have a 48 in. × 18 in. × 24 in. tank which originally contained only two fish: a pair of severums, male 7in. and female 6in. No plants were included in the tank decoration; just rocks and gravel—which was just as well because within a week the nice, even gravel was transformed into a lunar landscape.**

"The first batch of eggs was laid on the back glass; but after two days the eggs were eaten. We believe they were eaten because from a quiet fish house the pair were moved to a living room with all its associated noise, movement and shadows. About two weeks later we were pleased to see another batch of eggs had been laid in the same place. This time the eggs were tended by the parents, fanning and mouthing being a continuous operation. The eggs began to hatch and the fry were promptly moved to a corner where the parents re-attached them to the glass vertically up the corner angle. We did not feed any special food to the fry; the parents chewed normal food, then spat it out into the shoal of fry.

"The female herded the family about the tank and used to tell us when she wanted the light out by knocking on the condensation tray. When the light was out the female would herd the fry to a pre-dug hollow and settle them down for the night.

"When the fry were just over two weeks old we moved most of them because we had read in more than one book that the parents would probably turn on the fry after about three weeks. This did not happen to those left with the parents; in fact, the growth rate of the fry left with the parents was much greater than that of those that were moved to other quarters. The water temperature was maintained at 80°F and the water was relatively soft.

"In the 48in. tank we now have the two adult severums, plus five young which we kept; but now that they are about 2½in. long unfortunately we find that they are all males. There are also two, young, 2½in. gold severums, a 6in. oscar and a 5in. plecostomus.

"We also have four other tanks: a 36in. community tank; a 24in. and an 18in. both containing baby peppered catfish which we managed to breed; and a small, 12in. tank containing a pair of fighters that we managed to breed; and s small, 12in. tank containing a pair of fighters that we cannot seem to be able to get to spawn. We have also had spawnings of dwarf gouramies, and of the normal livebearers."

Mr. M. J. Gill's address is 4 Fitzgilbert Road, Colchester, Essex CO2 7XB. He writes: **"Many thanks for printing my letter in the July issue of the magazine regarding *Aquarist and Pondkeeper* indexes. Unfortunately, my name has been incorrectly quoted as Mr. J. Gill and I should be grateful if a suitable amendment would be printed as this is causing some confusion."** (Sorry about the error, Mr. M. J. Gill. I don't *think* I made it. Anyone writing to Mr. Gill to obtain indexes should ensure that his correct initials—M. J. Gill—are used. B. W.)

In the July issue I published a photograph of an unidentified plant that I said looked like a giant *Ambulia*—the correct name for the genus being *Limnophila*. A glance at the photograph on page 405 of *Aquarium Plants*, by Rataj and Horeman, T. F. H. Publications, 1977, leaves little doubt in my mind that the plant in my photograph is *Limnophila aquatica*. No readers wrote to me concerning the correct name of the plant.

From 74 Trafalgar Street, Healey, Batley, West Yorkshire WF17 7HA, came the following letter written by Mr. Graham Clayton. **"I have been meaning to write to *W. Y. O.* for quite a while now and, ironically, I've finally got round to it whilst I am an armchair aquarist, so to speak. The reason for this is that I am a student at the University of Stirling, studying biology; hence I am up and down the country too often to enable me to keep fish seriously in either place. Regrettably, therefore, my only contact with fishkeeping now is the available literature, and our garden pond at home.**

"I have been interested in and have kept fish for about nine years now. That was when I obtained my first aquarium anyway. Prior to that my fishkeeping was limited to the goldfish won at local fetes, and kept in goldfish bowls. If only I'd known then what I was doing to them! As my interest grew my late father took me to the local aquarists' shop, owned by Mr. Colin Briggs. Our weekly trips became something I greatly looked forward to and eventually my father bought me a 24 in. × 12 in. × 12 in. white, angle-iron tank—the old, putty-sealed type, of course. In it I kept coldwater fish and learned the technique of fishkeeping rapidly.

"About two years later I'd both convinced and conned (!) my father into buying me a 24 in. × 12 in × 12 in. stainless-steel, silicone-sealed tank for tropical, freshwater fish. Unfortunately, a short time later my father died; but my interest he'd given me in fishkeeping continued, aided also by the fact that I'd obtained a Saturday job at Colin Briggs' shop. Bad luck, in the form of a fire and, later, lack of trade, forced Colin to close his shop and take another job. I was then irreversibly stuck on fishkeeping, though.

"On a similar note, my work in the aquarium trade has taught me not to moan about equipment and fish prices to local stockists. Their prices aren't in the slightest, excessively high, yet their overheads are: their electric bills alone are shocking (sorry for the pun!).

"Well, on to one of the main reasons for my letter. Many aquarists are often in a dilemma over the use of floating plants which rapidly multiply and cut off the light from the plants below. In a 48in. set up that I had placed a strip of wood, some 2cm. deep, 0·5cm. wide and something like 0·75cm. less than the width of the tank in length, across a point about one third of the way along the tank. The reason for the wooden strip being slightly narrower than the tank in length is that wood, when wet, swells slightly, and so I placed two small pieces of polystyrene—just big enough to cover the ends of the wood—in these gaps. thus, when the wood swells the expansion is taken up by the polystyrene and not the glass—which could obviously have serious consequences. What one essentially has now is a surface divider; and so floating plants can be placed on one side of the divider, leaving either one third or two thirds of the surface free to allow light to penetrate. The floating plants will rapidly multiply and so an occasional scoop with a net will keep them in check.

"I found that the system also has great advantages at the gravel level. The floating plants mean that part of the tank is shaded and part is in strong light, thus providing more scope for the range of plants you can plant in the tank. For example, *Cryptocoryne* species can be placed in the shaded part and *Cabomba* plants in the well-lit part with, I found, excellent results. The advantages involve not only plants, either, since I found catfish and shade-loving species loved the area. When fish came into breeding condition it also proved popular. When set up it reminds one of a river with plants giving shade growing in slowly-moving water near the bank, and clear, well-lit waters in mid-stream. This image is enhanced by placing an air stone in the well-lit region and by landscaping—or is it aquascaping?—accordingly with the gravel sloping up to the shaded end, where tree branches (dead and well-boiled) can be placed. If the idea sounds appealing then try it and you'll find that the result is even better.

"To change the subject somewhat now, I'd like to go onto calendars. A long search has revealed thousands with views and thousands with animals on them. The only exception to this, of course, is fish. I think it'd be nice for *The Aquarist* to correct this; and I'm sure it'd not be too difficult with the cover shots you use. How about using the 12 pictures of each year's editions, one picture per month? Once used, the pictures could then be used for posters, or framed to make ever-lasting wall pictures. Anyway, why doesn't every aquarist write in with his opinion. I'm sure it'd be popular.

"So, on now to my final topic, although I'm sure I will have forgotten something I meant to write. This is more a suggestion of what I'd like to see in future editions of *The Aquarist*, in fact. It would be nice if *The Aquarist* took the bold step of printing a series of articles which would help aquarists become ichthyologists. By this I mean articles which are a little more scientific in their approach. I am sure every aquarist would then be able to understand more fully what is happening in this ecological system he calls his fish tank and how he can better (understand) and modify it. Subjects which could be incorporated are things like the genetics of breeding, nutrient cycles and their implications upon fish and invertebrate life, nutrition, respiration, etc. I doubt if the serious aquarist will not be able to digest things like simple Mendelian crosses; and if he knew the difficulties fish face in obtaining oxygen in an uncrowded (*sic*) situation he would certainly think twice about overcrowding.

I found Mr. Clayton's letter most interesting—especially because I once spent some time at the very beautiful University of Stirling. A calendar of tropical fish published by *The Aquarist* would certainly be an appealing idea to me. Perhaps the Editor will consider it. If I recall correctly, a German manufacturer once sent me an attractive wall calendar showing attractive coloured shots of tropical fish. I suspect that aquarists, in general, may tend to fight a little shy of articles that are too technical or scientific; and I'm not convinced that aquarists in general, i.e. hobbyists, would wish to become ichthyologists; however, you are not advocating anything too technical or too scientific. Could you write suitable articles on the topics you suggest, Mr. Clayton? As a student of biology at Stirling you must be in touch with current developments in the study of

living things and their environment. If you think you could write a series of suitable articles, why not drop a line to our Editor, Mr. L. E. Perkins, to see if he would be interested. Some scientific concepts are very difficult to explain to readers/aquarists without scientific training. Have you ever tried to explain pH to an ordinary aquarist? Anyway, Mr. Clayton, your ideas appeal to me; I hope they'll appeal to our Editor.

"I hope you don't mind my writing to you like this but much like you I'm just as interested in plants as fish," writes Mr. C. Jacklin, 26 Whitecross Street, Barton-on-Humber, South Humberside. He continues: **"Over the months of reading the *Aquarist & Pondkeeper* I seem to have taken to your idea about Malayan burrowing snails. The way they work amongst the gravel and the plants' roots has to make sense. Now I come to the tricky part of my letter. We don't have many aquarium shops in this part of England and I've hunted all over to try to get some Malayan burrowing snails; sorry to say, without any luck; so I'm sending you a s.a.e. and a plastic bag hoping that you can oblige me with a few snails to start my colony going because there are a few other chaps round here who are also interested in them and in time I would pass them round. Here's hoping you can fix me up."**

Unfortunately the water supply in my area has got very soft of late and my Malayan sand snails seem almost to have vanished. The water seems to be low in calcium and in carbonate hardness, and snails' shells are composed largely of calcium carbonate. Soft water tends to turn and remain acidic much more easily than hard water; and $CaCO_3$ dissolves in acidic media. This probably accounts for the reason why my few remaining Malayan sand snails do not have a tip or point on their normally pointed shell: the point has probably dissolved. No doubt there are those who will read this who will have some extra sand snails which they'd be happy to give to other aquarists. If so, please drop me a line and I'll mention the fact in a future feature. Sadly, no one seems to offer snails for sale nowadays. When I was a child several advertisers, each month, offered a variety of snails for sale at so much per dozen. Occasionally I sent for some after saving up my pocket money. If you have any spare snails, drop me a line, please. Perhaps I'll manage to do for Malayan sand snails what I did for Java moss: make them popular; just as I made the moss so popular that requests came from various parts of the world. One point: don't forget that snails in a polythene bag in an ordinary envelope will probably get squashed before they travel very far in the post! Something like a small snuff tin would best suit them. What is your opinion?

I am pleased to learn that **AQUA 81**, Northern Ireland's major aquarium show, will be held as usual this year. It will be sited in Bangor, County Down, and will be open to the public from Wednesday, 29th July, at 6·00 p.m.—when the Royal Wedding should be over—until 5·00 p.m. on Saturday, 1st August, when prizes will be presented. I hope I'll be able to visit the show and take a few photographs for this column. I'd like to wish the organisers every success.

Those following my light bulb saga will be interested to know that another Winfield clear bulb has blown. This latest one tops the Winfield league, having survived for 131 days. This makes the average price for Winfield (Woolworth) bulbs @ 95p for four, 0.0022041p per day. Incidentally, the aquarium hood holding this last mentioned bulb is slightly larger than the others—relatively speaking—and probably allowed the bulb to operate at a slightly lower temperature than some of the others in relatively smaller hoods with less adequate ventilation.

For a future issue please send me your opinions on any of the following: (a) breeding *Xenotoca eiseni*, or any other less common livebearer; (b) hatching brine shrimps' eggs; (c) cultivating *Aponogeton*, *Hygrophila*, *Bacopa* or *Vallisneria* species; (d) breeding *Corydoras* species; (e) experiences with less common catfish; (f) chip-controlled thermostats or heater/thermostats; (g) breeding Siamese fighters; (h) aquarium shows; (h) oscars; (i) this year's experiences with the breeding of pond fishes; and (j) freeze-dried foods. I hope you'll write me a letter. If you do, please **PRINT** your name clearly. It would be helpful also if you gave your age—not necessarily for publication—as I like to include letters from as wide an age range as possible. Occasionally it's useful if you include your telephone number—which I won't publish unless you ask me to—in case I need to contact you. (This week I had to phone two writers to discover/check their names; and I'm doubtful about the spelling of one name—belonging to someone who didn't give a phone number.) Goodbye until next month. Perhaps we'll have our summer, in my part of the country, between now and then.

Discover the Fish

Answer: Scissortail

Coldwater Queries

by Arthur Boarder

READERS SERVICE

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

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

I have a garden pond established 2½ years and although the fishes have appeared quite healthy they are badly infested with leeches. Is there any chemical I could put in the pond to kill them?

Any chemical strong enough to kill the leeches would certainly also kill the fishes. You can catch many of the leeches in traps made with a screw-top jar and a small funnel. Cut a hole in the top and fit the funnel in it. Bait each night with raw meat or garden worms, lower in the pond on a string and examine each morning. Flat stones or tiles laid on the bottom will also trap them. Most types of leeches lay eggs on stones or sides of the pond and to be sure of ridding the pond of these pests it may be necessary to empty the pond completely and allow it to dry out for a time, and at least a week.

I will appreciate some advice on choosing a water lily for my pond under construction. It will be 14 ft. × 9 ft. and 3 ft. deep.

You pond will be large enough to take two water lilies and there is a very good choice available. A good one is:—*Nymphaea escarboucle*, a fine dark red also *N. sunrise* is a very good yellow and scented. A strong growing white is *N. gladstonia*.

There are many other good varieties and it will be a good idea to tell your supplier the depth of your pond and the colours you prefer. He will be able to advise you on the best types he has available of the kinds suitable for you. The best time to plant is April and the plants should be set in baskets with some old turf in the bottom. I do not advise using any manure or fertilisers as these will tend to make the plant lazy and not send out roots to search for nourishment and so use up much of the waste matter from the fishes.

How many fish will my tank hold? It is 30 in. × 18 in. × 18 in.

The tank will hold about 23 inches of length of fish, excluding the tail. This is the maximum and so when stocking you should allow for growth of the fishes. Two 25 watt lamps should be adequate for your purpose as these will give some warmth for fancy goldfish.

I have a Mirror Carp in my pond which has developed a small patch of fungus near the back of the head. I have tried the usual cures from a pet shop but to no avail. What can I try next?

As you have the fish in a separate tank you should be able to cure it as the trouble appears to be in a limited area. Hold the fish in a wet cloth and wipe the fungus with neat T.C.P. on a soft cloth. Hold the fish uppermost so that nothing enters the eyes. Before returning the fish to the tank, smear the spot with Vaseline.

I am constructing a garden pond, 25 ft. × 12 ft., and I am thinking of stocking it with goldfish and either golden orfe or Rudd. Which of these two do you recommend and where can I get them?

The pond is a good size and I suggest that you stock it with goldfish and golden orfe. I consider that they are better for your pond than Rudd as the latter have a dark back and so are not very easily seen from above when in a pond. On the other hand, the orfe are brighter coloured, are mostly surface-swimmers and feeders and so can be visible at most times. They also shoal well and are very attractive. They can grow to 18 inches in length, can stand the cold in winter and should thrive and breed in your pond. In very hot, thundery weather, run the hose into the pond during the evening to ensure that the water contains sufficient oxygen. I have enclosed an address from where you can get the fishes you require.

Tropical Queries

by Dr. C. Andrews

I find it difficult to grow plants in my 4 foot aquarium, which is illuminated for 14 hours a day with a 4 foot 40 watt fluorescent tube. Can you offer any advice?

A four foot tank will require about 60 or 80 watts of fluorescent lighting (a little more if *Gro-lux* is used), if plants are to be grown successfully. The lighting should be left on for about 8-10 hours per day. You did not mention your method of filtration, and I should point out that undergravel filtration sometimes has an adverse effect on plant growth.

How can I obtain assistance locally in the diagnosis of the diseases affecting my fish?

To begin with you should borrow one or two books from the library and familiarise yourself with the diseases which affect aquarium fish, and their most prominent symptoms. Useful books include "Diseases of Fishes" by C. van Duijn (Iliffe, 1973), "Textbook of Fish Disesases" by E. Amlacher (T.F.H., 1970) and "Cure and Recognise Aquarium Fish Diseases" by G. Schubert (T.F.H., 1974). Joining the local aquarium society and chatting to the members, or popping into the local aquarium shop for a chat (when they're not too busy!) will also yield useful tips. If you live in a university or college town, then the Biology or Zoology Department *may* contain someone who is interested in fish diseases. Last, and by no means least, one or more local vets may have an interest in the diseases of aquarium fish (telephone numbers in 'Yellow Pages').

How do I calculate a safe stocking level for my tropical freshwater aquarium?

Calculate the surface area of your tank in square inches. Divide this figure by 10, and this will give you the total "length of fish" (excluding tail fins) in inches which you can safely stock. This is a fairly rough and ready method —but it seems to work! As well as considering the safe stocking level, you must not forget to ensure that the species are all compatible. If you are in any doubt, you may find it useful to consult a book like "Aquariums" by A. Evans (Foyles, about £1.25).

I would like some information on how to build my own aquarium. I am particularly interested in keeping cichlids, and would be grateful for your help.

I can thoroughly recommend the book "Making Your Own Aquarium" by J. Hansen (Bell & Hyman, about £6.00). Not only does this deal in great detail with the making of tanks at home, but also provides a lot of useful information on how to set-up the tank to keep different types of fish (including cichlids). I should also draw your attention to the British Cichlid Association, c/o Mr. I. Sellick, Department of Zoology, Bristol University, Woodland Road, Bristol BS8 1UG.

How can I make bogwood safe for use in the aquarium?

Bogwood may be purchased from most aquatic shops. Give each piece 2-3 coats in a polyurethane varnish, and then rinse it well in lukewarm water. By the way, bogwood can be anchored to the floor of the tank by sticking it to a piece of slate with aquarium sealer.

Can you provide me with some information on the Indian glass fish?

The Indian glass fish (*Chanda ranga*) comes from India, Burma and Thailand, where it occurs in both fresh and brackish waters. Their aquarium should be well planted, and a temperature in the region of 20-25°C provided. These fish do best if a little marine or aquarium salt is added to the tank; about 3-4 teaspoons to each 10 litres of water. Rather a timid fish, they should be mixed with other peaceful hardwater or brackish water species. Although some will take flaked foods, many individuals are extremely fond of live foods. The Indian glass fish has been bred in the aquarium, although the rearing of the tiny fry presents a challenge to the aquarist. You might like to have a look at "Brackish Aquariums by M. Gos (T.F.H., about £1.00).

I have one large *Osphronemus goramy*, one medium sized and four smaller specimens, in a five foot tank. Will they continue to mix peacefully?

The giant gourami is a relatively peaceful species, and I suggest that your specimens will continue to live together peacefully. However, this species may reach well over 30 cm. in length and hence you must ensure that you have adequate filtration and carry out regular, partial water changes. In time, you will doubtless have to de-stock your tank.

May I draw your attention to "Anabantoids" by R. Goldstein (T.F.H. about £3·00).

A friend of mine attended the Motherwell Show in April, and has told me that there is now available a kit for culturing live foods for marine fish fry. Can you send me some information?

The culture kits you mention may be obtained (along with further information) from Paul West, Aquariculture, P.O. Box 18, Oban, Argyll, Scotland PA34 4LA. I have, in fact, tried out these culture kits—and they *do* work!

By the way, further information on live foods and their culture can also be found in "Encyclopedia of Life Foods" by C. Masters (T.F.H. about £10·00).

Plant Queries

by Vivian De Thabrew

How can I grow large Water Lettuce on the top of a tank?

Growing Water Lettuce (*Pistia stratiotes*) is difficult enough, but to grow them large needs further attention. Anyway, the following conditions are essential:

(a) It requires permanently moist, humid air above and around it. Therefore the cover-glass should be kept on at all times, at least 3 inches above the plant.
(b) It requires bright and strong light. Here an intensity from a 40 watt bulb or tube over a period of 10 hours per day is most suitable.
(c) It requires a temperature range of 72°-80°F, the ideal being around 74°-75°F.
(d) It requires soft water, rainwater being excellent for this purpose. It should also be slightly acid to neutral, with a pH of 6·5-7·0.
(e) The water should contain substantial nutrients. Therefore a good nutritious tank bottom containing plenty of plant detritus should be provided. You may periodically add a small amount of liquid fertiliser.

The greater the surface area and distance between the water surface and the cover glass, the larger the plants will grow. Ideally, best specimens can be grown in a greenhouse in a tank. Nevertheless I have seen large, healthy specimens grown in fish tanks indoors.

I have a rare kind of a plant which I brought from the coast (Mombasa) and it grows well in my 100 gallon tank with four 75 watt bulbs, but the rest of the plants do not; they just need one Gro-lux tube light. However, the rare plant (*Nomaphila stricta*) does not grow well with the tube light. Can you suggest a way to grow all the plants?

Nomaphila stricta is a very hardy species which makes very few demands. It is best grown in a planting medium consisting of some clay and coarse sand. It should be kept at a temperature range of 68°-78°F. In Kenya, of course, you need not worry about this aspect, as it will be in its own natural temperature range. The water should be soft and acidic. Its only demand is good light, especially from above. The amount of light you give with four 75 watt bulbs is more than adequate. It appears that this amount of light is far too much for your other plants. Therefore, may I suggest you use three 40 watt lights for 8 hours per day. This light intensity should be acceptable to your other plants, and *Nomaphila stricta* too.

If you are using tube lights, two 40 watt white lights, such as 'Tru-lite' tubes, should be used for about 10 hours per day.

What plants do I need for a 'Rainforest river-bed' for Discus?

There are no specific plants suitable for Discus alone. I assume you require a good dense growth creating the 'rainforest river-bed' effect. It would be most appropriate to provide some of the aquatic flora familiar to the family of Discus and other related fish. Therefore a combination of the following plants would be satisfactory:

Alternanthera, Aponogeton crispus and *undulatus, Cabomba aquatica, Ceratopteris thalictroides* (Water Speite/Sumatra Fern), *Echinodorus brevipedicellatus* (Small-leaved Amazon Sword), *E. cordifolius* (Ribbed Amazon Sword), *E. magdalensis* (Dwarf Amazon Sword), *E. paniculatus* (Amazon Sword), *E. tenellus* (Pygmy chain), *Hygrophila polysperma, Limnophila, Marsilea, Sagittaria subulata, Synnema triflorum* and *Vallisneria spiralis*.

I would like some advice on what species of Indonesian plants would grow well together, including floating plants and water-lilies.

The following is a list of a selection of plants which grow in Indonesia. Most of these grow in harmony with each other, though there are variable factors in their requirements. For example, you require alkaline water conditions for Myriophyllum and Potamogeton species. Therefore, though these species grow in harmony in their natural habitat, due to the fact that diverse conditions are present in any given area, they may not be successfully grown in the aquarium, as the same conditions cannot be successfully simulated in the very limited tank area.

Barclaya longifolia, Blyxa echinosperma, Ceratopteris thalictroides (Water Sprite), *Crypotocoryne balansae, ciliata, cordata, johorensis, linqua* and *pontederifolia, Hydrilla verticillata, Hygrophila polysperma, Limnophila heterophylla* (Ambulia), *Ludwigia, Marsilea quadrifolia* (Water Clover), *Microsorium pteropus* (Java Fern), *Myriaphyllum verticillatum* (Parrot's Feather), *Nymphaea alba, N. capensis, N. lotus, N. peltata* (Water Fringe), *N. pubescens, N. stellata, Nymphoides indicum, Ottelia alismoides, O. lanceolata, Potamogeton crispus, lucens, natans* and *perfoliatus, Rotala indica, R. rotundifolia, Stratiotes aloides* (Water Soldier), *Utricularia exolata* (Bladderwort), *Vallisneria asiatica* and *Vesicularia dubyana* (Java Moss).

Plants floating on the surface: *Eichornia crassipes* (Water Hyacinth), *Hydrocharis morsus-ranae* (Frogbit), *Lemna minor* (Lesser Duckweed), *Pistia stratiotes* (Water Lettuce), *Salvinia auriculata, Trapa natans* (Water Chestnut) and *Wolffia arrhiza* (Water Meal).

Above: The 'Circus Trailer' from Castleford A.S.

Above: A charming 'Tudor Cottage' built by Ashby Fishkeepers

Left: Mr. M. Holingworth receiving 'Best Fish in Show' award from Denis and Lillian Greenwood

Below: Mexborough's triumphant 'One man Band'

Below: The 'Army Tank' which occupied the front line for Bradford A.S.

Yorkshire Aquarist Festival 1981

by B. Boydon – Chairman, Y.A.F.

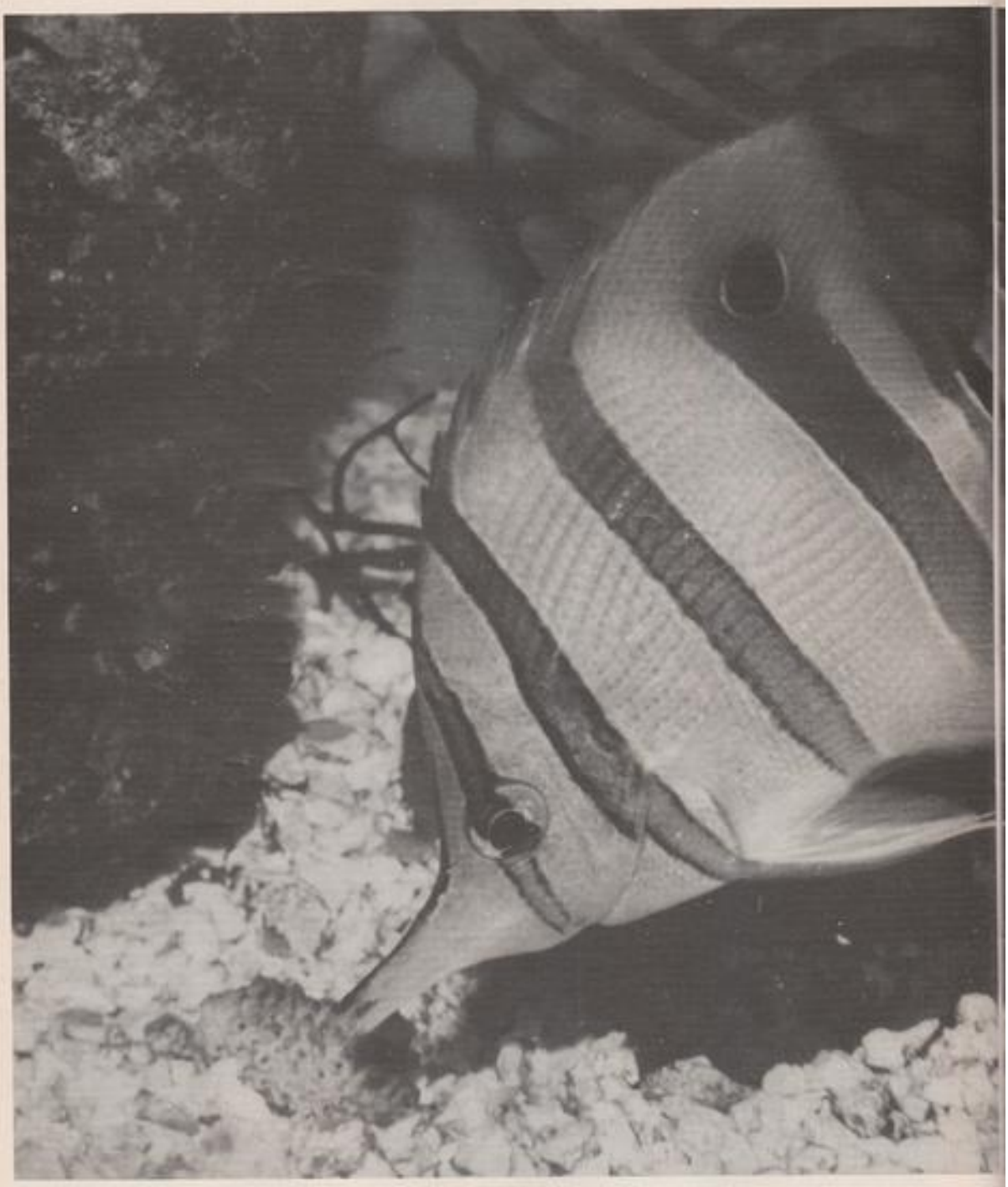
THE TIME IS 10.15 pm Sunday August 16th and the doors have finally closed on the great Yorkshire Aquarist Festival. The hall which five hours ago was thronged with people, is now empty and looks devastated. In the space of four hours over 1,000 feet of trade stands, and up to 23 tableaux have made their exit. Now is the time to look back on what has been achieved over the past two days.

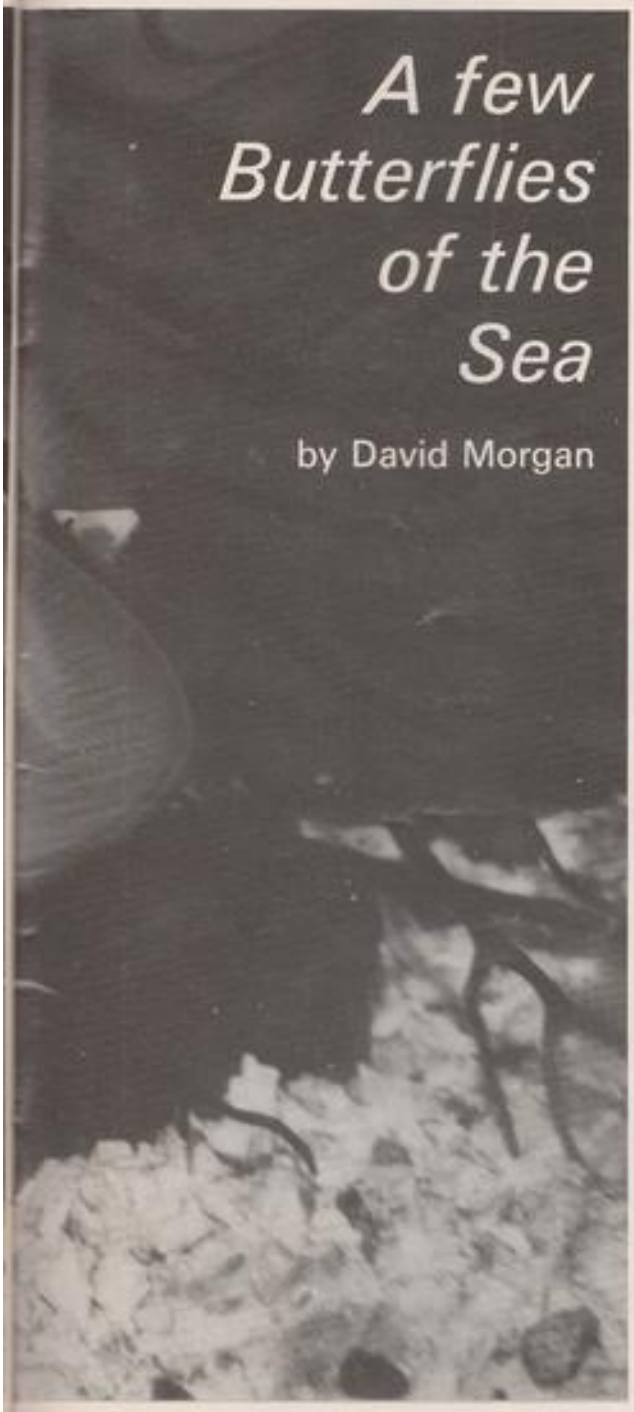
There is no doubt that our Festival brings together aquarists from all over the country, as well as people on the fringe of becoming interested in this fascinating hobby. In addition there is the general public who enjoy a days outing where all the family are catered for at a reasonable price. The Festival has succeeded in achieving this with the help of colourful trade stands which make a point of catering for beginners as well as the experienced aquarist. Members of the trade do much to promote the event by their obvious willingness to listen and offer advice to anyone with fishkeeping problems.

Equally as attractive and interesting as the trade stands were the tableaux which though depleted in numbers reached an even higher standard than in previous years. In general, entries tended to be much smaller this time but with far more emphasis on finishing touches and neatness of construction. The high standard provided the judges with a very difficult task and to them we offer our grateful thanks for doing a great job. The tableaux, as varied in design as ever, included an imitation One Man Band complete with flashing lights, all the instruments being played by Inky the octopus. A most fascinating entry and a firm favourite of the children. Mexborough were the society with this ingenious idea which gained them first prize. Making up the remaining five places were tableaux which included a Circus Trailer from Castleford A.S. complete with animals (stuffed we hasten to add), a replica of a Tudor Cottage by Ashby Fishkeepers, Chesterfields entry of a Sedan Chair, and Bradford A.S. who provided a model of an Army Tank which incorporated a moving gun.

There were of course many more, all of which must have taken many hours to construct. We never cease to be amazed at the time and effort people put into the building of such magnificent show-pieces. They really have to be seen to be believed! Neither must we forget the fish that were entered in the tableaux, about 500 prime specimens all trying so hard to win an award, something all aquarists are proud to achieve. The furnished aquaria demonstrated what an aquarium can really look like when sufficient care and imagination are lavished on it. With entries from the trade as well as individual aquarists it was a most impressive sight and a credit to the Festival. Our thanks to all participants.

To complete the family entertainments over the two days we had the Cartoon Cinema for children, and the Open Forum where experts answered any queries that were put to them. We of the Yorkshire Aquarist Festival committee like to feel that we make everyone truly welcome thereby ensuring their desire to visit us on future occasions. There is always a very close liaison with all parties involved and this we feel, helps to make ours a truly great event. We would like to take this opportunity of expressing our gratitude to everyone who made any kind of contribution. Our most sincere thanks to you all.
B. Boydon Chairman, Y.A.F.





A few Butterflies of the Sea

by David Morgan

THE BUTTERFLY fishes belong to the family Chaetodontidae. This is a large family which also encompasses the marine angel fish. As such it houses some of the most desirable of aquarium fish.

Despite the fact that the butterflies appear more regularly for sale than many of the angels, its difficult to get reliable information as to their suitability as an inclusion in the home aquarium. Many reports are of a very non-specific nature and even conflict. I have attempted to set down on paper my own observations on the species I have first hand knowledge of.

General Information

Butterfly fishes are so called because their feeding habits have been likened to those of terrestrial butterflies. An inaccurate comparison of course, but nevertheless, when these fish are observed picking at live coral heads they do look like butterflies probing a flower for nectar.

These are fish which seem a lot happier when maintained in a temperature between 75°F and 80°F, in well maintained water with a brisk circulation and a salinity of 1.025 to 1.03.

Usually these are peaceful fish but when threatened they can defend themselves by raising the first few dorsal spines and using them to prod at the intruder.

It is a mistake to include any invertibrate species in the same tank, as the butterflies will nip and bite off the delicate parts of their anatomy and eventually kill them. If you can include a piece of living rock, however, where some of the creatures encrusted in it might be considered expendable, so much the better.

Chelmon rostratus: The Copper-band Butterfly.

This fish was, until quite recently, referred to as the Long-nosed Butterfly. This caused a certain amount of confusion amongst aquarists as there is another species also known by this name. I am glad to say that Copper-band is now the accepted term as it is far more descriptive of the animal. This is one of the more spectacularly coloured of the Butterflies, the main body colour being silver with the iridescent qualities of mother-of-pearl. Broad metalic orange stripes sweep down the body, one through the eye, three along the flanks and one through the caudal peduncal. The first three bands are edged with black and there is a false eye spot on the dorsal. The overall effect is positively stunning.

These fish are delicate feeders with a very small mouth designed for picking scraps of food from crevices in rock or coral. In the aquarium they will take brine-shrimp, white fish flakes and very much enjoy picking the flesh from a cockle or mussel shell. Always shred the shell-fish with a small blade or nail-scissors first and remove any remnants after the fish loses interest. I have never actually seen this fish eat dried flake, though I have no reason to suppose that it doesn't, if the other occupants of the tank allow it to settle.

For this reason, if a Copperband is to be kept, choose its tank mates carefully. Only a few non-aggressive specimens should be included. In the wild they swim in small groups; in an aquarium they spar and nip at each other

so keep only one to a tank, and centre your attentions around its needs.

If you have to treat any ailments don't use copper based cures as it does show signs of sensitivity. Not a fish for the beginner.

Chaetodon collaris: The Pakistani or Brown Butterfly.

This fish has a black face which has a white stripe behind the snout and a white collar which gives it its scientific name. Its body is basically brown with a red tail.

This tends to be a good aquarium fish and usually tolerates another of its kind in the same tank.

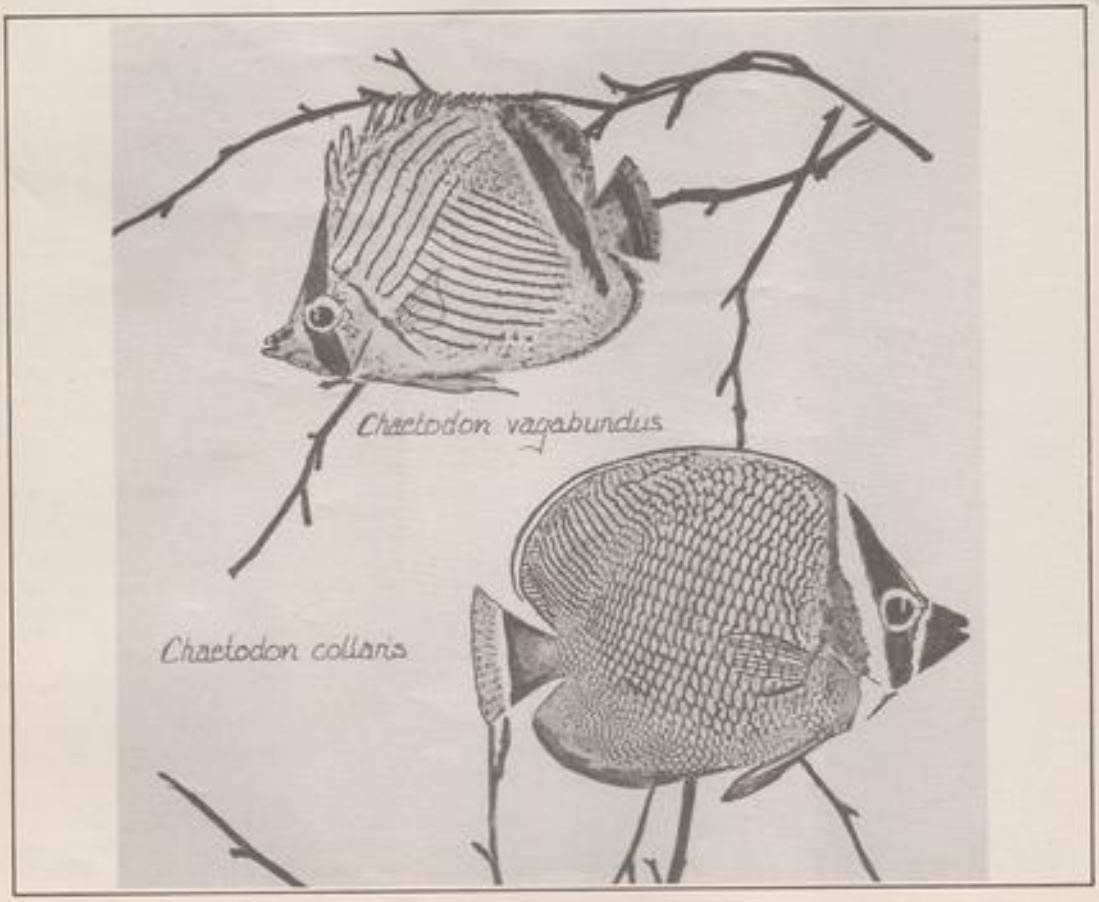
When first introduced it is finickly with its food. Start a programme of feeding beginning with brine shrimp, progress to *daphnia* and then the usual fare. Once again, I doubt you will actually see it eat flake food.

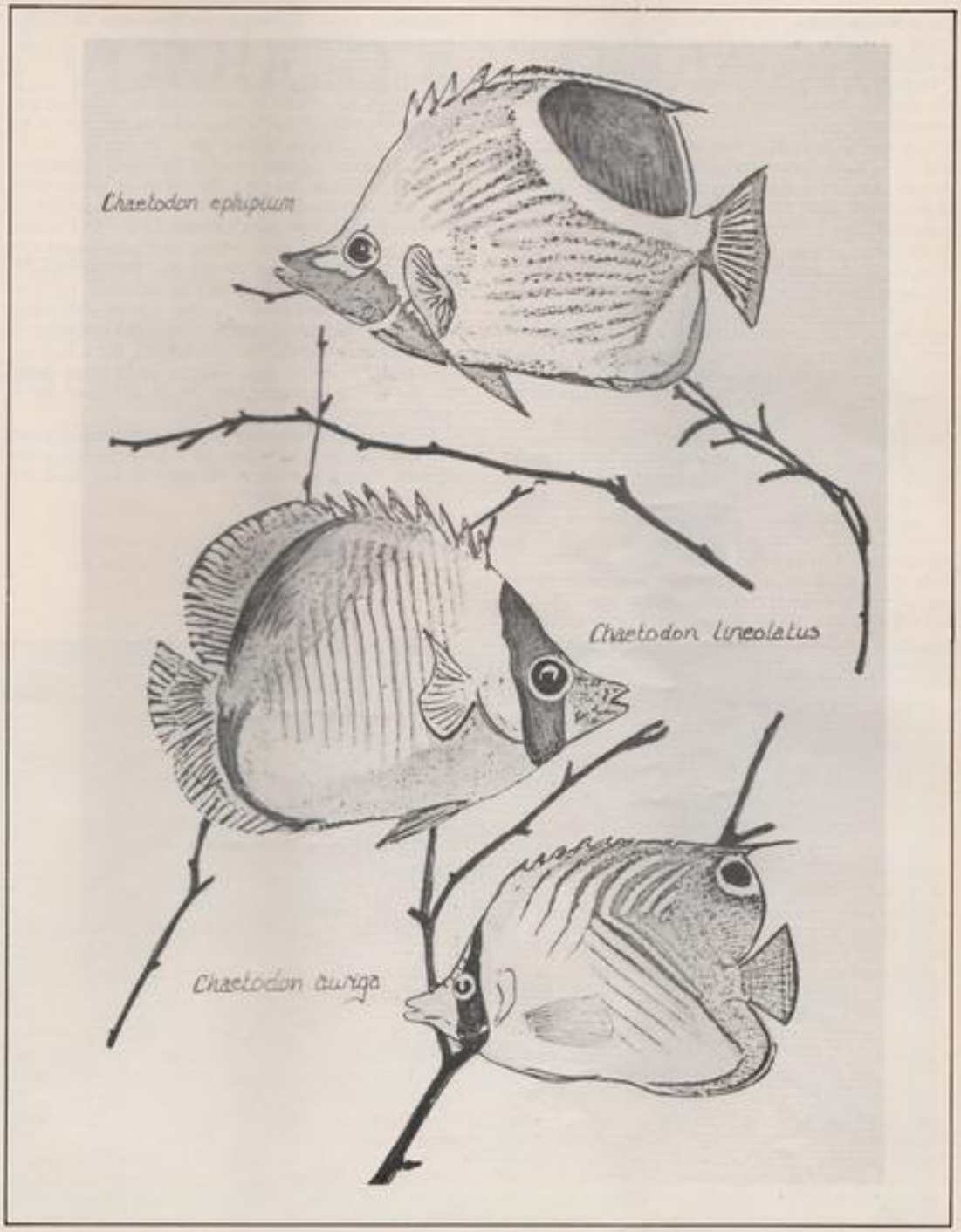
This is a robust fish which will look after itself if necessary but even so, do not include any persistent bullies in the same tank. What is the point of paying, perhaps, in the region of ten pounds for a fish only to have it worried into ill health?

If this fish ever does require treatment, never use medication containing copper. This fish is liable to become uncomfortable even if quite small copper concentrations are present, for example, the residue of past treatments. If poisoning does occur to a degree where any symptons exhibit themselves, it's usually too late to prevent the fish from dying, but transference into an uncontaminated tank may just save it.

Poisoning can be recognised by a drastic quickening of the gill movements and/or a change in colour of the fish. This is followed by the appearance of what look like lesions, or at any rate burst blood vessels, at intervals over the skin of the fish. Death usually follows within a few hours.

Some scientists believe this fish to be a local variety of *C. reticulatus*, but to the aquarist at least, it deserves its own identity.




Chaetodon ephippium
Chaetodon lineolatus
Chaetodon auriga

Chaetodon vagabundus: The Vagabond Butterfly.

This is possibly one of the hardiest Butterfly fish as far as aquarium life is concerned.

Its body is a whitish silver with a black band through the eye and two black bands with an orange or yellow area between at the back.

It is easy to feed taking flake and freeze-dried foods as well as live foods, (especially *tubifex* worms). This species may be expected to live for several years if housed in a large enough tank when well managed. It is a good community fish but when large becomes quite aggressive as Butterfly fishes go. It is impossible to house two of these fish in the same tank; they will fight to the point of causing serious injury to each other.

It is a very active fish, swimming about the whole of its tank, and likes plenty of rocks and coral to explore. I have never had to use medications with this fish, perhaps a further indication of its hardiness, but even so, exercise the usual caution. A good fish to choose as your fish Butterfly.

Chaetodon ephippium: Black-blotch Butterfly.

At first sight this appears to be a pretty fish but in the wild it grows to 12 inches in length, and therefore specimens offered for sale are little more than babies really. These specimens have quite a pronounced snout which is yellow-orange in colour. It has a white edged black patch on the top-rear end of its back and yellow edges to its fins. Its body is blue-ish white. This species is cropping up regularly lately which is surprising since its range is limited and it is quite rare, at least to collectors. Many authorities say this fish is difficult to keep but I consider this may be due to the fact that it needs growing space. It should be happy if housed in a large enough tank.

When properly acclimated it feeds well, but you may have to use brine shrimp, etc. at first. It seems best not to crowd this fish as, in order to prolong its life it needs special attention. Suitable tank mates might be a few small damsel fishes which would leave it alone. It really appreciates plenty of refuges so provide plenty of coral and rockwork.

To successfully maintain this species you must;
(a) have excellent water management techniques.
(b) provide a varied diet, which should include a little vegetable matter until preferences are noted.
(c) leave a healthy margin when stocking your tank.
(d) Once again, be careful if medication is required.

Chaetodon lineolatus: The Lined Butterfly.

An excellent aquarium fish when small, this too grows to at least 12 in. in the wild. It has yellow anterior finnage, a white body, with a black band through the eye, a black splash at the upper rear of the body from and beyond which, dark stripes permeate downwards towards the belly. Large specimens are very often seen in public aquaria. It is another long snouted species which enjoys poking about in coral for its food. It thrives on brine shrimp, and very much likes freeze-dried foods too.

This fish will grow in an aquarium and should be given the room it deserves. It is quite robust and does well in a community tank. Comments on medication as before. Another good choice for your first Butterfly.

Chaetodon auriga: The Threadfin Butterfly.

This fish too can be recommended for aquarium life. Yellow anterially, it has a black spot on the rear of the dorsal, just below a trailing piece of finnage. Brown stripes penetrate tranversly a white body with a black band once again through the eye. Its size seems to depend on where it comes from. In Hawaii it does not exceed 6 in. The water temperature there is a steady 75°F. In Australia, on the great barrier reefs, where water temperature may well be higher, it's found up to 9 in. I'm only theorizing here; in an aquarium up to 4 in. specimens are ideal, wherever they come from. Another species with a long snout, it too likes picking coral for minute scraps of food.

Feeding is as for the previous species, but it may not feed at all for several days when moved to a new home. Do the usual progression from live brine shrimp and it won't starve.

Once again, a sensitive species where copper is concerned, but quite hardy so shouldn't be a problem curing any ailments with less potent medicines. A long lived fish suitable for community life.

Evolution in the water

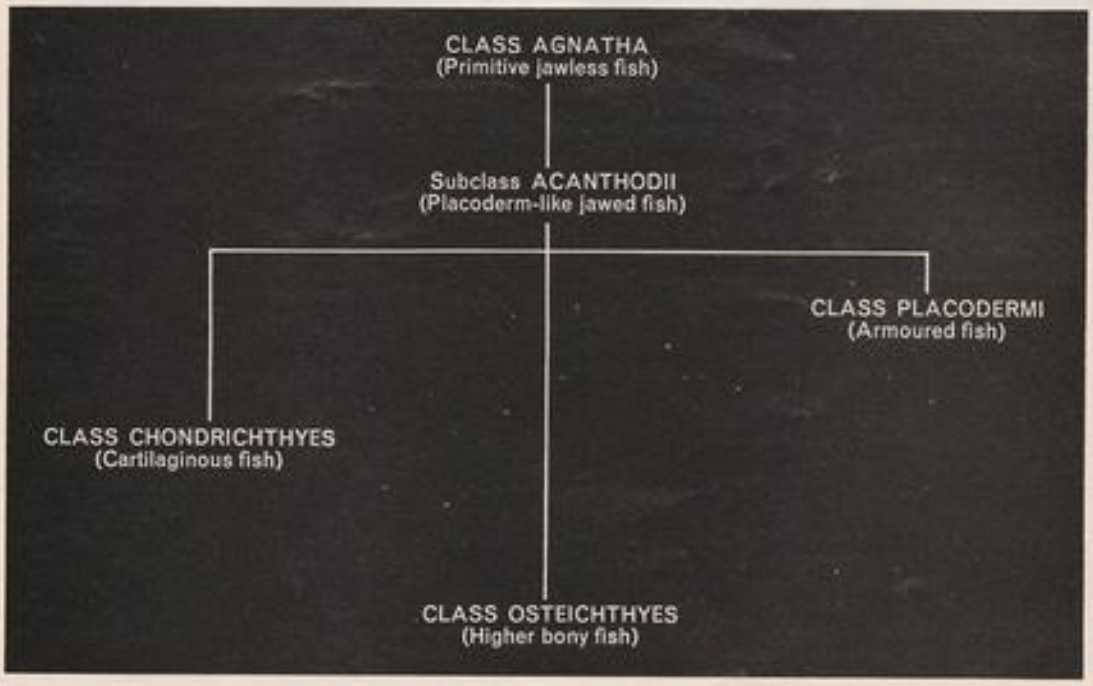
Part 1

Ancient Beginnings and Middle Stages

by Clive R. Hollin

THIS ARTICLE, and the one which follows, arose from my own search for an answer to a question of origin: Once, there *must* have been a first fish, so what did it look like? In what manner have fish changed since earliest times to the forms we know so well today? The search for answers to these questions led me far astray from the more common texts on fishkeeping and maintenance—to books dealing with, among other disciplines, anatomy, biology, palaeontology and physiology. The story which unfolded before me was so fascinating that I felt every aquarist would gain something from its telling, some sense of wonder related to the fish we sometimes take so much for granted. Thus what follows is a history, albeit somewhat potted, of the evolution of the fishes that inhabit the rivers, lakes and seas (not to mention aquaria) of the world.

Figure 1: Simplified fish family tree.



As so often happens when one sets off on one track of investigation, it becomes necessary to take a short diversion in order to continue one's journey. This was no exception, so let us first consider some of the terms and conventions which are to be followed. First taxonomy: The most usual method of classification is a natural one, animals that are genetically similar are placed in the same group (taxon). These taxons may then be arranged in the familiar form of a phylogenetic tree (see Figure 1). Generally speaking, the closer two animals are in the tree, the more closely related they are believed to be.

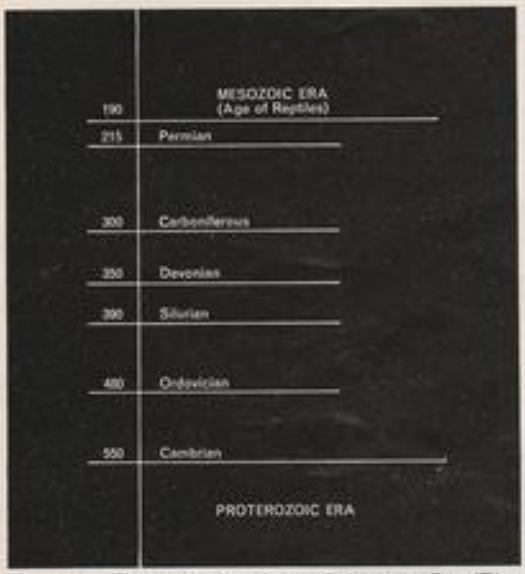


Figure 2: The periods of the Paleozoic Era (The Age of Ancient Life). The figures give the estimated time (in millions of years) since the beginning of the period.

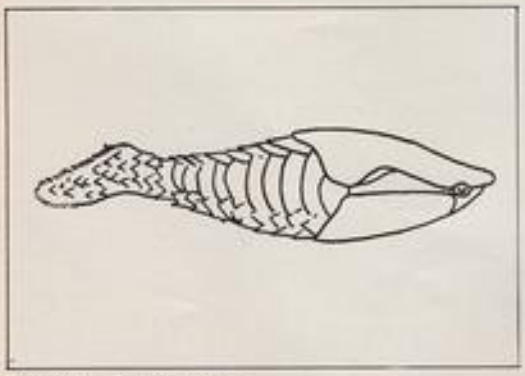


Figure 3: Ostracoderm.

As fish are vertebrates it is as well to be familiar with specific classification systems used in this case. The main taxons are: Classes, Subclasses, Superorders, Orders, Suborders, Families, Genera and Species. For purposes of clarity, present consideration will mainly be made to the more generic taxons, i.e. classes to suborders. The family tree shown in Figure 1 follows this self-imposed restriction in order that the progress of evolution can be more easily seen. Reference to Figure 1 will be of benefit throughout the reading. Where applicable the literal translation of a name is given to facilitate understanding. With reading the seemingly long, complicated names become familiar.

The second minor detour is in the direction of a brief knowledge of the periods of geologic history. This serves as an invaluable monitor of the evolution of life in the water. Figure 2 is self-explanatory in this respect.

Our story starts in the dim recesses of time, some 500 million years ago, in the Ordovician period of the Paleozoic (Age of Ancient Life) Era; well after the first stirrings of life. At the time of the emergence of the first life to be dubbed 'fish' the waters were populated with all manner of lower life forms: For example, all manner of crabs, sponges and worms lived at that time. This period saw the emergence of that class of fish which is at the very bottom of the fish family tree: The primitive jawless fish.

Such fish are of the class AGNATHA (literally, lacking jaws). Four orders of this class are given below:

Order Osteostraci
Order Anaspida
} All extinct
Order Heterostraci
Order Cyclostomata

The members of this class made their first appearance in the Ordovician period, flourished during the Silurian and survived into the Devonian.

The members of the first order, together with members of other orders (some mentioned above) have been given the name Ostracoderms and as such are the oldest known vertebrates. As can be seen from Figure 3 these specimens were characterised by bony plates (Ostraco = pot or shell) embedded in the skin around the head and anterior parts of the trunk, whilst smaller bony plates were to be found in the more caudal regions. Thus the plates and scales, which were made of phosphate, constituted a protective bony armour: Hence the name 'armoured fishes' often given to these creatures.

Figure 4: Lamprey.

Figure 5: Arthrodire.

Figure 6: Antiarch.

Fossil evidence strongly suggests that there were no internal bones within the armour box. Support would come from a notochord, which is a long straight flexible internal support composed of muscle fibre.

The armour plating was most probably developed as a means of defence. The ostracoderms were mainly flat-bodied and spent their lives grubbing in the muddy bottoms of fresh-water streams and ponds, sifting for food with the small opening or slit under the tip of their jawless mouth. Given that they were most probably sluggish beasts, these small creatures (typically 6-12 inches in length) were probably easy prey for the water scorpions (eurypterids) which proliferated at that time. However, as the ostracoderms increased in size and efficiency so the water scorpions dwindled to extinction as their food supply became harder and harder to catch.

The only modern-day survivors of the Agnatha class are the order Cyclostomata which is divided into two suborders: Myxinoidea (Hagfish) and Petromyzontia (Lampreys).

The lamprey is, as can be seen from Figure 4, eel-like in appearance (although it should be noted that it is more primitive in structure than the eels, which are highly developed bony fishes) and can grow up to three feet in length. It is soft-bodied, scaleless and, although possessing a feeble skeleton of cartilage, is entirely lacking in bone. Whilst living a marine existence the lamprey does migrate to fresh water to lay its eggs. The hagfish is similar in appearance and habits, with the exception that it is exclusively a marine creature.

As can be seen from Figure 1 the next evolutionary step was to the subclass Acanthodii. These fish rose to prominence during the Devonian period only to fall away to extinction before the close of the Paleozoic Era. As the acanthodians pose a special problem in terms of their classification, discussion will be delayed until after consideration of the next major class to appear: The class PLACODERMI (literally, plate-skin).

The placoderms originated in the fresh waters of the Silurian period, rose to prominence in the Devonian—in which time they invaded the seas—only to fall to extinction by the close of the Paleozoic. Some orders of this class are shown below:

Order Arthrodira (joint-necked fishes) } All extinct
Order Antiarchi (related to the arthrodires, but with 'bony' arms) } All extinct
Order Petalichthyida } (modified arthrodire descendants, evolving to the shark-like fishes) } All extinct
Order Rhenanida } (modified arthrodire descendants, evolving to the shark-like fishes) } All extinct

Like the ostracoderms the placoderms were covered, to varying degrees, by armour plating. However, the advance had been made that, unlike the ostracoderms, they were gnathostomes, i.e. they possessed jaws.

Figure 5 shows a typical arthrodire; a swift swimming predator. Bodily it was in possession of a heavy bony shield around the throat and head, with more armour shielding in the anterior region of the trunk. These two shields met in a movable joint with the remainder of the body being unprotected.

The antiarchs were grotesque little animals. Like the arthrodires they had two sets of armour but possessed small heads, tiny nibbling jaws, and a strange pair of jointed 'flippers' projecting like bony wings from the body. Figure 6 shows a member of this order.

Academic opinion seems to be that this step in evolution was something of an experiment carried out by nature to test for the best form of a jaw. Many varied types of jaw, most of them impractible, were evolved; and whilst the paired fin was developing this also was often of strange design. It does not seem likely that these fish were the direct ancestors of any later vertebrates, although it is possible that certain placoderm types gave rise to the primitive sharks. However, before turning our attention to the sharks let us return to the puzzle of the acanthodians.

The acanthodians were small jawed fish approximately the size of a minnow. They had armoured heads and bodies, and there is some evidence of an internal bone structure. It is this armour which links the acanthodians with the ostracoderms and the placoderms. The tail was tilted up in the manner of a shark; indeed, the acanthodians are often referred to as 'spiny sharks'. However, tail apart, there is nothing particularly shark-like in their structure. Inspection of Figure 7 shows the acanthodians to possess several sets of paired fins of a strange design. It is this aspect of their structure which separates them from the ostracoderms in terms of direct descent.

Thus it seems that there is a "missing link" in the tree. There are gaps in the fossil record between the jawless and the jawed fish (ostraderms and acanthodians), and between the acanthodians and placoderms. Unless new evidence comes to light it seems that the exact progress of evolution must remain a mystery.

Moving further up the tree the next class to appear was the class CHONDRICHTHYES (literally, cartilage fish). Some details of this class are given below.

Subclass Elasmobranchii (Naked gill slits)
Order Cladoselachii (Primitive Paleozoic sharks) } Extinct
Order Pleuracanthodii (Paleozoic fresh-water sharks) } Extinct
Order Selachii (Sharks)
Order Batoidea (Sawfish, skates, rays)
Subclass Holocephali (Gill slit covered)
Order Chimaeriformes (Chimaeras)

The Chondrichthyes first made an appearance in the latter part of the Devonian period, grew to abundance in the Permian (the end of the Paleozoic Era) and towards the end of the Mesozic Era shark-types similar to those we know today have been found. Also in the Mesozic the first skates and rays appeared—forms derived from the sharks.

Figure 7: Acanthodian.

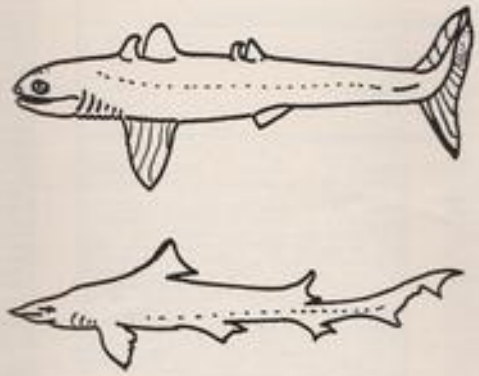


Figure 8: Primitive Devonian shark (*upper*) and modern-day shark (*lower*).

Figure 9: Chimaera.

Chondrichthyes are cartilaginous fish, that is to say they have no bone: Although the impregnation of lime salts can give this cartilage a firmness similar to bone. As these fish are descendants of the ostracoderms it seems likely that the absence of bone is a specialisation rather than a primary characterisation.

As can be seen from Figure 8 the primitive Devonian sharks had much in common with those sharks which patrol modern day seas.

For those who study such things the evolution of the shark is a significant starting point in their work: The arrangements of much of the shark's anatomy is comparable with the higher vertebrates and thus provides a point of departure which leads, if desired, to man himself.

The chimaeras (rat fish) are, like the skates, primarily mollusc eaters. As can be seen from Figure 9 the chimaeras are characterised by a flap of skin which covers the gill region; the upper jaws are also solidly fused to the brain case. The fossil record, whilst again incomplete, strongly suggests that whilst the elasmobranchii and holocephali are descended from the placoderms, they took separate lines of evolution.

This takes us to more modern times. In the next part the story will be completed with the appearance of the class OSTEICHTHYES; the class to which today's fish belong.

News from Aquarists' Societies

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

SOUTH EAST

South Park Aquatic (Study) Society held a Koi Forum on 21st July. A panel of Koi keepers consisting of Jenny Colewell, Lilly Grey, Nora and Sid Lewis and Roy Trim answered a variety of questions regarding the welfare of Koi from an interested audience. Topics included pond construction, water conditions, filtration methods, stocking levels, disease and quarantine procedures and show standards. Some of the Fry from Lilly Grey's recent large spawning were on display and appeared to be growing on well despite the poor summer weather. The society specialises in coldwater fishkeeping and meets at 8.00 p.m. on the third Tuesday of every month at the Wimbledon Community Centre, St. George's Road, London S.W.19. New members and visitors always welcome. Full details available from: Mrs. Marguerite Dudley, 163 South Park Road, Wimbledon, London SW19 8RX. (Tel: 01-540 5662).

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ON 18th August **South Park Aquatic (Study) Society** held an open night, when various subjects were discussed including live foods and in particular the feeding of Fry. Types of feeding varied greatly with Brine Shrimps, Micro Eels and Worms, Liquidry, Green Water, Egg Yolk, Fine Dry Foods, Young Daphnia, Chopped Grindal and White Worms and Liquidised Earthworm all being used to good effect by different members. Other topics raised included the differences of changing from tropical to coldwater fish, breeding Bitterling, the affects of the moon's cycle on Goldfish spawning and plans for the forthcoming Isle of Wight/Spass Interr Club show. The Society specialises in coldwater fishkeeping and meets at 8.00 p.m. on the third Tuesday of every month at the Wimbledon Community Centre, St. George's Road, London S.W.19. New members and visitors welcome. Full details from: Mrs. Marguerite Dudley, 163 South Park Road, Wimbledon, London SW19 8RX. (Tel: 01-540 5662).

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11TH OCTOBER: **Walthamstow and District A.S.** annual open show at Queen Mary College, 98-110 High Road, South Woodford E.18. The Show will be to F.B.A.S. rules and 32 classes overall.

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EAST KENT AQUATIC STUDY GROUP

FIFTY SIX People attended St. Barts Hall, Herne Bay, Kent, for the August meeting of the **East Kent Aquatic Study Group.** The main event was a talk and slide show presented by 14 year old Robert Waller. He amazed his audience with his knowledge of the hobby and his ability to quote the common and proper names of many different fish without once consulting a script. While Robert was talking, his father, Terry Waller, was busy judging the 21 entries in the table show. This month's classes were for "Cichlids" and "Danios". Terry congratulated the society on the high standard of presentation and condition of the fish on the bench. He then awarded cards:— Cichlids: 1, J. Edwards; 2, V. Bird; 3, C. Bridgeman; 4, R. Mathews. Danios: 1, J. Edwards; 2, R. Mathews; 3, P. Saxby; 4, A. Bird. Congratulation to A. Bird as this was his first ever try at showing fish.

After the tea break, the society's P.R.O., Bob Spoore, gave out details for the Public Exhibition to be held at Lower Hardres Village Hall, Canterbury, on the 5th and 6th of September. With the enthusiasm of the members, it is expected that over forty furnished tanks and Aquascapes will be on display as well as Reptiles/Amphibians and many other attractions. Membership of the Society continues to grow so fast that they are out growing their meeting place but new members are still very welcome as are guests and visitors. Further details are available from hon Secretary, C. J. Bridgeman, 150 Green Hill Road, Herne Bay, Kent. (Tel: Herne Bay 61907).

MIDLANDS AND WALES

Trethomas & District A.S. winners of open show held on 22nd August: Class B: 1, 3 and 4, S. Jones (RA); 2, S. Manuel (SAS). Ba: 1, C. Richards (SUD); 2, J. Egan (PT); C: 1, B. Witteridge (SUD); 2, S. Egan; 3, C. Richards; 4, E. M. Perkins (PT). Ca: 1, C. Richards; 2, B. Witteridge (SUD); 3, S. Manuel; 4, I. Lewis (RA). D: 1, C. Richards; 2, J. Egan; 3, S. Manuel; 4, A. Gale (NEW). Da: 1, S. Ostoby (CI); 2, C. J. Davies (TRE); 3, J. Egan. Db: 1, L. Gale (NEW); 2, 3 and 4, M. and D. Fitchet (NAL). Dc: 1 and 3, J. Heenan (TRE); 2, A. Phillips (TRE); 4, L. Gale. E: 1, S. Manuel; 2, B. Witteridge (SUD); 3, K. Davies (CI); 4, D. Williams (PT). Ea: 1, Bowyer and Nelder (CI); 2, W. Thomas (TRE); 3, C. Richards; 4, B. Witteridge. F: 1, B. Witteridge; 2 and 3, S. Manuel; 4, J. Heenan. G: 1 and 3, C. Richards; 2, D. Spence (NA); 4, A. Phillips. H: 1, L. Gale; 2, S. Jones (RA); 3, J. Egan; 4, A. Phillips. J: 1, J. Egan; 2, C. Richards; 3 and 4, B. Witteridge. K: 1, Bowyer and Nelder; 2, David Evans (TRE); 3, C. Richards. L: 1 and 2, C. Richards; 3, J. Heenan; 4, S. Ostoby (CI). M: 1, L. Gale; 2, M. McCarrol (SUD); 3, Bowyer and Nelder; 4, S. Manuel. O: 1 and 3, K. Merrion (CI); 2, D. Davies (TRE); 4, G. Lewis (LM). P: 1 and 3, L. Gregory (CI); 2, I. Lewis (RA); 3, L. Gregory (CI); 4, J. A. Thompson (LM). Q: 1, S. Jones (RA); 2, E. Perkins (PT); 3, K. Merrion (CI); 4, E. M. Perkins (PT). R: 1 and 3, J. Egan; 2, M. and P. Davies (TRE); 4, D. Davies (TRE). S: 1, D. Fitchet (NAL); 2, C. J. Davies (TRE); 3, K. Davies; 4, J. A. Thompson (LM). T: 1 and 2, S. Jones; 3, B. Witteridge; 4, M. and P. Davies (TRE). U: 1, A. Phillips; 2, L. Gregory (CI); 3, S. Ostoby (CI); 4, Mark Dowlin (TRE). V: 1 and 2, S. Howett (TRE). W: 1, L. Gale; 2 and 4, Bowyer and Nelder; 3, P. A. Mason (TRE). X-Bm: G. Heenan (TRE); 2, W. Holland (NA); 2, K. Davies (CI); 4, M. Thomas. X-OT: 1, G. Lewis (LM); 2, M. Thomas (CI); 3, S. Jones; 4, M. and P. Davies (TRE). N-OT: 1, B. Witteridge; 2, S. Jones; 3, D. J. Bolter (CI); 4, A. Phillips. N-BM: 1 and 3, Bowyer and Nelder; 2, S. Manuel; 4, J. Egan. X-UW: 1, 2 3 and 4, Bowyer and Nelder. B-MY: 1, G. Davies (CI); 2, D. Howells (TRE); 3, J. Bowyer (CI); 4, S. Howett (TRE). O-TY: 1, 2 and 3, D. Howells; 4, G. Davies (CI).

Best Fish in Show went to L. Gale, of Newbury. Key to Societies: RA—Rhondda; SUD—Sudbury; PT—Port Talbot; SAS—Selective; NEW—Newbury; CI—Castle; TRE—Trethomas; NAL—Nailsea; NA—North Avon; LM—Llantwit Major. RESULTS of the **Llantwit Major A.S.** annual open show: Class Ad: 1, J. Thomson (Llantwit). Ag: 1, Miss D. Lewis (Llantwit). Ba: 1, J. Egan (Port Talbot); 2, C. Turner (Llantwit); 3, Mrs. Rees (Port Talbot). Ca: Mrs. Rees; 2 and 3, C. Richards (Sudbury). Cz: 1, S. Manuel (Selective); 2, J. Egan; 3, Mrs. Rees. D: 1, A. Phillips (Trethomas); 2, Mrs. Rees; 3, C. Turner. Da: 1, A. Hillman (Llantwit); 2, S. Ostoby (Castle); 3, N. Jones (Port Talbot). Db: 1, Mrs. Rees; 2, C. Richards; 3, J. Egan (Port Talbot). E: 1 and 3, E. Jones (Port Talbot); 2, S. Manuel. Ea: 1, J. Egan; 2, C. Richards; 3, M. and L. Thomas (Castle). F: 1, S. Manuel; 2, M. Addicot (Llantwit); 3, B. Witteridge (Sudbury). G: 1 and 3, C. Richards; 2, C. Turner. H: 1, D. Davies (Aberdare); 2, A. Phillips; 3, C. Richards. By-Sy: 1, A. Samuel (Aberdare); 2, J. and P. Bowyer (Castle); 3, Miss E. Newton (Llantwit). J: 1, S. Manuel; 2, J. Egan; 3, B. Witteridge (Sudbury). K: 1, Mrs. Rees; 2, B. Witteridge; 3, J. and P. Bowyer. L: 1, C. Richards; 2, C. Turner; 3, S. Ostoby (Castle). M: 1, S. Manuel; 2, B. Witteridge; 3, Mrs. Rees. N: 1, J. Egan; 2, K. Hall (Llantwit); 3, J. and P. Bowyer. O: 1, M. and L. Thomas (Castle); 2, C. Richards; 3, W. Thomas (Castle). P: 1 and 2, M. and L. Thomas; 3, S. Ostoby. Q: 1, R. Perkins (Port Talbot); 2, Miss S. Jones (Rhondda); 3, N. Jones (Port Talbot). R: 1, M. and P. Davies (Bedwas); 2 and 3, J. Egan. S: 1, S. Manuel; 2 and 3, K. and S. Davies (Castle). T: 1, B. Witteridge; 2, M. and L. Thomas; 3, C. Turner. Ba-M: 1 and 3, K. Hall (Llantwit); 2, C. Turner. Xo-T: 1 and 2, C. Turner; 3, M. and P. Davies. U: 1, B. Porter (Llantwit); 2, L. Gregory (Castle); 3, C. Turney. Us: 1, C. Turner; 2, A. Samuel (Aberdare). V: 1 and 3, B. Porter (Llantwit); 2, C. Turner. W: 1, 2 and 3, J. and P. Bowyer. Best fish in show and *Aquarist* Gold Pin: Class H: D. Davies (Aberdare).

* * *

AT the A.G.M. of the **Llantwit Major A.S.** in July the following were elected to the committee: Chairman, Harold Chic; Vice-Chairman, John Thomson; Treasurer, Adrian Hillman; Show Secretary, Kevin Hall; Librarian, Gwynn Lewis; P.R.O.: Ian Singleton; Secretary, John Baker, 7 Blackbird Road, St. Athan, Barry, South Glam. CF6 9NL. The society meets on the 2nd Tuesday each month at 7.30 p.m. in the Clubroom, Leisure Centre, Ham Lane, Llantwit Major.

SOUTH WEST

IT is with regret that we report the death of Mr. Bert Coombes, of the **Bournemouth A.S.** on the 19th July. He had been a member of the Society since the early 1950s, and was for many years the chairman. He was a Coldwater enthusiast breeding fantails and shubunkins, but also took a keen interest in breeding tropicals. He was also an F.B.A.S. judge and speaker, but became inactive in recent years due to ill health. Bert Coombes will be greatly missed by aquarists along the South Coast. The Bournemouth A.S. extend their sympathies to his widow and family.

"FISHKEEPING MY WAY" proved to be an apt title for the talk given by Jim Amos to **Bristol A.S.** Slides were shown to illustrate many branches of Fishkeeping from Brine Shrimp Culture up to Pond Construction. Table Show Results: Comets: 1 and 2, H. C. R. Thomas; 3, C. Hayes; 4, M. Calway. Pond and River: 1 and 4, Miss H. Morgan; 2, C. Hayes; 3, J. Day. Koi: 1 and 2, Miss H. Morgan.; 3 and 4, O. Smith.

NORTH

AT the **Loughborough and District A.S.** open show held on 7th June, there were 353 entries. Results: Male Betta Splendens: 1 and 2, D. and P. Lawton (Potteries); 3, B. Chittenden (Leamington); 4, R. Fraser (Leamington). A.O.V. Anabantids: 1 and Best in show Tropicals, Mrs. A. Smith (Forest Town); 2, Mr. and Mrs. Johnson (Forest Town); 3, K. M. Fisher (Forest Town); 4, W. and H. Rodger (Loughborough). Small Characins: 1 and 2, P. G. Stoodley (Leamington); 3, R. Fraser (Leamington); 4, M. Craddock (Kettering). A.O.V. Characins: 1 and 2, P. A. Hughes (Loughborough); 3, C. W. Stoodley (Leamington); 4, R. Fraser. Dwarf Cichlids: 1, R. M. Smithurst and Son (A and D); 2, Master S. Dawn (Forest Town); 3, K. Rodger (Loughborough); 4, C. J. Sykes (Banbury). Rift Valley Cichlids: 1, K. M. Fisher; 2 and 3, M. Laws (King's Lynn); 4, L. Godwin (Leics. New Parks). A.O.V. Cichlids: 1, M. Wright (Kettering); 2, T. Dawn (Forest Town); 3, B. Chittenden; 4, R. M. Fisher. Small Barbs: 1, C. J. Sykes; 2 and 4, R. Hancox (Banbury); 3, Mr. and Mrs. Sutton (Leics. AS). A.O.V. Barbs: 1, R. and M. Smithurst and Son; 2, 3 and 4, K. Clayton (MASG). Corydoras: 1 and 2, D. and P. Lawton; 3, Miss Beverley and Mr. S. Carney (Bethnal Green Ind.); 4, C. J. Sykes. A.O.V. Catfish: 1, C. Burton (MASG); 2, P. A. Hughes; 3, Master S. Dawn; 4, T. Dawn. A.V. Swordtails: 1, Mr. and Mrs. Johnson; 2, L. Godwin; 3, T. and F. Panther (Kettering); 4, P. Robinson (Wellingborough). A.V. Platy: 1, W. and H. Rodger; 2, B. Chittenden; 3, Mr. and Mrs. Sutton; 4, C. J. Sykes. A.V. Mollies: 1 and 3, A. Barton (Wellingborough); 2, R. Vickers (Kettering); 4, Miss Beverley and Mr. S. Carney. A.V. Guppy: 1 and 3, R. Smith (Leics. AS); 2 and 4, Mr. and Mrs. Sutton. A.O.V. Livebearer: 1, L. Godwin; 2, P. A. Hughes; 3, J. Williams (Leics. AS); 4, M. Kirkham (MASG). A.V. Loach: 1 and 3, E. and N. Hallam (Loughborough); 2, Mr. and Mrs. Sutton; 4, P. G. Stoodley. Livebearer (Pairs): 1, Mr. and Mrs. Johnson; 2, T. and F. Panther; 3, Mrs. S. Dawn (Forest Town); 4, R. M. Smithurst and Son. Egglayer (Pairs): 1, W. and H. Rodger; 2, M. and B. Coe (Wellingborough); 3, P. A. Hughes; 4, R. M. Smithurst and Son. Anchoras: 1, D. Stevens (Dudley and Dist.); 2, Mr. and Mrs. Sutton; 3, R. Smith; 4, A. Babbs (Dudley and Dist.). Danios: 1 and 4, A. Babbs; 2, T. Panther; 3, E. and N. Hallam. A.O.V. Tropical: 1, M. and B. Coe; 2, H. Evans (Cannock); 3, Miss Beverley and Mr. S. Carney; 4, E. and N. Hallam. A.O.V. Coldwater Pond and River: 1, Mr. and Mrs. Silk (Sheaf Valley); 2, A. Barton; 3, P. G. Stoodley; 4, R. Fraser. Mini-Furnished Aquarium: 1, Mrs. G. Hughes (Loughborough); 2, Mr. and Mrs. Sutton; 3, J. Rodger; 4, A. Brunnell (Loughborough). Common Goldfish: 1 and 3, I. Purdy (AMGK); 2, R. Smith; 4, P. G. Stoodley. Bristol Shubunkins: 1, B. Ennis (AMGK); 2, N. Giles (AMGK); 3, W. Ennis (AMGK); 4, Karen Ennis (AMGK). Comet Goldfish: 1, Mr. and Mrs. Leasy (Leamington); 2 and 3, C. W. Stoodley; 4, R. Smith. Veiltails: 1, Mr. and Mrs. Silk. Orandas: 1, Mr. and Mrs. Silk; 2, Mr. and Mrs. Leasy; 3, Mr. and Mrs. Sutton; 4, A. Brunnell. Moores: 1, N. Giles; 2, Mr. and Mrs. Silk; 3 and 4, J. Capewell. Lionhead: 1, Andrew Field (AMGK); 2, N. Giles. Best Coldwater: 3, J. Capewell; 4, Mrs. J. Amos (AMGK). Fantails: 1 and 2, R. A. Field (AMGK). Bubble Eyes: 1, Andrew Field; 2, N. Giles. Pom Poms: 1, 2 and 3, James Amos (AMGK). The Society thank MAAS for providing the Tropical judges and AMGK for running and judging the Goldfish sections.

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Grimsby and Cleethorpes A.S. 10th open show results: Guppies: Mr. and Mrs. Howell 72; Mr. and Mrs. Farrow 71; Mr. and Mrs. Holland 69. Swordtails: Mr. and Mrs. Fawcett 71; A. Marples 70; A. Marples 69. Mollies: A. Marples 71; Mr. and Mrs. Sellars 70; Mr. and Mrs. Brackenbury 68. Platies: Mr. and Mrs. Holland 73; A. Gilbert 72; Mr. and Mrs. Penny 71. A.O.V. Live: Mr. and Mrs. Sellars 75*; P. Lane 74; M. and N. Hancock 73. Small Barbs: A. Marples 74*; Mr. and Mrs. Farrow 73; A. Ledgard 71. Large Barbs: R. Smethurst 73; R. C. Laverick 72; A. Marples 71. Small Characin: Mr. and Mrs. Holland 74*; Mr. and Mrs. Brackenbury 72; H. Roberts 71. Large Characin: P. Burnett 71; R. M. Smithurst 70; Mrs. G. Marples 69. A.O.V. Cichlid (small): B. Bee 75*, B. Bee 74; Mr. and Mrs. Sellars 73. A.O.V. Cichlid (large): Mr. and Mrs. Marshall 74; Mr. and Mrs. Silk 73; Mrs. Newham 71. Angels: R. M. Smithurst 71*; J. Hawdon 68; Mr. and Mrs. Hare 67. Endemic Rift Lake: Mr. and Mrs. D. Mitchell 74½*; R. Smithurst 74; Mrs. V. Mitchell 73. Corydoras and Brochis: Mrs. Anderson 72; F. Wilson 71½; S. Osborrow 71. A.O.V. Catfish: Mr. and Mrs. Howell 80*; D. Moody 78½; Mr. and Mrs. Marshall 75. Loaches and Botias: Mr. and Mrs. Davis 72*; A. Cook 71; Mr. and Mrs. Banks, 70. Sharks and Foxes: Mr. and Mrs. Howell 74*; R. M. Smithurst 71; Mr. and Mrs. Marshall 70. Small Anabantids: R. M. Smithurst 74; Mrs. Anderson 73½; Mr. and Mrs. Howell 73. Siamese Fighters: Mr. and Mrs. Fawcett 74; Mrs. Anderson 73½; Mr. and Mrs. Brackenbury 72½. Large Anabantids: Mr. and Mrs. Howell 76*; Mr. and Mrs. Richardson 74½; Mr. and Mrs. Howell 73. Common Goldfish: Mr. and Mrs. K. Allard 72; Mr. and Mrs. Silk 69; P. Spencer Franks 67. Fancy Goldfish: B. and G. 71; Mr. and Mrs. Silk 69; Mr. and Mrs. Silk 67. A.O.V. Coldwater: C. Mathews 74*; Mr. and Mrs. Silk 72; Mr. and Mrs. Silk 70. Aphyosemion: L. Tuxworth 72½*; Mr. and Mrs. Pickford 71; L. Tuxworth 70. A.O.V. Killifish: Mr. and Mrs. Culley 72; Mr. and Mrs. Pickford 71½; L. Tuxworth 71. Danios and Minnows: Mr. and Mrs. Culley 70; Mr. and Mrs. Brackenbury 69; Mr. and Mrs. Brackenbury 68. Rasboras: Mr. and Mrs. Lake 74*; Mr. and Mrs. Lake 70; Mr. and Mrs. K. Hare 69. A.O.V. Tropical: Mr. and Mrs. Howell 76½*; Mr. and Mrs. Mitchell 74½; Mr. and Mrs. Penny 73½. Marines: G. Band 72*; C. Cant 70. Pairs (Egglayers): Miss J. Lee 75½*; Mr. and Mrs. Lake 74; Mr. and Mrs. Hare 71. Pairs (Livebearers): D. Moody 75; Miss J. Lee 74; Mr. and Mrs. Fawcett 72. Novices: Mr. and Mrs. Wilson 71*; R. Loades 70; A. Ledgard 67. Breeders (Egglayers A and B): A. Marples 75; Mr. and Mrs. Sellars 74; Mr. and Mrs. Pickford 73½. Breeders (Egglayers C and D): B. Todd 80; B. Todd 79; B. Todd 78. Breeders (Livebearers A and B): Mrs. Anderson 79; Mr. and Mrs. Fawcett 77; Miss J. Lee 76. Breeders (Livebearers C and D): Mr. and Mrs. Banks 81*; Mr. and Mrs. Banks 80; P. Lane 75. Junior: A. Palmer 73½*; E. Marples 72; L. Wilson 71½. *Trophy winners: Best fish in show (A.O.V. Cat), Mr. and Mrs. Howell (A and D). Best Society, A and D. Best Livebearer, Mr. and Mrs. Sellers (Ind.). Best Barb, A. Marples (A and D). Best Characin, Mr. and Mrs. Holland (Retford). Best Cichlid, B. Bee (GCAS). Best Angel, R. M. Smethurst and Son (A and D). Best Rift Valley, Mr. and Mrs. D. Mitchell (Worksop). Best Catfish, Mr. and Mrs. Howell (A and D). Best Loach or Botia, Mr. and Mrs. Davis (GCAS). Best Shark or Fox, Mr. and Mrs. Howell (A and D). Best Anabantid, Mr. and Mrs. Howell (A and D). Best Coldwater, C. Mathews (GCAS). Best Killifish, L. Tuxworth (GCAS). Best Ras. Dan. Minn., Mr. and Mrs. Lake (GCAS). Best A.O.V. Tropical, Mr. and Mrs. Howell (A and D). Best Marine, B. and G. (GCAS). Best True Pair, Miss J. Lee (Ind.). Best Novice, Mr. and Mrs. Wilson (Hallcroft). Best Breeders, Mr. and Mrs. Banks (BBC). Best Junior, A. Palmer (Hallcroft).

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South Leeds A.S. thank Mr. L. Nicholson for his Lecture on "Discus" which proved very interesting with colour slides taken by himself. They would also like to invite any novice Aquarists and also experienced to their meetings which are held on the 1st and 3rd Wednesday of every month, at the Leeds Girl Guides Headquarters, Cookridge Street, Leeds 1. The Secretary is Mr. T. Holdsworth; Show Secretary, Mr. R. Day. Further details from Mr. Day at 3 Beulah Mount, Woodhouse, Leeds LS6 2JZ.

Yorkshire Association of Aquarist Societies Festival at Doncaster Racecourse 15th August. Results—Tableau: 1, Mexborough A.C.; 2, Castleford and D.A.S.; 3, Ashby F.K.S.; 4, Chesterfield and D.A.S.; 5, Bradford and D.A.S. Fish of Fishes: 1, R. Brown (Bradford); 2, Mr. and Mrs. A. Waterhouse (Merseyside); 3, T. Stansfield (Leeds P.O.). Best fish in show: M. Hollingworth (Forest Town). Best Exhibit: R. Brown (Bradford). Society with most points: Retford. Classes: Tropical Freshwater Furnished Aquarium Society entry on 24 in. × 12 in. base: 1, Retford D.A.S.; 2, Doncaster D.A.S.; 3, Ashby F.K.S. Tropical Freshwater Furnished Aquarium Individual entry 24 in. × 12 in. base: 1, F. Toyne (Sheaf Valley); 2, F. Smith (Forest Town); C. Coldwater Furnished Aquarium Individual entry on 24 in. × 12 in. base: 1, 2 and 3, D. Harris (Mexborough). Aquascape Individual entry: 1, Mr. and Mrs. Holland (Retford); 2, J. U. Hall (Attebrough); 3, Miss A. Chapman (Mexborough). Novelty Individual entry: 1, A. Smith (Forest Town); 2, K. Lancashire (Doncaster); 3, A. M. Barnett (Castleford). Guppies: 1, Mr. and Mrs. Chester (Retford); 2, P. A. Ashton (Wakefield); 3, Mr. and Mrs. Holland (Retford). Platies: 1, Mr. and Mrs. Holland; 2, Mr. and Mrs. Riley (Leeds P.O.); 3, N. Brunyee (Doncaster). Mollies: 1, K. Taylor (Hull); 2, Mr. and Mrs. Rackenbury (Ashby); 3, Mr. and Mrs. Lister (Ashby). Swordtails: 1, K. Corbett (Merseyside); 2, M. Johnson (Forest Town); 3, H. Ackroyd (Doncaster). A.O.V. Livebearer: 1, 2 and 3, C. Taylor (Hull). Small Barbs, up to 10 cm: 1, P. Wigley (Mexborough); 2, D. Sugden (Bradford); 3, S. Ainge (Bradford). Large Barbs, over 10 cm: 1, Mr. and Mrs. Kemp (Sheaf Valley); 2, J. Walker (Merseyside); 3, J. Crook (Sheaf Valley). Small Characins up to 7 cm.: 1, E. Mottershead (Bradford); 2, B. Parr (Pacene); 3, Mr and Mrs. Brackenbury. Large Characins over 7 cm.: 1, Mr. and Mrs. Holland; 2, J. Corbet (Merseyside); 3, B. Parr (Pacene). Rasboras: 1, Mr. and Mrs. Chester; 2, Mr. and Mrs. Holland; 3, Mr. and Mrs. Kemp (Sheaf Valley). Danios: 1, Mr. and Mrs. Brackenbury; 2, Mr. and Mrs. Chester; 3, J. Lynch (Merseyside). Minnows: 1, Mr. and Mrs. Brackenbury; 2, D. Wilson (Chesterfield); 3, L. and K. Starbuck (Castleford). A.V. Aphyosemion: 1, D. Clarke (Bradford); 2, Mr. Mrs. Culley (Ashby); 3, Mr. and Mrs. Chester. A.O.V. Killifish: 1, M. and L. Price (Castleford); 2, R. Brown (Bradford); 3, P. Griffiths (Mexborough). Siamese Fighters (True Colours): 1, Mr. and Mrs. Fawcett (York); 2, Mr and Mrs. Riley (Leeds P.O.); 3, Mr. and Mrs. Fawcett (York). Siamese Fighters (Multicolours): 1, J. and K. Johnson (Forest Town); 2 and 3, Mr. and Mrs. Brackenbury. Small Anabantids up to 10 cm.: 1, J. Walker (Merseyside); 2, Mr. and Mrs. Riley; 3, B. Jackson (Attebrough). Large Anabantids over 10 cm: 1, R. A. Johnson (Pacene); 2, G. Edwards (North Staff.); 3, D. Harris (Mexborough). Endemic Rift Lake Cichlids: 1, M. Hollingworth (Forest Town); 2, M. and L. Price (Castleford); 3, K. Fisher (Forest Town). Angels: 1, L. and K. Starbuck (Castleford); 2, Mr. and Mrs. Snowden (York); 3, B. Jackson (Attebrough). A.O.V. Cichlids up to 10 cm.: 1 and 2, M. and L. Price; 3, J. Corbett (Merseyside). A.O.V. Cichlids over 10 cm.: 1, T. Stansfield (Leeds P.O.); 2, K. Fisher; 3, Mr. and Mrs. Riley. Corydoras including Brochis: 1, J. Lynch; 2, M. and L. Price; 3, A. Darby (Pacene). A.O.V. Catfish: 1, Mr. and Mrs. Riley; 2, Mr. and Mrs. Chester; 3, S. Cooper (North Staff.). Botias and Loaches: 1, Mr. and Mrs. Richard (Pocklington); 2, S. Cooper (North Staff.); 3, Mr. and Mrs. Smith (Bradford). Sharks: 1, Mr. and Mrs. Kemp (Sheaf Valley); 2, M. E. Mountshead (Bradford); 3, Mr. and Mrs. Campbell (Ashby). Foxes: 1, Mr. and Mrs. Holland (Retford); 2, B. Ward (Doncaster); 3, C. Harrop (Huddersfield). Pairs Livebearers: 1, J. Corbett (Merseyside); 2, Mrs. S. Dawn (Forest Town); 3, K. Corbett (Merseyside). Pairs (Egglayers): 1, M. and L. Price; 2, Mr. and Mrs. Campbell (Ashby); 3, R. and A. Johnson (Pacene). Breeders (Livebearers A. and B.): 1, Mrs. S. Dawn; 2, D. Chadwick (Doncaster); 3, H. Shields (Dumbar). Breeders (Livebears C. and D.): 1, Mr. and Mrs. Fawcett (York); 2, R. Banks (Doncaster); 3, Mr. and Mrs. Chester (Retford). Breeders (Egglayers A. and B.): 1, Mr. and Mrs. N. Boden (Pocklington); 2, J. Walker (Merseyside); 3, K. and L. Briggs (Huddr.). Breeders (Egglayers C. and D.): 1, R. Brown (Bradford); 2, M. and L. Price; 3, K. Corbett. A.V. Female Livebearer: 1, C. Taylor (Hull); 2, Mrs. S. Dawn; 3, T. Sparrow (Ashby). A.V. Female (Egglayer): 1, T. Stansfield (Leeds P.O.); 2, Mr. and Mrs. Chester; 3, Mr. Mrs. Golland (Sheaf Valley). A.O.V. Tropical: 1, B. Wigley (Mexborough); 2, H. Ackroyd (Doncaster); 3, D. S. Penny (Doncaster). Common Goldfish and Comets: 1, K. Chapman (Mexborough); 2, Mr. and Mrs. Silk (Sheaf Valley); 3, K. Chapman (Mexborough). Shubunkins, Bristols and Londons: 1, Mr. Mrs. Silk; 2, B. Brooke (Huddersfield). Fancy Goldfish, Moors,

P/Tails, Oran, L/Heads: 1 and 3, Mr. and Mrs. Silk; 2, B. Brooke (Huddersfield). Breeders (Coldwater): 1, Mr. and Mrs. Chester; 2, B. Brooke (Huddersfield); 3, L. and M. Walker (Chesterfield). A.O.V. Coldwater: 1, K. Chapman (Mexborough); 2, Mr. and Mrs. Snowden (York); 3, Mr. and Mrs. Campbell (Ashby). Aquarium Plants: 1 and 2, J. Lemin (Holmfirth); 3, Mrs. Toyne (Shear Valley). Amphibians, Crabs, Shrimps, Lobsters Terrapins: 1, L. Brodie (Ashby); 2, J. Barford (Bradford); 3, Miss A. Stansfield (Leeds P.O.).

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Hull A.S. show results: Guppy: 1, D. Moody (Grimsby and Cleethorpes); 2, Mr. and Mrs. Davis (Grimsby and Cleethorpes); 3, P. Davis (Wyke). Swordtail: 1 and 3, C. Taylor (Hull); 2, C. G. Womax (Ind.). Platy: 1 and 2, Mr. and Mrs. Davis; 3, R. Gee (Wyke). Molly: 1, K. Taylor (Hull); 2, G. A. Todd (Hull); 3, S. L. Walton (Hull). A.O.V. Livebearers: 1, C. Taylor; 2 and 3, D. Moody. A.V. Female (Livebearers): 1, C. Taylor; 2, R. and I. Jackson (Ind.); 3, D. Moody. Pairs (Livebearers): 1, C. Taylor; 2, D. Moody; 3, G. A. Todd. Breeders (Livebearers C and D): 1, 2 and 3, C. G. Womax (Ind.). Rasboras: 1, D. Moody; 2, Mr. and Mrs. Davis (Grimsby and Cleethorpes); 3, R. C. Laverack (Wyke); 3, T. Goule (Wyke). Barbs (up to 10 cms.): 1, Mr. and Mrs. Davis; 2, Mr. and Mrs. Frisby (Wyke); 3, G. A. Todd. Barbs (over 10 cms.): 1, R. C. Laverack; 2, R. Stanford (Wyke). Angels: 1, C. Taylor. Rift Valley (Endemic): 1, R. P. Laverack (Wyke); 2, Mr. and Mrs. Frisby. A.O.V. Cichlids (up to 10 cms.): 1, S. L. Walton (Hull); 2, D. Dalton (Wyke). A.O.V. Cichlids (over 10 cms.): 1 and 3, Mr. and Mrs. Frisby; 2, R. Buckley (Wyke). Characins (up to 7 cms.): 1, D. Moody; 2, Mr. and Mrs. Davis; 3, S. R. Wilson (Hull). Characins (over 7 cms.): 1, A. Dubbing (Wyke); 2, B. Anderson (Ind.); 3, D. Moody. Fighter (male or female): 1, Mr. and Mrs. Davis; 2 and 3, B. Anderson (Ind.). Fighter (male or female): 1, Mr. and Mrs. Davis; 2 and 3, B. Anderson. Anabantids (up to 10 cms.): 1, B. Anderson; 2, I. A. Pickering (Wyke); 3, C. G. Womax. Anabantids (over 10 cms.): 1, M. Walker (Hull); 2, R. Gee (Wyke); 3, I. A. Pickering (Wyke). Egglaying (Toothcarp): 1, Mr. and Mrs. Davis; 2, D. Dalton; 3, G. A. Todd. Corydoras: 1, B. Anderson; 2, S. R. Wilson; 3, Mr. and Mrs. Davis. A.O.V. (Cats): 1, D. Moody; 2, R. Gee; 3, Mr. and Mrs. Davis. Loaches: 1, Mr. and Mrs. Davis; 2, D. Moody; 3, R. V. Gee (Wyke). Sharks and Foxes: 1, T. Goule (Wyke); 2, M. A. Walton (Hull); 3, David Leonard (Wyke). A.O.V.: 1 and 3, Mr. and Mrs. Ashton (Wyke); 2, A. Dubbing (Wyke). A.V. Female (Egglayer): 1, D. Moody; 2, Mr. and Mrs. Frisby; 3, B. Anderson. Pairs (Egglayers): 1, A. Dubbing; 2, R. C. Laverack. Breeders (Egglayers A and B): 1, B. and I. Jackson (Ind.); 2, G. A. Todd. Breeders (Egglayers C and D): 1, Mr. and Mrs. Frisby; 2, R. Gee. Goldfish and Comets: 1, E. Ashton (Wyke). Fancy Goldfish: 1, Mr. and Mrs. C. Briggs (Bridlington); 2, Mr. and Mrs. Ashton. A.O.V. Coldwater: 1, Mr. and Mrs. C. Briggs; 2, E. Ashton (Wyke). Best Fish in Show: D. Moody. Best Furnished Aquarium: 1, K. Taylor (Hull); 2 and 3, Mr. and Mrs. Walker (Hull). Best Fish in Aquaria: S. Wilson (Hull). The Society would like to thank Mr. W. Blundell and Mr. J. Scott who did an excellent job in judging the varied exhibits.

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RESULTS from **Ashby Fishkeepers Society** first open show on 2nd August. Guppies: 1, Mr. and Mrs. Howell (A and D); 2, P. S. Draycott and Sons (A and D); 3, Mr. and Mrs. Holland (Retford). Platies: 1, Mr. and Mrs. Holland; 2, Mr. and Mrs. Hare (Grimsby and Cleethorpes); 3, T. Sparrow (Ashby). Swordtails: 1, C. Womack (Ind.); 2, Mr. and Mrs. Pickford (Cannock); 3, R. Day (Caistor). Mollies: 1, Mr. and Mrs. Brackenbury (Ashby); 2 and 3, P. S. Draycott and sons. A.O.V. Livebearers: 1, Miss L. Wilson (Grimsby and Cleethorpes); 2, M. and N. Hancock (Hallcroft); 3, Miss P. Lane (Hallcroft). Small Characins: 1 and 3, Miss J. Lee (Ind.); 2, Miss P. Lane (Hallcroft). Large Characins: 1, Mr. and Mrs. Culley (Ashby); 2, Mr. and Mrs. Brackenbury; 3, K. Loukes (Grimsby and Cleethorpes). Endemic Rift Lake Cichlids: 1, K. Watson (Worksop A.Z.S.); 2, Mr. and Mrs. D. Mitchell (Worksop A.Z.S.); 3, P. Jackson (Attlebrough). Small Cichlids: 1, B. Bee (Grimsby and Cleethorpes) also Best in Show; 2, L. and M. Price (Castleford); 3, B. Bee. Large Cichlids: 1, N. Newman (Ind.); 2, Mr. and Mrs. Silk (Sheaf Valley); 3, Mr. and Mrs. Culley (Ashby). Small Barbs: 1, Mr. and Mrs. N. Farrow (Worksop A.Z.S.); 2, Mr. and Mrs. Davis (Grimsby and Cleethorpes); 3, Mr. and Mrs. Hare. Large Barbs: 1, Mr. and Mrs. Pickford (Calstor); 2, A. Henderson (Ind.); 3, J. Alston (Grimsby and Cleethorpes). Rasboras: 1, Mr. and Mrs. Holland (Retford); 2, Mr. and Mrs. Hare; 3, Miss J. Lee. Danios: 1, D. Moody (Grimsby and Cleethorpes); 2, Mr. and Mrs. Brackenbury; 3, Mr. and Mrs. Campbell (Harrogate). Minnows: 1, D. Moody; 2, Mr. and Mrs. Brackenbury; 3, Mr. and Mrs. H. Campbell (Ashby). A.O.V. Killifish: 1, Mr. and Mrs. Culley (Ashby); 2, Mr. and Mrs. Pickford (Caistor); 3, Mr. and Mrs. Davies (Grimsby and Cleethorpes). A.V. Aphyosemion: 1 and 2, P. S. Draycott and Sons (A and D); 3, Mr. and Mrs. Culley. Corydoras and Brochis: 1, L. and M. Price (Castleford); 2, D. Heward (Grimsby and Cleethorpes); 3, Mrs. F. Wilson (Grimsby and Cleethorpes). A.O.V. Catfish: 1, D. Moody; 2, L. and M. Price (Castleford); 3, D. Moody. Loaches and Botias: 1, Mr. and Mrs. H. Campbell; 2, E. Bowles (Ind.); 3, Mr. and Mrs. Howell (A and D). Sharks: 1, Mr. and Mrs. Howell; 2, Mr. and Mrs. Campbell; 3, Mr. and Mrs. D. Mitchell (Worksop A.Z.S.). Foxes: 1, P. Jackson (Attlebrough); 2, R. Beal (Huddersfield); 3, Mr. and Mrs. D. Mitchell. Small Anabantids: 1, Mrs. Anderson (Ind.); 2, C. Womack (Ind.); 3, R. Day (Caistor). Large Anabantids: 1 and 2, Mr. and Mrs. Howell; 3, Miss P. Lane. Fighters: 1 and 2, Mrs. Anderson (Ind.); 3, Mr. and Mrs. Brackenbury. Small Tropical A.O.V.: 1, Mr. and Mrs. D. Mitchell; 2, Mr. and Mrs. Howell; 3, Miss J. Lee. Large A.O.V. Tropical: 1, Mr. and Mrs. Howell; 2, E. Bowles (Ind.); 3, Mr. and Mrs. Pickford. Pairs (Livebearers): 1, Miss J. Lee; 2, P. S. Draycott and Sons; 3, Mr. and Mrs. Howell. Pairs (Egglayers): 1, Miss J. Lee; 2, Mr. and Mrs. Pickford; 3, D. Heward. Breeders (Live) A and B: 1, Mr. and Mrs. Campbell; 2, B. and I. Jackson (Ind.); 3, Mrs. Anderson (Ind.). Breeders (Live) C and D: 1, Miss P. Lane; 2, Mr. and Mrs. M. Holland; 3, C. Womack (Ind.). Breeders (Egglayers) A and B: 1, B. and I. Jackson; 2, Mr. and Mrs. Pickford; 3, P. S. Draycott and Sons. Breeders (Egglayers) C and D: 1, L. and M. Price (Castleford); 2 and 3, R. Todd. Goldfish and Comets: 1, Mr. and Mrs. K. Allard (A and D); 2, Mr. and Mrs. Silk (Sheaf Valley); 3, Mr. and Mrs. Lister (Ashby). Shubunkins and Fancy Goldfish: 1 and 2, Mr. and Mrs. Silk; 3, B. and G. (Grimsby and Cleethorpes); A.O.V. (Coldwater): 1, Miss C. Matthews, (Grimsby and Cleethorpes); 2, Mr. and Mrs. Campbell; 3, Mr. and Mrs. Silk. Furnished Jars: 1 and 2, Mr. and Mrs. Brackenbury; 3, Miss P. Lane. Novelty Jars: 1 and 2, Mr. and Mrs. Brackenbury; 3, Mr. and Mrs. D. Mitchell. Junior Livebearers: 1 and 2, Miss L. Wilson (Grimsby and Cleethorpes); 3, D. R. Draycott (A and D). A.V. Junior Egglayers: 1, A. Palmer (Hallcroft); 2, D. R. Draycott; 3, A. Palmer (Hallcroft).

Top Society points: Ashby, 41; Grimsby and Cleethorpes, 40; A and D, 38; Hallcroft, 34; Cannock, 14; Worksop A.Z.S., 13; Castleford, 10; Sheaf Valley, 10; Retford, 9; Attrborough, 4; Harrogate, 3; Huddersfield 2.

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THE **West Yorkshire Marine Aquarist Group** have just finalised their 1982 agenda, and would like to invite any marine aquarists and their friends to any of their forthcoming meetings. Your first visit will be free and subsequent visits will cost 50p. The agenda: 13th Jan. annual general meeting; 10th Feb., Discussion evening; 14th Feb., visit to Matlock waterlife centre; 10th March, Dr. David Ford of "Aquarian Foods"; 14th April, David Kenley of "Underwold Products"; 18th April, Visit to Skipton Aquaria; 12th May, Dr. Chris Andrews of "Ferra", 9th June, film—"Beneath the seven seas"; 14th July, George from "Coral Reef"; Lewis on his fish-invert "Tunza system"; 8th Sept., Invertebrate discussion; 13th Oct., to be arranged; 10th Nov., film—"Conservasea"; 8th December, to be arranged; 14th December, Xmas meal. If you are interested please contact the secretary, Mr. Steve Preston at Hecklemondwike 405387. Meetings are held at the "Dewsbury Club and Institute", Oxen Street, Dewsbury every second Wednesday of the month (excluding August).

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THE **Northern Goldfish and Pondkeepers Society** held their 5th open show on the 15th August with a record number of exhibitors and the standard of fish very high. A Livebearer owned by Mr. R. J. Pinnock, of Bristol, took best fish in show. The Aquarian trophy for best breeders team was won by Mr. and Mrs. R. Hodgkinson with a team of Livebearers.

Results: Common Goldfish: 1 and 2, W. Ramsden and B. Rothwell (NGPS); 3, I. Mildon (Bristol). Comets: 1, M. Tatterton (NGPS); 2, E. Harris (Burnley); 3, N. Heyes (NGPS). Bristol Shubunkins (Sm.): 1 and 2, H. J. Whiting (Bristol); 3, B. Rothwell. Bristol Shubunkins (greater than 3 in.): 1, R. J. Pinnock (Bristol); 2, B. Rothwell; 3, H. J. Whiting. Veiltails: 1 and 2, B. Rothwell; 3, W. Ramsden (NGPS). Moors: 1, 2 and 3, W. Ramsden. Orandas: 1, D. Lord and W. Gregory (NGPS); 2, Mr. and Mrs. M. Swift (NGPS); 3, J. Day (Bristol). Lionheads: 1, R. J. Pinnock; 2, Mr. and Mrs. R. Hodgkinson (NGPS); 3, P. Johnson (NGPS). Fantails (Calico): 1, 2 and 3, Mr. and Mrs. R. Hodgkinson (NGPS). Fantails (Metallic): 1 and 2, Mr. and Mrs. R. Hodgkinson. Bubble Eyes: 1, 2 and 3, D. Lord and W. Gregory. London Shubunkins: 1, 2 and 3, Miss S. Andrews (NGPS). Breeders (team of Bristol Shubunkins): 1, P. Davies (Telford); 2, B. Rothwell; 3, V. Cole (Bristol). Breeders (team of Veiltails): 1, V. Cole; 2 and 3, B. Rothwell. Breeders (team of Moors): 1, 2 and 3, W. Ramsden. Breeders (team of Fantails): 1, 2 and 3, Mr. and Mrs. R. Hodgkinson. Breeders (team of Twintail without Dorsal): 1 and 2, Mr. and Mrs. R. Hodgkinson; 3, D. Lord and W. Gregory. Breeders (team of Comets): 1 and 3, Miss S. Andrews (NGPS); 2, T. Plant (NGPS). Breeders (Single Tail): 1, B. Rothwell; 2 and 3, A. King (Dulkeith). Breeders (Twintail with Dorsal): 1 and 2, W. Ramsden; 3, J. Day. Breeders (Twintail without Dorsal): 1, 2 and 3, Mr. and Mrs. R. Hodgkinson. Pondfish (European): 1, P. Johnson (NGPS); 2 and 3, M. Baugh (NGPS). Pondfish (Non-European): 1, J. D. Lord (NGPS); 2, B. Frost (Fleetwood); 3, Mrs. L. A. Lord (NGPS). Matched Pair of Fancy Goldfish: 1, H. J. Whiting (Bristol); 2, B. Rothwell; 3, W. Ramsden.

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THE **Louth I & E A.S.** held their first open show at Monk's Dyke High School. A total of 293 fish were entered from as far afield as Sherwood, Sheaf Valley, and district organisations also took part. Judging was done by five members of the Y.A.A.S. Winners received plaques and cards, also points, that go towards their Club in the League.

Section results: Guppies: 1, Mr. and Mrs. A. Smith; 2, P. S. Draycott and Son; 3, Mr. and Mrs. K. Hare. Platties: 1 and 2, Mr. and Mrs. K. Hare; 3, Mr. and Mrs. Cracknell. Mollies: 1 and 2, P. S. Draycott and Son; 3, A. Marples. Swordtails: 1, Mr. and Mrs. Pickford; 2, Mr. Sands; 3, A. Marples. A.O.V. (Livebearers): 1 and 2, Miss L. Wilson; 3, M. and N. Hancock. Small Characins: 1, Miss J. Lee; 2 and 3, Mr. and Mrs. Lake. Large Characins: 1, R. M. Smithurst and Son; 2, Mr. and Mrs. Brakenbury; 3, Mrs. G. Marples. Rift Lake Cichlids: 1, Mrs. V. Mitchell; 2, K. M. Fisher; 3, R. M. Smithurst and Son. Angels and Discus: 1, R. M. Smithurst and Son; 2, Mr. and Mrs. K. Hare; 3, Miss J. Lee. A.O.V. Cichlids (up to 10 cms.): 1, 2 and 3, Mr. Bee. A.O.V. Cichlids (over 10 cms.): 1, K. M. Fisher; 2, Mr. and Mrs. S. H. Marshall; 3, Mr. and Mrs. Silk. Rasboras: 1, Mr. and Mrs. Lake; 2, Miss J. Lee; 3, Mr. and Mrs. K. Hare. Danios and Minnows: 1, D. Moody; 2, Mr. and Mrs. Brackenbury; 3, Mr. and Mrs. Lake. Small Barbs: 1, A. Marples; 2, Mr. and Mrs. M. Parrow; 3, Mr. and Mrs. Davis. Large Barbs: 1, R. C. Laverick; 2, Mr. and Mrs. Pickford; 3, A. Marples. A.V. Aphyosemion: 1, Mr. and Mrs. Culley; 2 and 3, P. S. Draycott and Son. A.O.V. Killifish: 1, Mr. and Mrs. Pickford; 2, Mr. and Mrs. Culley; 3, P. S. Draycott and Son. Small Anabantids: 1, R. M. Smithurst and Son; 2, S. Oxborrow; 3, B. Riley. Large Anabantids: 1, M. J. Waite; 2, Mr. and Mrs. D. Penny; 3, Mr. and Mrs. D. Mitchell. Fighters (True Colours): 1, 2 and 3, P. S. Draycott and Son. Fighters (Multicolour): 1 and 2, Mr. and Mrs. Brackenbury; 3, Mr. and Mrs. D. Penny. Corydoras and Brochis: 1, S. Oxborrow; 2, Mr. and Mrs. Davis; 3, Mr. and Mrs. Lake. A.O.V. Catfish: 1, Mr. and Mrs. S. H. Marshall; 2, K. M. Fisher; 3, D. Moody. Loaches and Botias: 1, S. Oxborrow; 2, Mr. and Mrs. K. Hare; 3, D. Moody. Sharks and Foxes: 1, Mr. and Mrs. S. H. Marshall; 2, A. Palmer; 3, Mr. Johnson. A.O.V. Tropical (up to 15 cms.): 1, D. Moody; 2, Mr. and Mrs. D. Mitchell; 3, Mr. and Mrs. D. Penny. A.O.V. Tropical (over 15 cms.): 1 and 2, D. Penny; 3, Mr. and Mrs. Pickford. Pairs (Livebearers): 1, D. Moody; 2 and 3, P. Lake. Pairs (Egglayers): 1, S. Oxborrow; 2, Miss J. Lee; 3, Mr. and Mrs. Lake. Breeders (Livebearers A and B): 1, A. Marples; 2, Miss J. Lee; 3, K. Prendergast. Breeders (Livebears C and D): 1, Mr. and Mrs. Hancock. Breeders (Egglayers A and B): 1 and 2, P. S. Draycott and Son; 3, Mr. and Mrs. Pickford. Breeders (Egglayers C and D): 1, Mr. and Mrs. Pickford. Common Goldfish and Comets: 1, Mr. and Mrs. Silk; 2, P. Lane; 3, Mrs. G. Marples. Fancy Goldfish: 1 and 3, Mr. and Mrs. Silk; 2, B. and G. A.O.V. Coldwater: 1, C. Mathews; 2, Mr. and Mrs. Silk; 3, Miss L. Wilson. The prize for the best fish in show went to Mr. Bee of Grimsby and Cleethorpe. This small society is looking for new members, young and old, who will be welcome at 17 Florence Wright Avenue, Louth.

Dates for the diary

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

OCTOBER

3rd October: Goldfish Society of Great Britain open show and convention. Particulars from H. Berger, 74 Baron Gardens, Barkingside, Ilford Essex.

3rd October: The British Koi-Keepers Society—11th Anniversary celebration at the Leicester Centre Hotel from 12.30 p.m. onwards. Lectures will be given by Dr. David Ford (Feeding, etc.), Mr Austin Cartwright (Diseases), and Mr. Roland Seal (Film on Koi). Dinner-dance in the evening. Contact R. Talbot (Tel Garboldisham 368.). Membership Sec. Mrs. C. Mullins, "Woodlands," South Avenue, Langdon Hills, Basildon, Essex.

4th October: Newbury and District A.S. open show at the **Corn Exchange**, Market Place, Newbury, Berks. For more information contact the **Show Manager**, Robin Canning, 6 Southend, Cold Ash, Newbury, **Berks.** (Tel: Thatcham 64254).

4th October: A & D Fishkeepers first open show at the Sutton in Ashfield Social Service Centre, Hillocks School, Sutton.

11th October: British Cichlid Association convention at the Meeting Rooms, Zoological Society of London, Regents Park, 2.0 p.m.

11th October: Darwen A.S. open show in the Library Theatre Darwen., Details from Secretary Derek Gow, 95 Greenway Street, Darwen.

11th October: South Leeds A.S. open show at Hunslet Boys Club, Hillidge Road, Leeds 10. Benching 12-2 p.m. Schedules from R. Day, 3 Beulah Mount Woodhouse, Leeds LS6 2JZ.

11th October: Loughborough and Dist A.S. M.A.L. and Open Show at the Burleigh Community College, Thorpe Hill, Loughborough. Schedules from Mr. G. Taylor, 33 Shakespeare Street, Loughborough. (Tel: 39745).

17th October: East London Aquarists and Pondkeepers Association annual open breeders show at the Catterall Hall, Cecil Road, Chadwell Heath, Romford, Essex. Schedules from Mr. Keith Palmer, 16 Fullwell Avenue, Barkingside, Essex.

18th October: Doncaster & District A.S. open show at Don Valley High School, Jossey Lane, Scawthorpe, Nr. Doncaster.

18th October: Wyre Forest A.S. open show. Show secretary Charles N. Baskerville.

18th October: Bethnal Green & Independent A.S. first open show at Windsor Road School, Windsor Terrace, East Ham, London, E.6. Further details and schedules from Mr. J. A. Brown, 40 Airthrie Road, Goodmayes, Ilford, Essex IG3 9QU (Tel: 01-599 8232).

21st October: Ainthorough and District A.S. Mini-Show, Greenacre Hall, Low Road Side, Rawdon, Nr. Leeds. Further details from: B. Jackson, 19 The Lilacs, Guiseley. Tel: Guiseley 77764

25th October: Basingstoke & District's open show at the Carnival Hall, Basingstoke. Details from Show Secretary, M. D. Chapman, 149 Coniston Road, Kempshott, Basingstoke, Hants.

NOVEMBER

1st November: Halifax A.S. open show. Benching 12-2 p.m. Schedules (s.a.e. please) from Mrs. M. Swales, 34 Eastwood Avenue, Bradshaw, Halifax. (Tel. Halifax 248068).

7th 8th November: British Aquarists Festival at Belle Vue, Manchester Details and schedules from John Hall, 54a Carr Road, Calverley, Pudsey LS28 5RU

8th November: Bradford and District A.S. open show at Textile Hall, Westgate, Bradford. Details and schedules can be obtained from the show secretary, Mr. A. D. Fisher, 2 Sherbourne Road, Idle, Bradford (Tel: Bradford 614160).

15th November: Essex & East of London A.S. 1st Convention. Speakers: Ian Sellick (Cichlids); Mike Sandford (Pond Life); Joe Linale (Coldwater); and a speaker from the Characin Society. To be held at St. Augustine's Church Hall, Birbeck Road, Rush Green, Romford. Tickets: £1·00 (s.a.e. please), available from Dave Henman, 1 Windmill Meadows, Aythorpe Roding, Dunmow, Essex.

21st November: Goldfish Society of Great Britain general meeting, 2 p.m., Conway Hall, Red Lion Square, Holborn, London.

28th November: CAGB Convention: (Speakers—Dr. Keith Bannister (BMNH), "Catfish Anatomy" and "The Zaire Expedition"; Ian Fuller, "Breeding Corydoras". To be held at Aylward Lower School, Windmill Road, Edmonton London N18. Tickets priced £1·50, £2·00 to non-members and are available from S. Pritchard, 12 Widgeon Way, Watford, Herts WD2 4RG.