August 1958 *Two shillings*

FISHKEEPING

and Water Life

RIDDLE'S or X-RAY TETRAS (*Pristella riddlei*)

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VOL. 13 NO. 10
NEW ISSUE
AUGUST 1958

FISHKEEPING
and Water Life

IN THE SWIM

Seaside Contest . London Show
Elevated Goldfish . Tame Pond Fish
Specialist Groups . Temporary Departure
World-wide Pompadour Success
Acclimatizing Cichlids

● **Photographic competition.** A first prize of £30, with second of £15, and third of £5 will be awarded in an amateur snapshot competition promoted by the Southend Aquarium, Pier Hill, Southend-on-Sea.

The prizes will go to photographers who take the best snapshots of fish in the Southend Aquarium during the 1958 season.

There is no entry fee for the competition. Closing date is October 24. Judging will be undertaken by Messrs. Kodak Ltd.

● **National Exhibition.** Rising costs were responsible for a loss of nearly £600 at the 1958 National Exhibition of Cage Birds and Aquaria, despite a greater attendance. The Aquaria Section felt the effect of these increases in no small measure. For example, just to supply water, heating and lighting for the aquariums now costs about £3 per tank, a state of affairs which means that the Aquaria Section, whilst forming one of the exhibition's highlights, must not assume unrestricted proportions.

The fact remains that, with an attendance of around 30,000, this exhibition is the aquarium hobby's main shop window. It bears restating that this central London show must be regarded primarily as a unique opportunity for the fishkeeping hobby to publicise itself.

To that end emphasis in recent years has been mainly on furnished aquaria and special displays, although the competitive element has been introduced as far as possible.

The next show at Olympia will be on January 8-10, 1959, and the Aquaria Section committee will meet shortly to arrange the programme. An announcement will be published as soon as details have been finalised.

● **Very fair.** When Terry Cleverley was just four years old his father took him to a fair-ground. In one of the competitions, young Terry won a Goldfish. He proudly carried it away and, fortunately, his father, Warrant Officer R. Cleverley, knew something about fish culture; enough, in fact, for that very same fish, five years later to win best in show award at the 1958 annual inter-club show between Pontypool A.S. and Llantwit Major A.S. W.O. Cleverley is a member of the Llantwit Major club.

J. Higham photograph

● **Outdoor pools.** Feeding time for fishes in outdoor pools is always pleasurable for the pond owner as the fish come snapping to the water surface.

In our photograph, Mr. Atkinson of Bexhill-on-Sea, Sussex, is seen feeding fish in the sunken garden which he designed and built himself. The fish are thriving in the pond, which is well stocked with plant life.

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● **Goldfish group.** Despite the effect of the London bus strike the first two meetings of the Goldfish Society of Gt. Britain's South London Section gave every indication that the group will form a useful pocket of enthusiasm for coldwater fish fanciers in the area and a fine example of co-operation between two of the hobby's leading organisations—the Goldfish Society and the Association of South London Aquarist Societies.

The new club is affiliated to A.S.L.A.S. and the annual subscription is £1, with a 10/- entrance fee to cover the cost of badge, standards booklet and other G.S.G.B. publications.

The chairman is Mr. G. O'Neill and the secretary, Mr. W. P. Walters, 41 Manor Drive, Hinchley Wood, Surrey. Capt. L. C. Betts, the G.S.G.B. chairman, spoke on the "Traditions and Aims of the Goldfish Society" at the inaugural meeting on May 16 and he was followed by Mr. R. J. Affleck, M.Sc., the Goldfish Society's President, who discussed "Problems of Goldfish Breeding".

Members got down to serious study of Goldfish on June 11 when Mr. R. E. Ison, B.Sc., lectured on "Pigment and Reflecting Tissue" and Mr. Affleck on "Japanese Goldfish and How they Influenced British Standards".

Roy Skipper (Edgware) collecting Daphnia.

● **Au revoir.** Readers were doubtless surprised to see an advertisement from Roy Skipper in the last issue announcing that his entire stock of fishes and equipment was up for disposal. It is just over two years ago that Roy created a stir in the aquarium world when he bred Pompadours and found that early in life the young fish fed from their parents' bodies. The full story of the breeding and subsequent observations were published in this journal.

Why, then, should this lifelong fish fancier (he started keeping fishes when eight years old) decide to give up the hobby completely for the time being? Business pressure is the answer. His health began to suffer as he tried to continue his customary enthusiastic support of the fancy along with increased business commitments. So he took the wise but drastic decision to take a rest from the hobby for a time.

I cannot believe that, with his burning interest in fishkeeping, this will be any more than just a phase, but meantime it is worth recording that he served the Hendon club for almost eight years as chairman and, during that time, had control of some 350 meetings. A proud record.

● **Prolific Discus!** It so happened that a couple of days before I visited the Skippers' Edgware home last month new, soft water had been run into aquaria containing the breeding stock of Pompadours and it had stimulated two pairs to spawn once again. These mature breeding Pompadours will go to a hatchery well experienced in fish breeding with Roy Skipper acting in an advisory capacity.

Just about the same time as my Edgware visit I read in a supplement to the June issue of *The Fish Culturist* (journal of the Pennsylvania Fish Culturists' Association) that a third Pompadour Fish spawning had been obtained by Thomas J. Schubert, Camden, New Jersey, a member of the Association. The *p*H of the water was 6.0 and the German degree of hardness, 3. A water temperature of 85 deg.F. was maintained throughout.

● **Fresh to salt.** It gives us some satisfaction if we can gradually acclimatize to fresh water a fish naturally accustomed to saline water. This process has been reversed by London Zoo recently with the large mouthbreeding Cichlid, *Tilapia mossambica*.

T. mossambica is normally found in the fresh or brackish waters of East Africa but it does enter the sea on occasion, although there is no record of it having bred there. London Aquarium have, however, transferred a shoal to pure sea-water and have had them breed.

Tilapia mossambica has now assumed economic importance and has been introduced to countries from the Far East to the West Indies. It, and related fishes, have been found to adapt themselves well to commercial pond culture where they breed prolifically and grow rapidly.—L.W.A.

FISH OF THE MONTH

PRETTY PRISTELLAS

An old-established aquarium species that deserves greater popularity

by WINIFRED M. MEADOWS

THE X-ray or Riddle's Tetra (*Pristella riddlei*) is a Characin which comes from the North-east coast of South America and is a species which will live happily in a community tank of the smaller tropical fishes. It reaches a length of 1¼ to 2 in and is not shy, tending to stay near the front of the aquarium and remaining very active.

The fish's body is a yellowish-green and almost transparent. A thin line runs from the gills to the base of the tail fin and there is a black spot behind the gills. The dorsal fin has three distinct colours; it is yellow in its rear area, then black, with white at the top. The anal fin has the same three colours, with the yellow starting near the body.

Male fish have not only got these three colours in their anal fin but also a white front edge to it. Pristellas possess an adipose fin. Their tail fin is pink. When these fish are in first-class condition their colours make a shoal of them look really beautiful.

Sexing is easily done as the male has the so-called "Characin hook" at the front of its anal fin. This catches in a fine mesh net. The thin white line on the front of the anal is only found in the male. Also, if one looks through the fish with a low-power light shining from behind, the outline of the swim-bladder is different in the female, where it is rounder and rather higher in the body. The female is generally larger than the male.

I cannot understand why there are not many more Pristellas around; they are peaceful and playful and one of the easiest tropical species to breed.

Varying Conditions

It is not possible to lay down hard and fast rules for breeding egglayers, as water conditions are not always the same. I, personally, have to contend with hard water and Pristellas prefer it slightly soft, so I use tap water which has stood in the fishhouse for at least two weeks and then boil enough of it to use half boiled and half unboiled water in the spawning tank.

A small aquarium, 18×10×10 in. or 14×10×10 in., is prepared. This is thoroughly cleaned, and a thin layer of well-washed,

J. E. Downward photograph of Cypripedium insigne *orchids in flower.*

Orchids—the perfect complement to a fishhouse

AN ideal place for growing orchids is where tropical fish and reptiles are bred because the kindly warmth and humidity, plus the diffused light, provide good conditions.

Unfortunately a lot of the shorter-leafed orchids, so ideally suited to fishhouses, are not exhibited at the flower shows and are therefore not so well-known. Although dwarf in habit, the flowers of these plants are as big as those from the larger foliaged orchids and nearly as numerous.

There are several hundred types of orchids that can be grown in a fishhouse or over an aquarium. Some of the flowers are remarkable and have movable lips to attract insects so that the flowers can be pollinated. One actually imprisons the insect for several hours to make sure it gets the pollen on its head and then takes it to the next flower.

Lælias have purple and white flowers; Masdevallias, red, scarlet, and white blooms and Odontoglossums, yellow, purple spotted and plain blossoms. The Slipper Orchid, (*Cypripedium*), has its "slipper" streaked with gold, green, red or yellow and the top of the flower usually has a band of white.

Orchids are very long-lived and the plants require little attention. Repotting is only necessary every two years. No soil is used in potting an orchid, only sphagnum moss and fern fibre so there is no chance of any extraneous matter getting into the aquariums to harm the fish and the plants are always clean to handle.

In its native home the orchid grows in the first fork of an evergreen tree and only gets a little sunlight early in the morning or late in the evening. This means diffused light is the best for most of them.

Ideally the orchids should stand on a wood lath platform, or be suspended by a wire or in a wire stand. Some orchids grow downwards and these should be accommodated in baskets. In fact baskets and clay pots are ideal.

Water requirements are simple—once-a-week watering except in cold spells in Winter when the light is often poor. Never water a plant that is wet; leave it until the following week. As most dwarf orchids have a good pseudo-bulb they can stand periods of drought.

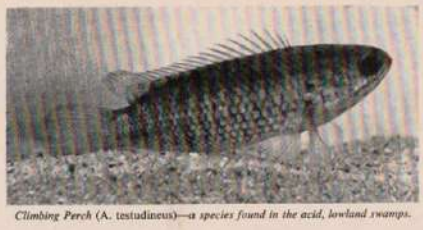
Very satisfactory results have been obtained by fishhouse and reptile-house owners who have been surprised at the long-lasting qualities of the flowers. Some orchid flowers will keep fresh for eight weeks.

There is an idea that orchids do not flower every year and I think this is because the plants take eight years to reach maturity and people think this is the flowering interval, which it is not.

Good plants can be bought at 25/- to £2 each and they will then be of flowering size. Considering that the plants are at least eight years old they are not expensive.

Orchids have thick leaves and are not subject to insect damage. Sponge the leaves every six months with diluted soap and water and they stay clean and fresh.—LEONARD HATCHER.

AQUARIUM FISHES FROM CEYLON



Climbing Perch (A. testudineus)—*a species found in the acid, lowland swamps.*

No. 3. RODNEY JONKLAAS (*Ceylon*) *concludes his survey of species from the acid, lowland swamps*

THE Snakeheads, listed last issue, are essentially carnivorous and predatory and, being "gulpers", prey on good-sized livefood only, in the shape of other fishes, baby frogs, toads and tadpoles, insects, even tiny lizards and water-snakes if they are small enough to be engulfed.

The Catfishes are the nocturnal scavengers and bottom-feeders of the swamps and eat practically anything that comes their way. There is every reason to suspect that in their clumsy grubbing about with only their whiskers to guide them in the dark, they devour a great deal of spawn, baby fishes too helpless and small to flee (e.g., young *Etroplus maculatus* or *suratensis*) and the nocturnal worms and insect larvæ. The Spiny Eels are essentially eaters of worms and take practically nothing else.

Breeding Stimuli

Whereas the rains and consequent increase of food supply, water area and water depth all stimulate the breeding of swamp fishes, some species seem to be prolific the year round, depending on how the swamp is affected by the seasons.

Swamps which suffer greatly from drought and are overcrowded with fishes, soon get very muddy and foul and there is little or no breeding of any fishes. Otherwise the Cichlids and Snakeheads and bubble-nest builders raise broods at all times of the year.

The rains have a definite stimulus on the breeding of Panchax, Barbs, Danios, Rasboras and *Esomus danricus*. Possibly the sudden cooling, change of *p*H to a less acid nature, influx of more food and greater area of water available provide the stimuli.

Most aquarists find that the best way to breed Barbs is to stimulate them with fresh rain-water and the same applies to Rasboras, Danios and the like. With Cichlids and bubble-nest builders this is not quite so necessary. Catfishes are quite definitely observed to lay eggs during or just after the major rains have set in.

The greatest enemies of swamp fishes are their own kind which turn cannibalistic when hungry. Unattached Cichlids will not hesitate to rush in and gobble mouthfuls of babies which the parents are not guarding carefully enough.

The adult Snakeheads, once their young are over two inches long, will hunt them systematically if they do not get away out of the parental hunting range. A large Snakehead seldom fails to seize a hook baited with one of its erstwhile babies.

A variety of water birds like herons, kingfishers, egrets and kites prey on the fishes of the swamps. Otters, water-snakes and the savage fishing cats and leeches all take their toll.

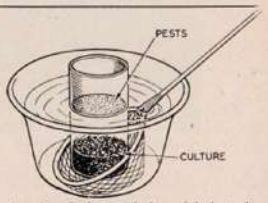
Latterly, the introduced *Tilapia mossambica* and *Trichogaster pectoralis* have all but displaced the Barbs, Cichlids, and Rasboras,

and only the Catfishes and larger Snakeheads have withstood their mass breeding onslaught. This state of affairs is more evident in parts of Ceylon close to Colombo where the stocking programme originated.

In conclusion, it may be readily gathered that the swamp fishes of Ceylon are extraordinarily hardy, easily bred (except for the Catfishes and Spiny Eels) but, with one or two exceptions, are not particularly colourful and gaudy. Only the Panchax species and *Etroplus maculatus* can claim to be really colourful.

The majority of them come in the "weird" fish category typified by the Spiny Eel, Climbing Perch, and Catfishes.

Ridding Dwarf White Worm Cultures of Pests



A portion of culture at the base of the bottomless tin and with the pests floating.

I HAVE found difficulty in eliminating the small, active white pests which sometimes thrive in Dwarf White Worm cultures. Every means employed to dispose of them has left a few behind and these have proved to be prolific breeders.

The only way I have discovered of separating them from the culture is by complete immersion in water when the pests float to the surface. Then the problem arises of removing the cleaned worms without their coming in contact with the pests floating on the water surface. If the water is poured off some pests invariably remain. If more water is added in order to float them over the edge of the bowl there will still be survivors.

However, I have evolved a simple method whereby the culture can be completely cleared, provided reasonable care is taken. Materials needed are a large bowl (5-6 in. deep), an empty tin with the bottom removed, and a net large enough to take the tin.

The culture is tipped out onto a piece of paper or into a spare bowl. The culture box can then be thoroughly sterilized with boiling water—not forgetting the underneath of the box and the lid!

The bowl is filled with water (78 deg.F.) and the net placed on the bottom of the bowl. The bottomless tin is placed on the net with the top of the tin clear of the water.

Now comes the part where especial care is necessary—the transfer of the culture into the tin without any pests jumping into the surrounding water. This is not too difficult if the tin is a reasonable size, say, 5-6 in. diameter, and the culture is spooned in, holding the spoon over a plate.

A quantity of the medium is placed in the tin. Some slight agitation is required to release all the pests from the culture. A little time should be taken at this stage to ensure all the pests have reached the water surface.

Having satisfied oneself this has been done, lift the tin, taking great care not to raise it out of the water! The cleaned culture can then be withdrawn in the net from beneath the tin and the pests are left trapped inside the tin.

The cleaned culture is then gently squeezed in the net to rid it of excess water and it is returned to its box. The procedure is repeated until the whole culture has been treated.

—L. H. RIVERS

The net and culture being withdrawn with the pests left in the tin.

VARYING WAYS WITH ZEBRA FISH

L. E. Perkins photograph

by J. MOLES

I HAVE been successful with two methods of breeding Zebra Fish (*Brachydanio rerio*) but before writing on them I should like to tell of an experience which I had some years ago.

Through illness, I was obliged to live in a room facing a northern aspect and without any heat, in fact the temperature of the room was approximately the same as outside—one end being completely open to the elements.

I had always been a fish-keeping enthusiast and did not want to get completely out of touch so I attempted to breed several species of so-called tropical fish in cold water at temperatures ranging from 52-66 deg.F.

The Zebra was one of the fish with which I had great success, in fact many hundreds of them were bred and reared to maturity in the temperature range stated.

Development Slowed Down

I did find, however, that the eggs took longer to hatch, approximately five to seven days, and, also, that the fish were not mature for some twelve months at these lower temperatures. Nevertheless, I am not advocating that Zebras should be bred under these conditions as normal practice, because I do believe that heat is necessary to bring about quicker growth and ultimate maturity.

Those who are interested in the Zebra Fish need not have any worries in breeding them. I can say that any schoolboy could propagate the species in a tank ranging from 8×8×6 in. to 48×15×15 in., provided the males and females are in fairly good condition.

The two methods I use are controlled and uncontrolled breeding. The controlled method is for a group of males and females, three or four of each sex being selected. The most important point is that the females must be nice and plump—in fact, full of eggs. These fish are then placed in a breeding trap which is placed into an aquarium. The size of trap I use is approximately 16×8×5 in. The thermostat is adjusted to bring the water to approximately 72-75 deg.F.

Position of Breeding Tank

The tank with fish in the breeding trap should be placed where no direct light can reach it. I use the corner of the room farthest away from the windows. The fish are then left for some three to four days and it will soon be noticed that hundreds of eggs are resting on the bottom of the aquarium, having dropped through the breeding trap and away from the fish which are quite avid eggeaters. When sufficient eggs are laid in this manner the adult fish can be moved back to the community tank.

With this method of spawning Zebra Fish it will be noticed that no plants are used and no special attention is paid to water requirements. Tap water direct from the mains supply or filtered rain water can be employed, provided it has been allowed to stand for a day or so

before placing the fish in it. At a temperature in the range of 72-75 deg.F. the eggs hatch in approximately three days.

I have noticed on all occasions where I have used this method, that only one pair of fish has done the actual spawning, the object in putting several of each sex in the trap is that the pair most suited to each other may be brought together for breeding.

The uncontrolled method I use for breeding Zebras is where a quantity of mature fish are placed in a heavily planted 36×15×15 in. aquarium, which has a thick surface layer of *Riccia*.

The fish are left alone and eventually a small number of fry can be seen among the *Riccia*. This method is suitable if the aquarist has female fish which he wishes to spawn and he does not expect great numbers of youngsters, or perhaps has not the room or conditions for rearing large quantities of fry.

In the selection of breeding stock, I suggest that males and females with the following characteristics be chosen: good body size, approximately 1½-1¾ in.; bold colours (steel blue on background of cream or yellow); straight and evenly placed bars; no broken bar ring, and fish that have recently reached maturity.

The fry can be raised on an infusion of any type of green water from an old rainwater butt. They should take fine dried food in a fortnight and should not present any difficulty in rearing; they will, in fact, eat any fine foods.

L. E. Perkins' photograph of the yellow, black and white Clown Fish.

Brilliant Marine Tropicals among the New Imports

by P. MILLET

IN response to a slight rekindling of interest in tropical marine species a Midland importer has flown in one or two experimental consignments of these very beautiful fishes.

Since 1945 great strides have been made in Germany in the technique of keeping these seawater fishes and, as a result, our previous notions on the subject must be modified to come in line with modern practice.

Many pre-war articles suggested that marine fishes did better in water with a lower density than natural sea-water. It has been found by Germany's leading exporters of these fish that they succeed better in sea-water *more* dense than that found on European shores.

This, of course, is following Nature's teaching, for such waters as those of the Red Sea and Indian Ocean are normally denser than those in colder climates owing to the vast amount of evaporation caused by the tropical sun.

Artificial sea-water is now used extensively on the Continent, and the density (tested with a hydrometer) is adjusted at around 1.028. Filtration and aeration is employed, and the fishes thrive under these conditions at temperatures approaching 80 deg.F.

Three outstanding species are included in the present import. One is an old favourite with marine aquarists—the Clown Fish or Anemone Fish (*Amphiprion percula*). Its colouring is unlike that of any freshwater fish for this 2½ in. beauty is banded with wide dazzling white and brilliant yellow bands bordered with intense black.

This fish is one of the few marines that has bred in the aquarium where the eggs are attached to rocks and guarded by the male who spends his time removing sediment and keeping the eggs generally clean.

As can be expected, it is difficult to rear the youngsters, but coast-dwelling aquarists might be able to collect sufficient microscopic life to bring the fry through the difficult first three weeks. After this they should be able to take Brine Shrimps.

Damsel Fishes

Also included in this import is a beautiful Damsel Fish of the Genus, *Dascyllus*, which resembles *D. carneus*, and a startling blue species which flashes like an opal. This fish, *Chromis caeruleus*, like the Clown Fish, is continually on the move, but the *Dascyllus*, while also a lively fish, seems to be slightly more nervous and likes a rock crevice in which to dive when it thinks danger threatens.

The fishes in the current import all feed avidly on White Worms, and are in unfurnished tanks provided with biological filters. No fish in the consignment has been lost from natural causes, and no difficulty has been experienced in acclimatising them to new sea-water.

A trader in South-west London is offering the small Indian Catfish, *Mystus tengara*, a species that is rarely seen in this country. These unarmoured Catfish bear a strong resemblance to the South American *Pimelodidae* family and, like them, bear two dorsal fins and long barbels. They reach a length of 4 in. and are harmless to other aquarium inmates for, like many Catfishes, they are purely scavengers.

From the same source is an African Catfish of the Genus *Cephaloclarias*, some nice *Leporinus friderici*, and a wide selection of rare and unusual amphibians and reptiles from both the Old and New Worlds.

In the Midlands a recently-imported Tetra has now been identified as *Hyphessobrycon roberti*. This fish resembles the "Bleeding-heart Tetra" in all respects except that the "heart" is absent!

Brought in about the same time were some magnificent specimens of *Leporinus maculatus* and *L. strigata*, and an exceptional batch of *Apistogramma ramirezi* from Venezuela. *A. ramirezi* is about the prettiest of the Dwarf Cichlids. It can be bred by the experienced aquarist though not readily enough to make it a very cheap fish, for parental care is not an outstanding feature of this species, at least under aquarium conditions. To be seen at its best, this Dwarf Cichlid should be kept slightly warmer than is usual with tropicals, and a little over 80 deg.F. seems to suit it well.

Australian Rainbows

Two species in good supply which are often confused and named wrongly are the Australian Rainbow Fishes, *Melanotaenia mccullochi* and *M. nigrans*. The first named, which used to be offered as *M. nigrans*, is easily distinguished by its brilliant red horizontal stripes and its red anal fin. The male of this species, which reaches 3 in. in length, develops a yellow streak along the middle of its back when in breeding condition.

M. nigrans is a larger species, for it reaches a size of 4 in. There is but one horizontal stripe on it, and the general body colour is greenish though the fins are yellow with small reddish spots. Both species are easily spawned, and both can tolerate lower temperatures than most other tropicals.

We have recently read of the "Veiltailed" White Clouds that have been produced in Australia. Somewhere in England there is a veiltailed Spotted Rasbora (*Rasbora maculata*) for, in a recent import at a West London establishment, there was one specimen with an extraordinary growth of the caudal fin, the lower lobe of which was as long as the fish's body.

In Circulation

This fish has been disposed of, but if the lucky owner succeeds in breeding from it (no easy task) he may well rear youngsters that show this characteristic to some degree.

If it can be fixed and developed by careful selection, we shall have yet another species that has been altered under aquarium conditions.

Among the plants I have seen a consignment of the new and spectacular *Cryptocoryne tomphongsi*. This is a distinctive plant even for this Genus where the species vary enormously, and it is a useful species for the larger tank where its graceful form can be seen to the best advantage.

Drawing of Cryptocoryne thwaitesii *by Miss I. Zewald.* a=*flowering plant.* b=*single leaf.* c=*the ovaries.*

A Diminutive Cryptocoryne

C. thwaitesii *is a little-known species well worth cultivating*

by Dr. H. C. D. de WIT

THE director of the famous botanic garden at Schönbrunn in Austria, H. W. Schott, published details on *Araceae* in "Bonplandia". This was in 1857 and in those days "Bonplandia" was a well-known botanical journal. His article was almost wholly composed of descriptions of nine new species of *Cryptocoryne*, and this group of "first described" species has caused a great deal of trouble to later botanists interested in the Genus.

Schott was an able botanist. He had very little knowledge, however, of the wide variability in the majority of *Cryptocoryne* species and did not realize that a clear delimitation of the species could not be derived from the characters of the few dried specimens he had at his disposal. His brief descriptions frequently proved to be insufficient to recognize his proposed species, and this resulted in much confusion while some problems may never be solved at all.

Type Specimen Still Exists

Some of Schott's species can be recognized with certainty. Of these a dried specimen which Schott examined and used to compose his description (the so-called "type specimen") still exists. It is in the Kew Herbarium and is the type specimen of *C. thwaitesii* Schott. This is the only specimen I have been able to examine in the large European and Asiatic Herbaria although there is a duplicate in Paris.

I have been fortunate to receive from Mr. Blass at Munich—Mr. Blass is an extremely successful grower of Cryptocorynes—two fresh inflorescences and a leaf of this species. I have also seen some living plants in the Netherlands; these latter have not flowered so far.

Origin of Name

This has enabled me to add many points to Schott's original description. Incidentally it may be of interest to know that the species was named after G. H. Kendrick Thwaites, who was born in 1811 at Bristol, and who died at Kandy (Ceylon) in 1885. He was a clever and industrious practical botanist and established the fact that diatoms are plants, not animals, as was the general belief up till then.

Thwaites was a very capable director (1857-1880) of the glorious botanic garden at Peradenyia (Ceylon). He collected the plant in "Ceylon, in forests". It is a peculiar fact, that since then (over a century), no other dried specimens have reached any European Herbarium though plant-lovers seem to have rediscovered Thwaites's *Cryptocoryne* and introduced it to Europe in a living state.

I am including a drawing (made by Miss I. Zewald) of *C. thwaitesii* and it shows the habit of the plant rather well. The leaves are broad, oval and narrowly heart-shaped at base with the blade 2-2½ in. long and its edge finely toothed. The rounded, indented stigma on the ovaries is shown in detail (a good character to distinguish this species), and there is the small charming, long-tailed inflorescence.

The drawing cannot indicate the dull, dark green colour of the rather coarse leaves, and the pallid lilac-pink hue of the limb and tail. The upper (inner) surface of the limb is sprinkled lengthwise with many dark blue-violet narrowly-oblong dots. When grown submerged there is no possibility, I presume, that the plant will flower. The leaves lengthen considerably and become bronze-green or even brownish purple, their upper surface is dull, often very delicately mottled and seemingly somewhat rough. The leaf-blade in submerged plants is often slightly wavy.

Cryptocoryne thwaitesii is a slow grower and produces few stolons. If young plants are separated from the parent plant too soon they are certain to die. The species is difficult to propagate, therefore, and will never become a common aquarium plant.

For the connoisseur in aquatics it is a most desirable plant, however; in a well tended aquarium it is a pleasing species of modest size and attractive shape and colour.

Should you succeed in growing it in the tropical marsh environment and have it flower, you may be sure that you can show your friends something very few people have seen, and you may be equally certain that they will be impressed and delighted by the unobtrusive but striking beauty of this little plant.

Tropical Reflections

FISH CAN BE FADDISTS

—*says* DR. F. N. GHADIALLY *who emphasizes the need for variety in their diet*

Although many species of fish can be trained to take unusual foods, Dr. Ghadially has found the adult Angel Fish particularly conservative in its tastes. Photograph, W.S. Pitt.

"A LITTLE of what you fancy does you good". This old saying is relevant for fish as well as men. Fish like *Daphnia* and a little is good for them. The accent however is on the word "little". Every Summer, when the pools are full of *Daphnia* many of us succumb to the temptation of feeding them too often to our fishes. I, at any rate, find it difficult to resist this temptation.

As I told you in my last article, I heavily stock my garden pool with *Daphnia* and, in a short while, I can get abundant quantities to feed to all my fishes. This is far simpler than spending hours chopping up hundreds of maggots, peeling a pile of prawns or making pitiful attempts at scraping enough meat off the Sunday joint to feed the 3,000-4,000 fishes that are being reared in my fishhouse at the moment.

Whenever, either due to lack of time or just plain idleness, I have kept the fish on an almost exclusive *Daphnia* diet I have found that the growth rate of the young stock has dropped markedly.

Of course there is no difficulty in explaining why this should be so. A little thought will show that there is not a great deal of food value in a *Daphnia*. A large part of it is made up of a fairly tough chitinous outer covering. This is quite indigestible and hence of no nutritive value.

This indigestible mass, left behind in the gut, will then act as a roughage. In moderation, such material is beneficial as it helps the formation of faeces and hence prevents the animal from becoming constipated. In excess it will have a distinct laxative effect. Needless to say, a chronic laxative reaction is hardly conductive to rapid growth in any animal.

Daphnia themselves feed on a tremendous variety of diatoms, algae and infusoria. Hence one would expect them to be rich in vitamins and minerals. Their undoubted value as food adjuncts cannot be, and should not be, underrated but there is very little "meat" in *Daphnia*.

Daphnia may be compared with our spring salads, rich in minerals and vitamins and roughage, but you cannot expect to get fat on salads or to grow well for they contain only very limited amounts of material to feed the fire of life or to provide the building blocks for new tissues. These must come from other foods such as meat, fish, potatoes and bread.

In the case of our fish, dried foods can provide these energy and metabolic requirements. Used in conjunction with *Daphnia*, excellent growth and health of our fishes may be expected.

Those who have a domestic refrigerator available can further extend the menu of their fishes. Each week or ten days I put through the mincer ½ lb. of lean steak and ½ lb. of liver (separate, not mixed). These are then placed into numerous little plastic containers used for making individual ice cubes.

Storing the Meat

The containers are stored in the little compartment in the refrigerator intended for making ice. One or more of these meat or liver cubes can be used as required later on to feed to the fishes.

This is, of course, a method of value only to aquarists with large collections of fish to feed. Those with only a tank or two to look after can get all they need by scraping the domestic meat supply, as and when the opportunity occurs.

It must be pointed out that while in a true deep freeze temperature below 18 deg.F. meat and liver can be stored for, say, over six months without appreciable deterioration, this is not so in the case of the ice box in the domestic fridge where the temperature is only a few degrees below zero. Here it is best to use up all the meat cubes within a fortnight.

There is one other item of diet which I find of considerable value, when used with discretion for feeding fishes. Breakfast oats cooked to a porridge with a liberal dash or two of common salt added. Most tropicals will eat this after some training. The addition of salt certainly seems to make it more attractive to the fishes.

All these foods must be used with caution. The novice is advised to place only a very small quantity in the tank at any given time as uneaten porridge or liver can rapidly make the water cloudy and lead to more serious trouble if steps are not taken to rectify the situation.

Another point to remember is that different species have varying preferences. The livebearers, and Guppies in particular, will try anything and, as a rule, can be persuaded to eat almost anything. Large Angels, on the other hand, have very set ideas about what they like and dislike. What is even more amazing is that individual fishes of a given species also have their own peculiar food fads.

Of four year-old Black-lace Angels that I have at the moment, one refuses to have anything to do with chopped or whole maggots which the other three devour with relish.

One of the four Angels will eat porridge, the other three will not. They have all refused liver for many weeks but now they have grown to like it.

This example will illustrate to you the futility of generalizing about the diet of fishes. Most people have found that their fishes will accept bits of raw or cooked cod. I have been unable to use this item of diet to feed my fishes successfully.

This brings us to the question of training fishes to accept a new item of diet. Most fishes are conservative by nature and will almost invariably refuse, in the first instance, any new food offered to them. When I want to introduce some new food item, I first withhold all food for at least 12, and preferably 24, hours. Then I introduce a small quantity of the new food into the water.

Of course, as the fishes are hungry, they make a dash for it. Usually I find that they take in a mouthful and then spit it out. This process is repeated until a few of the fishes will eat some of the particles. The more conservative brethren resist a bit longer but, if the food is a reasonable one, they finally accept it.

Several Attempts Necessary

Two or three such episodes may have to be staged before the fish will eagerly and unreservedly accept the new food. If, after five or six attempts, I find that no progress is being made then I abandon the new food as unsuitable for the species concerned.

Fighters, Barbs and livebearers are easy to please, Cichlids and, to a lesser extent, Characins are a bit more particular. This is, of course, a broad generalization. There are many exceptions. The notorious food faddist whom I would hate to reform is the adult Angel Fish. Disagreement about diet between the aquarist and Angel may easily provoke a hunger strike on the fish's part from which it may be difficult or even impossible to rescue the particular specimen.

Fortunately, baby Angels do not behave in this manner. They are most accommodating with regard to diet and are no more difficult to feed than, say, a batch of young Swordtails or Tiger Barbs. In fact, all young fishes are more cosmopolitan in their tastes than their parents.

AUSTRALIAN MOUNTAIN DEVIL

Pattern of life of this grotesque, ant-eating lizard

by JOHN WARHAM

IN 1840, John Gould, "father of Australian ornithology", exhibited a strange, grotesque creature to a meeting of the Zoological Society of London. This was a lizard, but one quite unlike anything the members had previously seen. The most obvious peculiarity was the way in which the whole of the upper parts, the flanks and tail were covered with a series of cone-like warts from each of which a stout and very sharp spine arose.

A large spine also grew over each eye giving the animal a rather horned appearance and even bigger spines protruded from two rounded bosses on the shoulders.

A Type of Dragon-lizard

This creature proved to be an aberrant member of the large and mainly oriental Family of Dragon-lizards (the *Agamidae*), a group which includes many remarkable animals including the famous "Flying Dragons" of Indonesia.

Dr. Gray, of the British Museum, who named Gould's new discovery, placed it in a Genus of its own; impressed apparently by its bizarre appearance, he called it *Moloch horridus*.

In its native land the animal is essentially an inhabitant of the dry, sandy interior but it is also quite common in the settled wheat-growing areas of southern Australia. Here it is popularly known as the Moloch or Mountain Devil.

Smaller Males

These animals generally measure from 6-8 in. long, males being appreciably smaller than the females. Otherwise both sexes look alike. Not only is the back spined (as can be seen from my photograph) but even the feet are covered with smaller warts and their attendant spines.

In addition, the whole of the skin covering the upper parts is as hard as a coat of mail—a spiny armour for protection against enemies.

Much of the Mountain Devil's active life is spent in the open where there is very little cover but, despite this, it has not retained the quicksilver-like agility customary among lizards. Although the Mountain Devil can move fairly quickly in hot weather, it is very easily captured—you simply pick it up!

In its sandy environment the Mountain Devil

needs protection from birds like hawks and eagles, from lizards like the big perenties (Australian Monitors), and from mammals such as the marsupial cat, the dingo and the introduced fox. The continued existence of the lizard, despite its sluggishness, shows that it has some way of surviving such perils.

Purpose of the Spines

It has been suggested that one purpose of the spines is to give their owner an unnatural silhouette and shadow which hides the animal's true nature from the air. The broken outline is thought to aid concealment just as military installations in the last war were provided with false shadows to lessen the chances of detection from aircraft. It is significant that, despite the Mountain Devil's small eyes, a recent observer notes that its distance vision is very acute, the animal being able to spot a high-flying bird almost invisible to the naked eye.

Like some other Dragon-lizards, the colouring of the Mountain Devil varies according to its background. The usual pattern is orange-yellow banded with chocolate—an attractive and unusual combination.

Animals from hotter areas are lighter than those from dark soil districts. Individual specimens have the ability to change their colours to a certain extent although an animal brought from a light, sandy area, where it is hot, to one with a darker soil can always be distinguished by its colour from the animals native to the dark soil area.

Kept in Australia

Some new facts on the ways of Mountain Devils are revealed as the result of the work of an Australian naturalist who has studied these lizards over a period of six years. They are easy to keep in semi-captivity in Australia since, although they have a very specialised diet, eating only a limited variety of small ants, such ants are very numerous and an old meat bone readily ensures a continuous supply "on tap" for the lizards' requirements.

The Australian observer, C. C. Sporn, found that captive individuals, like wild ones, were inactive during the colder and wetter Winter months and ate very little during this time. With the coming of warmer weather, however, they begin to move around and to feed. To do this they sat beside a trail of ants and mopped them up one by one with their tongues. The insects were taken at a rate of 20-30 each minute and, as a meal lasted for from 1-1½ hours, some 1,200-1,800 ants were taken at a sitting.

Any animal occupying so arid a habitat as that chosen by the Mountain Devil must be able to exist for long periods without water. Doubtless much of the lizard's moisture requirements are obtained from the ants on which it preys. Nevertheless, like most reptiles, it does take some water, not only by absorption through the relatively soft skin of the belly, but also by drinking. Mr. Sporn notes that, after Summer rain, it will lick the wet sand and lap up water droplets from the surface of fallen leaves.

Much has been revealed on the breeding cycle by this recent study. Mating was first seen in mid-April, preceded by much excited bobbing of heads, but "nesting" did not take place until November. The male, of course, took no active part in the latter operation.

Nesting consisted of the excavation of a tunnel about 1½ ft. long ending nearly a foot below the surface. The female dug by scratching backwards several times with one foot, followed by more scratching with the other foot on the same side of the body. She then changed to the other side of the body and continued like this using one foot at a time and each one in turn.

Nesting Period

At her first attempt she took three days to complete her tunnel, but the following year only two days were needed to tunnel, lay the eggs and replace the soil.

The female produced six or seven eggs to the clutch, apparently all laid over a single night and filling in began the following morning, the soil being raked back using one foot at a time and the material being rammed home tightly by butting with the head!

The lizard was very careful to destroy all traces of her activities, scratching around so that the surface was level and apparently quite undisturbed.

The eggs were then left to their own devices and hatching took place 13 to 18 weeks later, provided that they were not destroyed by adverse weather. The shorter incubation periods coincided with hot and dry weather.

Hatching Size

The newly-hatched Mountain Devils measured about 1½ in. long. They appeared to have forced their way to the surface unaided, emerged looking like miniature editions of their parents, and began to feed on their first day of life.

Their growth was quite rapid and skins were shed first when about nine months old and again at about 11 months, whereas the adults cast their skins about once yearly, usually at the end of the Summer. At 12 months the young lizards were about five inches long and well on the way to maturity.

Mr. G. F. Rose's beautifully planted garden pond which won first prize in the 1958 Nottingham club's contest.

IDEAS FOR POND DESIGN

Variety in the Nottingham Society's Competition

IN the 1958 pond competition of Nottingham A.S. a number of interesting designs were entered. First prize (as in 1957) went to Mr. G. F. Rose of Carlton, Nottingham, who has an informal layout where maximum use is made of the limited space it occupies. Willows and other trees overhang the water, whilst ferns and irises flourish at the pond margin.

Formal Bedding

Second place went to Mr. A. E. Adcock of Beeston, Notts. This pond, incorporating a fountain, is a formal one and the surround area is bedded out with fuschias, geraniums, marigolds, etc., to provide a colourful setting.

Joint third prizewinners were Mrs. D. Revitt and Mr. M. A. Morley. Mr. Morley's layout has a large volume of water (10,000 gallons). It simulates a natural stream divided into three sectional ponds, overhung with willows.

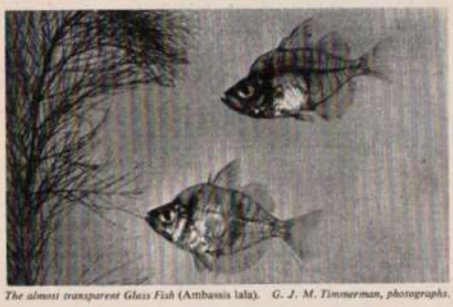
Mixture of River Fishes

The waters are stocked with river fishes, for Mr. Morley is a keen angler, and these include Golden, Mirror and Crucian Carp, Bream, Roach and Golden Orfe. The Roach and Orfe have spawned and been reared in this pond.

Judges in the 1958 competition travelled about 100 miles to complete their task. Points scheme adopted was as follows: plants (25); fish (25); design (25); and technique (25).

Second and third prizewinning entries in the 1958 Nottingham pond competition. Left is Mr. A. Adcock's attractive formal design and, right, is a small section of Mr. M. A. Morley's extensive water garden.

BREEDING TROPICAL EGGLAYERS



The almost transparent Glass Fish (Ambassis lala). *G. J. M. Timmerman, photographs.*

FISHES FOR HARD-WATER DISTRICTS

By D. B. McINERNY

MANY of my visitors tell me they are unable to breed fishes because the water in their home area is the hardest in the country. Were half these claimants correct, it would seem that most Water Boards are out to top the record and, at the same time, frustrate the local aquarists!

The fact is that most of these people do not fully understand hardness, and imagine the worst. Probably more than two-thirds of the tap water in this country is rather hard and on the alkaline side, and this leads aquarists to envy those of the fraternity who happen to live in areas where soft, slightly acid water is literally "on tap".

Variation in Water Needs

One constantly finds reference to the idea that to breed such and such a fish the water should be soft and slightly acid, and this repetition has led to the belief, I fancy, that all fishes do better, and only breed successfully, under such conditions.

While adjustments can be made to soften water or vice versa, many would-be fish breeders, have neither the knowledge nor the time to do this, and depend largely on their tap-water.

Recommended Livebearers

To those who live in districts where the tap-water is hardish and alkaline, I would recommend any of the following livebearers: the superb Sailfin, *Mollienesia velifera*, or the Sailfin or Perma-black, *Mollienesia latipinna*, Platies of all colours, Limias and some of the Half-beaks.

Among the egglayers we have Angels, Festivum Cichlids and most of the Dwarf Cichlids (all dealt with in my previous articles) as well as the Australian Rainbow Fish, *Melanotaenia maccullochi* and *nigrans*; the dainty little Glass Fish, *Ambassis lala* and any of the *Corydoras* Genus (here demand nearly always exceeds supply) and, finally, the beautiful Glass Neon (*Telmatherina ladigesi*).

All the above will do well in hardish water where the reading is 180 p.p.m. upwards and

The lovely Glass Neon (Telmatherina ladigesi) *species which will breed in hard water.*

the *p*H is from 7.2 to 7.8. For good measure they also benefit from the addition of a teaspoonful of salt to each gallon of water.

When spawning Australian Rainbows I use the standard 24×8×8 in. breeding tank. This is layered with ¾ in. of well-washed 1/16 grade sand, and filled with tap-water, which in my area has a hardness reading of 186 p.p.m. and a *p*H of 7.4.

Planting the Tank

The tank is then planted with a row of *Sagittaria* or *Vallisneria* along the back and sides. A little from each end I place a bunch of *Myriophyllum* or *Cabomba*, and fill in the intervening space with short *Cryptocoryne beckettii*, or baby Indian Ferns. The tank is stood in a good light and the parent fish, which have been kept apart in separate tanks so that the female is deep, wide, and bulging with roe, are put in at evening time.

Usually they spawn next morning, the males being ardent and persistent drivers, and the eggs, which are scattered mostly in the bunches of *Myriophyllum*, may be seen shining among

A male black Sailfin Mollie of the Mollienesia latipinna *species.*

the fronds of the plant, though many more sink among the baby ferns and are hidden from view.

As soon as spawning is complete both parent fish are removed; failure to do so may result in most of the eggs being eaten. The young can be seen hanging tail down from the foliage, or the glass sides of the tank six to seven days later, and are not difficult to raise. Give Infusoria as first food and, a few days later, newly-hatched Brine Shrimps. After that they do well on fine dried food.

For *Ambassis lala* the water can be much harder, even 250 to 300 p.p.m. The tank is planted similarly, but there should be a good ½ in. layer of *Riccia* floating on the water surface. The fish spawn in the floating plants, the bronze gold male pressing the paler female sideways and upwards under the *Riccia*. The eggs hatch in half a day but the parents, if well fed, need not be removed and may continue spawning for several days.

The babies will take Infusoria and newly-hatched Brine Shrimp and, when ½ in. long, Micro-worms, sifted *Daphnia* and *Cyclops*. This species prefers livefood and rarely takes dried food.

The beautiful *Telmatherina ladigesi* is another fish well worth breeding, and it is not really difficult. Be careful when you first acquire these fish as they do not take kindly to changes of water so make any changes very, very gradually.

Finely Developed Male

Once settled down they are extremely colourful, and the male, which is easily identified by the long, extended rays in his dorsal and anal fins, is a sight to remember when it is courting. Its dorsal and anal fins are then spread until the first rays of both are splayed out at right angles to the body.

The tank is set up more or less as before but with one important difference; instead of planting the *Myriophyllum* and *Cabomba* in

bunches, insert the individual stems about 1 in. apart and dot them well about the tank. This is because, when spawning, the female lays single eggs which are attached to her body by a fine thread and, as she swims through the plants, the thread catches the fronds and adheres, leaving the eggs suspended.

Now, although the parents usually ignore the eggs, which are clearly visible, they will eat the newly-hatched fry. Thus it is best to remove the eggs to a separate hatching container, filled with the same quality of water and at the same temperature. This container may be a large sweet jar, or battery jar if no small tank is available.

Removing the Eggs

It is easy to see the eggs suspended from the stalks of *Myriophyllum* and then, without disturbance, to pull out the stem and float it, with the eggs still attached in the container. If the *Myriophyllum* is planted in bunches, and eggs are seen later, it is almost impossible to pull out the one stem without uprooting the whole bunch, and in such a disturbance many of the eggs originally seen will fall and be lost.

The eggs hatch in three or four days according to temperature, but may fungus during this time. To prevent this happening, add two or three drops of methylene blue to the hatching container, so that the water is tinted a pale blue, and you will find many more eggs will hatch.

The parents go on spawning for a week or more so, after removing several stalks of *Myriophyllum* daily, replace these with new stems.

Eggs will, of course, hatch out over a period and, though the newly-hatched fry will take Infusoria, the older ones, which are now a week old, will require newly-hatched Brine Shrimps.

Matching the Young

Should you get a great many eggs, start off a second hatching jar, so that the batches of babies growing on will match in size. When the fry are ½ in. long they can be given sifted *Daphnia* and *Cyclops*, and also some fine dried food. *T. ladigesi* are moderately uncommon, and consequently are not cheap, so are worth-while breeding.

Follow exactly the same method when breeding *Oryzias latipes*, the Gold Medaka. These fish, which prefer the water a little softer, spawn in the same manner as *T. ladigesi* but, instead of a single egg at the end of each thread, there is usually a bunch of four or five so that the number of fry obtained mounts up much more quickly in the same given time.

I shall deal with the *Corydoras* Catfish in my next article.

★★★★★★★★★★★★★

Fish Philately

★★★★★★★★★★★★★

Pike

IN 1955, the Finnish Government brought out a set of three fish designs in the country's annual tuberculosis fund charity issue. The lower amount on the stamp goes to the fund, the larger represents the postal value.

The brown, 15-mark stamp illustrated here bears a wonderfully vigorous picture of the greatest freshwater predator of Britain and Europe, the Pike. Its specific name, *Esox lucius*, is printed in the stamp's lower margin.

The Pike, proverbially voracious, is fearsomely equipped for the capture of live prey. Its large mouth has numerous sharp, strong teeth, some movable, which prevent the escape of victims.

So voracious is the Pike, in fact, that it is unusual to find more than one adult in any one stretch of water. It takes fish, swallowing them head first, and will also take water birds, rats and other aquatic animals.

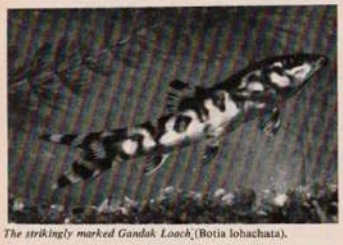
Pike spawn in the early months of the year, when some half-a-million eggs are laid on the beds of streams. Most are eaten by other fishes and are not cared for or protected in any way by the parents. When the young "pickerels" hatch, they are as voracious as the adults and will, after many years, reach about five feet in length.

The larger North American species, the Muskellunge (*E. masquinongy*), is even more ferocious than its European counterpart and achieves a weight of about 110 lb. and a length of eight feet.

JOHN WAKEFIELD.

★★★★★★★★★★★★★

COLOURFUL INDIAN LOACH



A distinctive pattern which could make it a rival to the popular Clown Loach

by
THOMAS M.
MACKESSACK, S.J.

The strikingly marked Gandak Loach (Botia lohachata).

IT is rare for a loach to be both beautiful and a useful occupant of the aquarium. As a rule loaches are just good scavengers. So far as beauty of form and coloration are concerned, the words of the old limerick tell us what we may expect :—

As a beauty I am not a star,
There are others more handsome by far ;
As for my face—I don't mind it,
For I am behind it ;
It's the people in front that I jar !

One of the few exceptions to this family ugliness is the Clown Loach (*Botia macracantha*), photographed on the front cover of the January issue, but we may claim a like exception for the as yet little known *Botia lohachata*.

I have been able to observe this loach species over a period of three years but before dwelling on its merits as an aquarium fish let me provide a short historical digression.

B. lohachata, or the Gandak Loach (as it is popularly known in India), was first discovered in 1912 by an Indian naturalist—a Mr. B. L. Chaudhuri[1]—in the Buri Gandak (the name given to the upper reaches of the River Gandak), a fast-flowing tributary of the Ganges in Bihar.

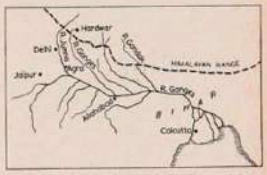
I still recall the day, some 15 years ago, when I stood on the banks of this river, and gazed at its swift, seething, surging waters. It was May, when rivers in India run low, but the Gandak was swollen by water from the thawing Himalayan snows. Now I can look back on that scene and say, "So that was the river in which *B. lohachata* was first discovered !"

After its discovery in 1912, the fish was completely lost sight of until four years ago, when the journal of the Bombay Aquarium Society carried an article on the fish by M. R. Ranade, thus re-introducing it to the aquarium world.[2]

Its rediscovery was quite a work of chance. In May 1952, my friend, Dr. H. G. Kewalramani, curator of the excellent Taraporevala Aquarium in Bombay, when visiting Calcutta, was presented with six small fish which he could not identify because they lacked colour and were immature. All he was told was that they had been collected, along with some Carp fry, in the Gandak—the same river in which the *B. lohachata* had been originally discovered.

Taking them back with him to Bombay he fed them on live *Daphnia* and *Tubifex* for three months, when they grew to a length of three inches and displayed their distinctive markings.

[1]Chaudhuri, B.L., B.A., B.Sc. Records of the Indian Museum, Vol. VII, pp.437-444.
[2]Bulletin of the Bombay Aquarium Society, Sept.-Oct. 1954.



Map of North India showing the localities which are referred to by the author.

It took another two years before the fish could be scientifically identified and classified.

Not long after I ran into more information about the species. Some four years ago, when I was visiting Delhi, my keen aquarist friend, Jim Sutherland, invited me over to his place for a sight of his many beautiful aquariums. "In one of my tanks," he said, "I have some Tiger Loaches. I am sure you will like them. I get them in the Jumna."

When I arrived at his home, he took me over to his show tanks where Angels, Neons, several other fishes and the Tiger Loaches lived in harmony. Angels and Neons were not new to me but the "Tigers" certainly were. They were outstanding fish, altogether remarkable, and I fell for them immediately. The "Tigers" were none other than the *B. lohachata* as I was subsequently to find out.

Another Location

Now, as the Jumna, where Jim finds his loaches, is another tributary of the Ganges, and as it flows by Delhi and Agra and finally joins the Ganges at Allahabad, it follows that the fish must be found in the entire stretch of river between the Jumna in Delhi and the Gandak in Bihar—a distance of some 600 miles.

It would not be correct to conclude that it is confined to that stretch of river alone. Indeed, I would say that it could be found even farther up, say, in the Ganges at Hardwar, a town 200 miles N.E. of Delhi, and as far east as the Hoogly in Calcutta; that is, in a stretch of river more than 1,000 miles long.

Incidentally, this would imply that the fish would be able to stand temperatures anywhere between 40 and 100 deg.F. for Hardwar, in Winter, goes down to freezing and Bihar, in Summer, gets as hot as 117 deg.F.

In shape, *B. lohachata* resembles *B. macracantha*. There is the same distinctive mouse-like head, the distinctly-arched back from dorsal to nose-tip, the comical, moustache-like barbels (four pairs in all), the sharp spines, the tapering body from dorsal to caudal peduncle, and the sharp fork in the tail. But there the resemblance ends.

In colouring the two loaches are very different. The general body background in the Gandak Loach is a rich cream, like the shade of ivory that has aged. The white portions in the picture, some of them resembling rude arches, have this creamy hue. The fancy bands, black in the illustration and about seven in number, are a dark brown and encircle the fish. The underside is more white than cream.

All the fins are either splashed with brown and white blotches, or marked with bars of the same colours.

The Gandak Loach is a bottom-feeder which burrows vigorously in the sand for left-overs but at feeding time it rises towards the surface like other fish, and even crawls over them to pick up particles of food that roll down their sides!

At times it can be seen lolling contentedly on a spray of *Myriophyllum* like a sleeper stretched on a hammock. On other occasions it will stand bolt upright on a rock or plant apparently nibbling at the algæ. It also loves to shoal with others of its own kind in a cylindrical tube or piece of piping like the outlet to a cement tank.

Although references to the hinged spine in the Clown Loach say that the function of it is unknown, if you touch the Gandak Loach near its eyes—for this fish has a similar spine—you will soon find out! Many's the time I have been "stung" by this barbed devil when groping for it in an outdoor tank or trying to pick it out of a net. Fortunately the pain vanishes immediately, and no deleterious effects result, as the spines carry no poison.

I have never attempted to breed the fish but the experiment might well be worth trying, although the chances of success might prove no better than with other loaches.

B. lohachata is a long-lived fish, especially if it is fed on livefoods (it takes dried foods readily enough), and if it is kept in soft water. Four loaches which I presented to the Rev. A. Navarro of St. Xavier's, Bombay, where the city water is much softer than here in Jaipur, grew healthier and bigger than they have ever done in my tanks.

The author (right) on a fish-collecting trip.

If well cared for, they will easily live six years in an aquarium, but will not grow to more than three inches, although their length is up to four or maybe five inches in the wild.

Finally, since the *B. lohachata* is a beautiful fish, an excellent scavenger, and one that is not at all shy—for it often parades before the front glass of an aquarium—it is a great pity that it is so little known and I hope it soon becomes available to British and American aquarists.

Care of Coldwater Fish in a Heat-wave

by N. E. PERKINS

WHILE the majority of coldwater fish have a far greater temperature range than the tropicals (i.e. from freezing point to 90 deg.F. or above) they do tend to experience difficulty during prolonged hot spells. Usually the cause of their discomfiture is a fall in the oxygen content of the water resulting from a rise in temperature and this can prove fatal with such fish as Golden Orfe, Golden Rudd, Minnows and similar types. These fish should have a pond which is deep and not exposed to full sunlight, for they require a higher percentage of dissolved oxygen than do Goldfish, Carp, Tench and the like.

Larger Surface Area

Obviously, in view of the foregoing remarks, it is advisable to give fish far in excess of the surface area computed to be sufficient for their requirements (i. e. 24 square inches per inch of fish). If a pond is rather crowded with fish and also has dense masses of aquatic plants, then trouble will arise during the night in hot sultry weather, for both fish and plants are releasing carbon dioxide at this time.

Under such conditions the fish will be seen mouthing at the surface and this will continue until several hours after dawn, even in some of our natural country ponds. That they do eventually go down and resume their normal activities is because, in the presence of daylight, the plants commence to release oxygen into the water and, if the vegetation is dense, the balance will be rapidly restored.

Reducing Fish Population

For fishes in aquariums it is a good plan to reduce the number of fish per tank at the approach of warm weather and to provide artificial aeration if this is not already installed.

Should the fish experience oxygen shortage for long periods, they would inevitably fall victim to disease even if they escaped death by suffocation, so that any mouthing at the surface must be taken as a warning signal. If this mouthing is at all continuous, steps must be taken immediately to remedy the cause, which is usually that too many fish are housed in the aquarium or pond.

Of course, with a rise in temperature, the breakdown of any rotting material in the pond, such as dead leaves, etc., will be speeded up, and this could give rise to similar conditions. When fresh water is added—especially to small volumes—it is important that it should be of approximately the same temperature as that in which the fish are living, since any change exceeding 10 deg.F. is harmful.

Fish are cold-blooded (variable temperatured) and maintain a blood heat very little in excess of the water in which they swim. Sudden changes would therefore produce a considerable shock to them.

Location of the Ponds

It is commonly stated that pools of two feet in depth are adequate for Goldfish and allied forms, but in my opinion this is not wholly correct since location plays a big part. If fully exposed to the weather they will be far too warm in Summer and possibly freeze almost solid in Winter, quite apart from the rapid fluctuations caused by very cold nights after hot sunshine. Actually I would always advocate a much greater depth for such a pool, four feet at least being more suitable and preferably a little more.

Warm weather can also affect fish in another rather peculiar fashion. They may be found

Tail fin of a Veiltail Goldfish showing split finrage caused by burst gas bubbles in the tissues.
L. E. Perkins photograph

hanging head downwards from the surface with their tails inflated with gas-bubbles ranging in size from a pin's head to a small pea.

In a previous article I referred to this phenomenon as gaseous embolism and I have been unable to find any material on this subject outside my own experience. However, the signs are obvious and the cure quite simple, provided it is undertaken immediately. Fresh water must be added in considerable quantity and the pond or aquarium shaded from direct sunlight. If neglected, the bubbles will burst, badly fraying the tail and fins, which will, in all probability, become diseased.

Supersaturation

As to the cause, I am of the opinion that the gas is oxygen and is the result of supersaturation of the water, due to oxygen released by algæ and aquatic plants. One contributing factor can be the constant changing of the water during the early Summer with the result that a permanent condition of greenness prevails. I have experienced this when watering the garden from the pond and allowing fresh water from a hose to refill it.

Some sort of shade from direct sunlight is definitely an advantage and, although Waterlilies will provide a reasonable cover, a small overhanging tree, such as a Silver Birch or even a prostrate form of conifer like *Juniperus tamariscifolia*, will do much to lessen the problems brought about by warm weather.

Fish that are in a weak state through exposure to oxygen shortage or embolism should be placed in a large shallow bowl or pan, suitably covered to preclude their jumping out and kept like this for a few days, the water being carefully changed each day. The bowl should be kept in a cool, shaded place and it is unnecessary to feed the specimen if the period is but a few days. Should signs of fungus be apparent then an addition of block salt (about two tablespoonfuls to an ordinary enamel bowl of approximately 13-14 in. diameter) will quickly ensure its removal[1].

Salt Treatment

Naturally, the salt must be replaced as the water is changed daily and if the process takes more than a week then food in the form of chopped worms should be given. The changing of the water once worms have been given must not be overlooked as the fragments tend to decompose rapidly. However, a complete change once a day will suffice when the fresh worms may be added.

Photograph, D. P. Wilson.
Common Periwinkles (L. littorea) *on the seashore.*

Marine Aquarium Keeping

USEFUL AND ATTRACTIVE "WINDOW-CLEANERS"

by J. S. VINDEN

THE Common Limpet (*Patella vulgata*) is familiar to everybody who has ever visited a rocky shore and is interesting in that it is able to cling to rocks with extraordinary force. Sinel tells us that, at Jersey, steel clips were affixed to some limpets and were then connected to a spring balance which was adjusted to record the maximum pull on the spring. It was found that limpets of a 1¼ in. maximum diameter did not come off the rock until the pull was 70 pounds!

These experiments proved that it is not suction alone that holds the limpets, for the pull required was nearly five times that needed to overcome the atmospheric pressure on a sucker of that diameter.

There are several limpet species, but they are not generally recommended for marine aquaria.

Having heard this I had never introduced any to my tanks until a few months ago when I found some with a very fine growth of *Ulva* on their shells. I took four, thinking that the sea lettuce on its anchorage was worth-while to me even if the limpets died.

Since that date, four months ago, one limpet has died and the other three have survived. They are in a tank on three sides of which there is a thin growth of Green and Blue-green algæ on which the limpets live.

The course of their nocturnal wanderings can be seen, for they clean the glass perfectly when they eat and, although there is plenty of algæ for them, they seem to consume very little.

On rocks, limpets return after feeding each to its own station, where it has made a depression to fit its shell. On glass in my tank, however, they feed and settle where they happen to be until they are hungry again. One of the limpets remains near the surface of the tank, and is often only half submerged, but the other two never leave the area near the bottom of the tank. There are several nearly-related forms to the limpet, but these have no particular attraction to the aquarium keeper.

For the aquarist with a large marine tank, and a healthy growth of small algæ, there can be few more impressive molluscs than the Ormer or Venus Ear Shell (*Haliotis tuberculata*). Unfortunately this handsome creature is hardly a British animal for, although common on the French coast, the only British waters it frequents are those of the Channel Islands. However, since so many people now fly there and back for holidays, any lucky aquarist who does so should be able to bring back this prize, even if he has to buy it from a fisherman.

J. E. Taylor says of the Ormer, "In the aquarium it is as good as a natural scrubbing-brush for keeping the sides, etc., clean; whilst it is equally useful in devouring decaying vegetation". Fully grown, the Ormer is about the largest of our univalves, for it can reach a length of some 4 in. and a width of about 2½ in.

Other useful window cleaners—and handsome as well—are the Top Shells of various Genera—*Gibbula*, *Osilinus* and *Calliostoma*. These animals have a strong coiled shell, resembling an inverted spinning top, and they feed in the same way as limpets, that is by rasping vegetation from the rocks. Some of the species are very beautiful, and are quite long lived in established aquaria provided there is a growth of algæ on the rocks or glass.

The periwinkles are too familiar to merit description, but it is perhaps not generally known that the beach harbours several different species with varying habits and that those found clustering the rocks at or above high water level have totally different habits from those found in pools near low water.

The species furthest from the sea is the Small Periwinkle (*Littorina neritoides*), an animal that many naturalists believe is well on the way to leaving the sea altogether for, apart from needing the sea for egglaying, it can live without it.

The next species encountered as we walk down the beach is the Rough Periwinkle (*Littorina rudis*) which, unlike the last-mentioned, is a viviparous species, but one needing frequent exposure to the air.

The third species, which is found in the zone of *Fucus* or the wracks, is *Littorina littoralis*. It occurs in many colours ranging from black to yellow or even striped, and the other species which may overlap the last-named in zoning is the Common Periwinkle (*Littorina littorea*), the largest of the four species. It is a common and very hardy animal and it appears to live equally well in exposed or protected situations, in estuaries of brackish water, on rocks or on weeds, in sun or in shade.

The Common Periwinkle does well in an established aquarium and, not only does it clean the glass to a certain extent, but it appears to eat a certain amount of decaying vegetation.

All the univalves we have considered so far are purely vegetarian and the worst they can do in an aquarium is to eat a little weed or die and pollute the water. In the next article we shall deal with a group of carnivorous molluscs whose appetite must be satisfied or else they will kill and eat some of their more defenceless brothers.

For Your Bookshelf

A Key to the British Species of Freshwater Cladocera*

THIS revised edition of a publication that appeared originally in 1941 fills the need for an inexpensive guide to a group of crustaceans of great importance to aquarists and pondkeepers. Although many fishkeepers are content to call all Cladocerans "Daphnia" there must be many who wish to know more about these creatures and particularly their life-histories and ecology.

This information is provided in a concise form in the present key, which will be found much easier to use by the inexperienced than the original edition.

The pictorial guide, showing characteristic members of each Family, is very helpful in beginning the identification of a specimen and the inclusion of ecological information about each species in the body of the key instead of in a separate section as before, is a great convenience. A good bibliography and an index round off a most valuable publication.—JOHN CLEGG.

* By the late D. J. Scourfield and J. P. Harding. Freshwater Biological Association Scientific Publication No. 5. 4s. 6d.

FISH ENEMIES

Hydra

by JOHN CLEGG, F.R.M.S.

Illustration by the author

HYDRAS belong to the large group of animals called Coelenterates which also includes sea-anemones, jelly-fishes and corals. Most coelenterates are marine creatures and our three species of *Hydra* are the only members of this large Phylum that have taken to living in freshwater wholly, although a somewhat similar colonial form, *Cordylophora*, seems to be in the process of changing its habitat from brackish water at the mouths of rivers to freshwater.

The body of a *Hydra* is hollow and tube-like and at the top bears a crown of long tentacles each of which has a great many stinging cells and it is with these that Hydras capture and paralyse their prey.

There three species of *Hydra* in Britain: —The Brown Hydra (*Hydra oligactis*), the Slender Hydra (*Hydra attenuata*) and the Green Hydra (*Chlorohydra viridissima*).

The first is the largest and, when extended, its body-tube may be as much as an inch in length. At the base is a slender stalk or "foot". The tentacles, when fully extended, may be four or five times the length of the body.

The Slender Hydra is only about half the size of the previous species and with much shorter tentacles in proportion. The body-tube has no stalk and is the same thickness all the way down.

There is no difficulty in identifying the Green Hydra for its brilliant emerald green colouring is a sufficiently characteristic feature. The colouring, which incidentally is due to the presence in the inner cells of its body of minute algæ (*Chlorella*), makes this species particularly difficult to see when it is attached to water plants.

The sizes given above are, of course, of the animals when extended. If alarmed they contract to a mere blob and are almost invisible to the naked eye.

Much enlarged photograph of a Hydra *with a young individual budding on the side.*

Hydras feed on any small aquatic creatures they can catch with their tentacles, particularly Water-fleas and their relatives. They reproduce mainly by budding. When food is plentiful small buds develop on the side of the body-tube and these grow until they are fully formed but minute hydras, complete with tentacles with which they capture their own food. Eventually they break off the parent and lead a separate existence.

Hydras also reproduce sexually, male and female cells being formed, often on the same individual. After fertilization, the egg develops into a new *Hydra*.

In Tropical Aquaria

Hydras sometimes grow in astonishing numbers in tropical aquaria into which they no doubt become introduced on plants. Usually they congregate on the glass sides of the tank. Although they cannot do any harm to larger fish they can and do catch small ones up to about ½ in. long. One method of biological control is to introduce certain Gouramies into the tank, for these fish feed readily on them.

Hydras are difficult to eradicate except by chemical means. The usual method recommended is to add household ammonia to the water at the rate of one teaspoonful to every four gallons of water in the tank or pond. This concentration is lethal to other animals-so all fish, snails, etc., must be removed first, but plants should not be affected. After a few hours the solution is drained off and the tank or pool refilled with fresh water.

We like to have your views but please keep letters to a reasonable length. The Editor does not necessarily agree with the opinions expressed.

Cryptocoryne Disease

SIR,—We believe, on the basis of our recent experience, that so-called "*Cryptocoryne* disease" is not a true disease.

Our show tank had a nice stand of Cryptocorynes until a short time ago. We then decided it was time to change a portion of the water, which we do regularly. Usually we run the water into a dish, which diffuses it. This time we ran a hose directly into the tank. It was allowed to flow very gently until the tank was topped up.

Water added was identical in *p*H, temperature and hardness to that in the aquarium and it had been aged a week with continuous aeration. The following day all the Cryptocorynes in the path of the water flow appeared to have *Cryptocoryne* disease. In about three days only the roots were left.

We often plant *Cryptocoryne* varieties in water aged for only two days and they thrive. We have never found *p*H to affect them (although we usually keep the aquariums at *p*H7) and we have not noticed that unsuitable conditions have any effect other than on growth rate. We can only conclude from our latest experience, therefore, that Cryptocorynes dislike currents of water other than those occurring normally in the water where they are living.

Vancouver, 16, B.C., Canada. DONALD SPRIGAL (Aquarium Sales and Service)

Continental Visit

SIR,—As Overseas Secretary of the Federation of Guppy Breeders' Societies, I recently spent two weeks in Holland visiting our Section in the Hague. I had many meetings with our members there and, on one occasion, had the honour to present a table banner to the Section on behalf of the Federation.

On this evening the first official overseas table show was held and silver pins were awarded to the winners of the two classes, Mr. Salome and Mr. Damen.

During my visit I also had pleasure in meeting, together with the Hague Section representatives, Mr. J. D. Kok, general secretary of the Nederlandse Guppen-Kring and Mr. A. Groen, overseas secretary of this organisation. At this meeting the adoption of the F.G.B.S. Guppy standards was re-affirmed by the N.G.K. officials who recognise the wealth of breeding experience from which these standards have been evolved.

Measures of active co-operation were also agreed between Den Haag F.B.S. and N.G.K., which I am sure will prove of great benefit to those immediately concerned and eventually to aquarists generally who are interested in Guppy culture in Holland.

Hornchurch, Essex. ROBERT ALLEY.

L. to r., Messrs J. v Dijk (Secretary) Alley, Sleeking, Gronloh, J. Salome (Treasurer), Damen, Kennedy (Vice-chairman) and F. Hocks (Chairman)

Crayfish Moult

SIR,—I have kept a single Crayfish in an aquarium for some time now—just one specimen on its own. Imagine my surprise when one morning I glanced into the tank and saw *two* Crayfish—one "dead" and the other very much alive!

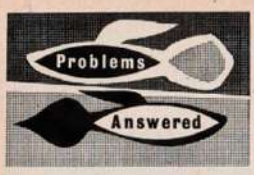
How did the other one get there? A close scrutiny and I realised that the "dead" creature

was, in actual fact, the moulted cuticle of my pet.

This is the first time I have found a complete shell, as Crayfish usually eat it. However, I removed it carefully, allowed it to dry and then took the photograph reproduced here.

Feltham, Middx. W. J. HOWES.

Societies and individuals in the areas covered by our correspondents (See pages 505-7) are invited to contact them with news highlights.



Queries are answered free of charge by experts. They should be sent to "Fishkeeping", Dorset House, Stamford Street, London, S.E.1, with a stamped addressed envelope for the reply. All queries are answered direct but a selection is published here.

Fishhouse Heating

I have acquired a shed which I have converted into a fishhouse. The size of the structure is 7 × 6 ft. It is insulated and receives natural daylight through the roof. There are 18, 24 × 12 × 12 *in. tanks and six smaller ones in it and I wonder what would be the most economical method of heating.—(B. J. P., Brentwood, Essex).*

There are several methods of heating a fishhouse, i.e., solid fuel boiler feeding hot water pipes, gas, electricity and oil. Depending on the position of your fishhouse in relation to the house and the distance you would have to run the mains supply, individual heating of each tank with an electric immersion heater might be best. On the other hand, your fishhouse is not too large and, provided you could arrange the species of fish so that those requiring most heat are in the upper tanks, there is no reason why oil heating should not be satisfactory. A good quality oil convector heater, used in accordance with the manufacturers' instructions and kept clean and free from surplus oil, should heat the place quite well. If the heater is used as suggested above, there should be no harmful fumes either to fish or plants.

You mention the house is insulated but, if it has not already been done, we would suggest that the roof be double-glazed. It is through a single-glazed roof that a considerable heat loss occurs in cold weather.

Setting up an Aquarium

What thickness of glass would be necessary for glazing a 48 × 15 × 15 *in. aquarium? Also, would one or two immersion heaters be best and which type of lighting (bulbs or strip light) would be most satisfactory?—(M.P., Hull, Yorks).*

To glaze your 48 × 15 × 15 in. good-quality quarter-inch plate glass would be strong enough.

It would be an advantage to have two heaters, each placed about 12 in. from the ends of the tank and lying horizontally about 1 in. above the gravel. These will help to maintain an even circulation of warm water throughout the tank.

Ordinary strip lighting is suitable, but you may find the normal domestic bulb more convenient. These are easily changed, and the lighting can be adjusted by using bulbs of a different wattage, which enables you to experiment until you are satisfied with the plant growth in the tank.

Malayan Angels

I have recently seen fishes called Malayan Angels and wonder whether these are the same fish as Monodactylus argenteus. *If so, can they be kept with Characins, what do they eat and what water suits them best?—(C.I.R., Cranford, Kent).*

The fish you saw was *Monodactylus argenteus*. It would be in order to keep these fish with Characins and other species while they are young, but they grow rather quickly if given the right food and conditions. Although they are not pugnacious it would be unwise to keep them once they develop in a tank with other small tropical fish.

They are not difficult to feed; they will take most meaty foods such as earthworm, raw meat, liver, heart, and shellfish, also *Daphnia* and *Tubifex*.

Malayan Angels will live in fresh water, but prefer a slightly saline medium.

Plecostomus Catfish

I have a Plecostomus *Catfish which is about 3 in. long. Every month it appears to be full of eggs. Its stomach, which is normally flat, becomes so swollen that the fish can hardly stick to the glass. This swelling disappears after two or three days. I understand that the species has never been bred in aquariums; could you give me some details of its requirements?—(J. H., Wakefield, Yorks).*

It is rather difficult to diagnose the reason for your *Plecostomus* swelling at monthly intervals. Being only 3 in. long it is only half-grown; they do reach 6 in. to 10 in. in aquaria and very much larger in their natural waters.

These Catfish are omnivorous but, although they will eat livefood such as earthworms or even small pieces of raw meat, they much prefer a diet of algae.

They are not happy in a bright light and like to search for food after dark, so it is a good plan to give them their food when it is getting dark and the other fish in the tank are settling down for the night.

There is no record of them having been bred in this country. Do not worry too much about the *p*H of the water. They are quite happy in matured tap water.

Water Analysis

SAMPLES should be sent (NOT delivered by hand) in a clean pint bottle, well packed, to "Fishkeeping" Analyst, 12 Featherbed Lane, Addington, Surrey, together with a fee of 5s. per sample. Name and address of the sender and details of prevailing conditions should accompany each sample sent. Post-mortem examination of fishes *cannot* **be undertaken under this service and corpses must not be sent to our Analyst with samples of water.**

South-West Viewpoint *by H. C. B. Thomas*

I WAS made very welcome when I went down to Taunton on June 19. The whole atmosphere of the meeting was one of informality and I soon found myself discussing fish culture as though I had known the members for as many months as I had already spent minutes with them.

Saturday, July 12, saw a party of the Tropical Study Group members at Yeovil for the annual table show of Yeovil A.S. Victor Jones, who is chairman of the group, was judging the show and he took the opportunity of giving the members hints on the finer points of judging.

There were 98 entries up for competition and I was impressed by the very wide variety of fish on show. Congratulations are due to Mr. B. S. Stidson who was acting as show manager and to his helpers.

The Yeovil society meets on the first Thursday of the month at the "Elephant & Castle", Yeovil, and the secretary is Mr. M. Enticott, 93 Highfield Road, Yeovil, from whom particulars of future meetings can be obtained.

On June 6 the Carlton Park Secondary School, Bristol, held a show of pets and handicrafts. The main part of this exhibition, which has been held annually for 16 years, is provided by the scholars' own activities.

This year, as an added attraction, Mr. and Mrs. G. S. Stone, assisted by other members of the Bristol Tropical Fish Club, set up four furnished aquaria containing 38 different varieties of fish, all provided by Mr. Stone who, with his wife and helpers, earned the warm thanks of the Headmaster for Bristol T.F.C. efforts.

The Bristol Tropical Fish Club holds meetings on the third Thursday of each month at the Old Duke, King Street, Bristol. Meetings usually take the form of a talk and a table show of some variety of fish. The secretary is Mr. E. Ridler, 9 Friendship Road, Bristol 4.—H. C. B. Thomas, 2 Grove Park, Bristol, 6.

News from the North-West *by "Aquaticus"*

LIVERPOOL Show in July had, as usual, the annual show of the Merseyside Aquarists' Society as a major attraction in the great floral marquee, thanks to the work of Mr. W. Kelly, the society's show secretary, and his many helpers. Two new cups presented to the society by Mr. W. Bailey meant that there were four cups and five plaques up for competition. These notes went to press before the results were decided, but huge hand has become the society's major annual event and is of immense publicity value to the hobby.

My recent remarks on the toleration of brackish water by the Common Newt in the River Alt at Liverpool sewage-farm made me turn up some old notes of a pre-war aquarist club with which I was connected. I found that the same creature had been collected from the very polluted arm of the Mersey near Warrington. It breeds also in the brackish sand-dunes dykes at Freshfield.

I have made the following summary of some interesting collecting grounds for the teachers and other pond-collectors. The warm mill-dams and lodges, where cooling water is run off at the East Lancashire mills at Oldham, Bolton, etc., and some of the local canal stretches at Reddish, Bolton, Droylsden, etc., have *Vallisneria spiralis* and *Azolla* water-ferns established. There are also the American Ramshorn Snail (*Planorbis dilatatis*) and the West Indies warm-water shell (*Physa heterostropha*).

The microscopist seeking specimens will be happy along the green and slimy ponds but for Rotifers and other subjects for his slides he should not neglect the acid sphagnum bogs and pools like the gull-ponds by the Manchester scout camp at Sandiway, Cuddington (Delamere), which are also a good breeding haunt of several species of dragonflies, as is nearby Petty Pool. Likewise the Black Lake in the heart of Delamere Forest, near the railway, and the cotton-grass bog or "arm" above Oakmere, and the back of Hatchmere.

Another very interesting Cheshire collecting ground lies in the pools behind the Leasowe-Moreton Embankment, near the old lighthouse. These contain a strange mixture of sea and fresh-water life, including prawns fresh-water shrimps, water bugs, various water beetles, dragonfly and caddis larvæ and Ten-spined Sticklebacks, while the Water-Milfoil zone has Water Spiders feeding on tiny larvæ *Gammarus*. Plants also include the South African *Cotula* or yellow-button.

Not far away, between Meols Station (whose pond has the true Mare's Tail plant, *Hippurus*, now becoming scarce in the Wirral) to Carr Lane and Foonell's Green, a pond of water-dock, etc., has a colony of the Water Soldier, a scarce plant now in the Wirral.

In North Wales, Lake Bala has the only Welsh haunt of the water snail, *Myxas glutinosa*, and the Dee at Llangollen and the nearby arm of the Shropshire Union Canal have the American sandhopper-like amphipod, *Encrangonyx gracilis*, which is spreading slowly along the canals of Britain, chiefly in the south of England. But for the average fishkeeper, Summer is spent afield looking for *Daphnia* ponds, and there are several good ones near Rufford Station, Walton canal (Warrington), Willaston-Ness (Wirral), Capesthorne (Macclesfield), etc.—"Aquaticus", 47 Woodsorrel Road, Liverpool, 15.

Midlands Miscellany *by W. L. Mandeville*

SOCIETY outings are now in full spate. Walsall made a tour of the Cotswolds to an itinerary arranged by their President, Mr. Millis-Clarke. Members used the opportunity to get to know each other better, and to renew acquaintance with Chipping Norton, Bourton-on-the-Water, Stow-on-the-Wold, and Mandeville-on-the-Prowl—the latter resort existing only in the fertile mind of the president.

Smethwick combined a visit to the London Zoo, with a call on Queensborough Fisheries, and found sunshine all the way, which reflects credit on Mr. A. E. Allsop, the secretary, who made the arrangements.

Coventry toured the Thames valley and also visited the Queensborough Fisheries. Mr. F. C. Randall, editor of the Coventry Newsletter, comments favourably on the outing, but his reference to a "square-wheeled coach" indicates some travel hazards.

Into the Midlands came Mr. H. S. White, to speak to representatives of nine societies on the culture of the Guppy, hospitality being arranged by Dr. C. E. Cole.

Capt. L. C. Betts arrived in Birmingham to speak on "Water Conditioning" at a Midland A. & P. S. meeting.

His subject matter, and easy conversational style, were greatly appreciated. To Walsall came Mr. V. Jones from Bristol Zoo, to recount the joys and sorrows inherent in the maintenance of public aquaria.

Museum's Enterprise

Visitors to Birmingham for the Midlands Show should not fail to take the short walk from Bingley Hall to the Great Charles Street entrance of the Birmingham Museum and Art Gallery. Here the interest in fishes always shown by Mr. Percy Bilton, Curator of the Natural History Department, has resulted in a permanent display of tropical fishes housed in cabinet aquaria that will be the envy of every local aquarist.

This is only one of many efforts made by the Curators to increase the attractiveness of the Museum, especially in the Natural History Section and, as this area teems with aquarists and anglers, one wonders how long it will be before a living display of native fishes, provided by anglers and maintained by aquarists—even on a seasonal basis—is an accomplished fact.

Museum authorities have to budget with care, but the craftsmanship of the museum staff, who made the cabinet display, allied to the skill of the Midland anglers, plus the care of local aquarists, could keep costs to a minimum.

Good Companions

Relationship between "the trade" and societies in the Midlands has always been cordial, the annual Birmingham show being only one example of the close collaboration existing between traders and hobbyists. This event is not only helped financially by the space renters and brightened by their attractive stands but, in the staging of the event, both parties work in close harmony to their mutual advantage, begging, borrowing, and stealing (!) from each other to make the show as effective as possible.

Throughout the year, most societies owe something to the assistance so freely given by one or other of the local traders—a case in point being Mr. D. A. Attewell's recent visits to several Midland societies to tell them of aquarists' activities on the Continent.

One major point stressed by him, and endorsed by Mr. Stuart Erskine, is the fact that, whilst the trade in Britain will usually accept small parcels of surplus plants and fishes from local culturists, there would be greater advantage to both parties if shopkeepers could rely on consistent supplies of differing species from aquarists prepared to specialise in their culture for a contracted period.

In any business, traders can only sell what other people want but, too often in the aquatic market, they are expected to buy what others cannot sell.—W. L. Mandeville, 327 Queslett Road, Gt. Barr, Birmingham.

Scottish Commentary *by K. A. M. Robertson*

INVERNESS and District Aquarium Society is a young club but certainly not in its ideas. Owing to the geographical location it is arduous work for the officials trying to keep an active programme in operation.

When Mr. John E. Edwards, organising secretary of the British Aquarists' Study Society, was on holiday in the area he called on the secretary and was immediately persuaded to give a talk for the benefit of the local members. Honorary membership was bestowed upon him.

Any aquarist visiting the area should contact the Inverness secretary, Mr. J. A. F. Bain, 52 Dunain Road, Inverness; they can be assured of an enjoyable time with the aquatic followers in the area.

The latest venture in Inverness to interest the public in aquarium keeping and also educate them on the various areas from which the different types of fish emanate is rather ingenious. The president, Mr. H. Bottom, and the secretary devised a plan and thought a suitable situation.

Thanks to the co-operation of a local cinema manager, Mr. J. S. Nairn, the location problem was solved. A tank was set up in the foyer of the cinema and above it a large map of the world was affixed. This map was wired from the rear and lights were installed where needed. A panel below the tank was then assembled and this showed photographs of the various fish contained in the tank, also their names. Under each photograph a press button was placed and wired to the location map thus giving the necessary information at a glance.

Members of the society attend to the maintenance on a weekly rota system. They have also installed a tank in a local children's hospital.

A recent visit to Gartloch Hospital on the outskirts of Glasgow once more proved to me that our hobby can be of great benefit to those in need of distraction from their ailments. Two of the wards have large aquaria containing mostly livebearers. A small nursery tank is also installed in one of the wards. The quality and condition of the fish cannot be improved upon and, in fact, some of those exhibited at the Scottish show have gained major awards.

The aquariums are maintained by the Sisters in charge of the wards, Sister Letham and Sister MacKellar, and some friendly rivalry is shown. Should anything serious happen to the tanks or fish, the Hospital is fortunate in having the guidance of Mr. Anthony Watt who is a very accomplished aquarist. I understand that the Medical Superintendent, Dr. Macpherson, is hoping to increase the number of tank installations to four, following the success of those in use.

New Organisations

During May some eight societies met in Perth and agreed to form a Federation of Scottish Aquarium Societies. The next meeting takes place on Sunday, September 7, commencing at 11 a.m. in the Working Men's Club, Infirmary Street, Edinburgh, 1. There will be a table show for Guppies, Platies, Barbs and Tetras.

A newsletter will be issued to all aquarium societies in Scotland prior to this meeting. Any interested organisation should contac the secretary, Mr. A. Cross, 49 Ferry Road, Monifieth.

The Glasgow Section of the Federation of Guppy Breeders' Societies is now holding meetings

Left, J. S. Nairn, Manager, stands by the aquarium set up by Inverness A.S. in a local cinema foyer. Right, H. Bottom and J. A. F. Bain.

at 327 Gallowgate, Glasgow, on the last Wednesday of each month. Like most new ventures this one requires greater support. It is hoped, therefore, that any interested fishkeeper will call at the above address for the August meeting which starts at 7.30 p.m.—K. A. M. Robertson, 32 Edzell Drive, Newton Mearns, Renfrewshire.

New F.B.A.S. Ideals to be Issued Shortly

IT was announced at the June 28 Assembly of the Federation of British Aquatic Societies that a new series of guides and show standards would shortly be available. The issue will consist of 12 sheets covering *Coltsa lalia, Brachydanio albolineatus, Brachydanio nigrofasciatus, Danio malabaricus, Epiplatys chaperi, Apolocheilus lineatus, Pterophyllum eimekei, Cichlasoma meeki, Xenophyrodon discus*, and Bubble-eye, Celestial and Pearl-scale Goldfish. The set will be 1/6d, post free, and Mr. L. Coatman, 10a Parkhill Road, London, N.W.3, will receive orders.

At the same meeting a vote was taken to elect two new Council members. Those appointed were Messrs. A. Huntley (Friends A.S.) and D. Mayhew (E. London A. & P.A.).

The Services Secretary, Mr. A. H. Gale, reported that so far this year 76 London and 36 provincial engagements had been booked.

Big Entry at Portsmouth

OVER 300 entries were staged at the second annual show of the Guppy Federation's Portsmouth Section on June 14. Diploma winner at the exhibition was Mr. R. Forest-Jones, B.Sc. with a good quality Coletail. Mr. Forest-Jones also won the classes for Robson females and Gold-laced males.

Other first prizewinners were:—Mr. R. Rouch (Veiltails and breeders' males), Mr. T. H. Thomas (Scarftails, Bottomswords and Gold females), Mr. D. Sumner (Topswords), Mr. R. Bryant (Doubleswords), Mr. H. White (Pintails), Mr. F. Humpidge (Speartails), Mr. F. Cox (Robson males), Mr. A. Taylor (Roundtails), Mr. J. Burdge (Lyretails), Mr. W. Howe (Coloured females and Gold-laced females), Mr. L. Challenger (Grey females), Mr. D. Nichols (Albino females) and Mr. C. MacRae (Albino males).

Annual Guppy Show

THE Federation of Guppy Breeders' Societies 1958 annual show will be held in Queen Mary's School, Basingstoke, on September 27 and 28. Twenty-three classes are scheduled, including a competition for international entries.

Completed entry forms should be returned to the show secretary, Mr. R. Forest-Jones, B.Sc., 5 Park Lane, Old Basing, Basingstoke, Hants., by first post on September 15.

Mr. W. Howe has recently become eligible for the gold jewelled Guppy pin. Mr. Howe, who is vice-president of the F.G.B.S., won the classes for Coloured females and Gold-laced females at the Portsmouth Section's second annual show.

East Midlands Programme

IN the first leg of the 1958 inter-society competition of East Midlands Affiliated Aquarist Societies the Bedford Club will meet Peterborough, Corby will compete against Bedford, and Peterborough against Northampton. All these competitions must take place before September 15.

South London Table Shows

THE Association of S. London Aquarist Societies' third table show takes place in the Adult School Hall, Beahill Avenue, Sutton, Surrey, on September 13. Classes are for Catfish, Barbs, breeders' entries and plants.

First prizewinners at the second table show were:—Mr. W. A. Hawkins, with a Combtail, Mr. E. Angus, with a Bleeding Heart Tetra, and Mr. H. G. Rundle, with a Black Shark.

The sixth issue of the informative A.S.L.A.S. Newsletter has recently been issued.

● Secretary of the **West London Guppy Breeders' Society** is now Mr. N. W. Webb, 90 Wellesley Road, Chiswick, W.4. New members would be welcome and they should contact Mr. Webb direct.

● Mrs. W. M. Meadows was the judge at the annual show of **Folkestone** A.S. held in conjunction with the Folkestone Flower Show on July 17 to 19.

● A highly successful show is reported by **Macclesfield** A.S. on July 12. Mr. S. Cass won the diploma for best fish in show with a 98-point *Apistogramma agassizi*.

● The annual show of **Urmston** A.S. took place on August 4 when a diploma was awarded for the best furnished aquarium.

● A FISHKEEPING AND WATER LIFE Quiz was used as the basis of a recent meeting of **Nottingham** A.S. On the same evening it was decided that the club's 21st anniversary dinner would be held on October 31. First prize in the tropical home aquarium competition has been won by Mrs. R. Walker. Mr. C. Hill was runner-up. Mr. A. E. Adcock was first in the coldwater home aquarium contest, closely followed by Mr. S. Starbuck.

by H. O. MUNRO

THE African Jewel Cichlid, *Hemichromis bimaculatus*, has been the special study of a young German student, W. Spatz, and a report on his work in the July issue of DATZ makes interesting reading.

This Cichlid is one of the most attractive fishes when in breeding colour; its normal olive-green coloration then changes to a vivid red and, in some individuals, especially males, to a dark blue, almost black. The fish has three dark spots on each side; one on the gill plate, another in the centre of the body and a third on the tail. It also carries numerous metallic blue spots on its sides and fins which bear a red edge.

Jewel Cichlids are not difficult to provide for as far as water conditions are concerned and they will accept all livefood. They are certainly not community fish and in the breeding season not more than one pair can be kept in a tank.

After courtship, the breeding pair either take to each other or fight to the death. Breeding habits are much the same as with other Cichlids, both parents sharing the care of eggs and fry.

During this period the fishes are particularly aggressive to any real or imaginary enemy and attack anything approaching the tank. The author even made the discovery that the fishes produce a distinct noise when they attack. This is made by a grinding movement of the lower jaw. The noise was clearly audible with the aid of a stethoscope.

Mudskippers Observed

MR. LULING reports in the June issue of DATZ on his observations into the interesting behaviour of a Mudskipper (*Periophthalmus barbarus*). This amphibious fish was kept by him in an all-glass tank with sand so arranged that the water had a maximum depth of six inches and a strip of wet sand above the water level was available for the fishes.

The only furnishing consisted of an old root on which the fish would climb. Temperature of the water was high (78 to 61 deg.F.) and slight aeration helped to keep the water fresh.

As this arrangement caused the water to evaporate very quickly fresh had to be added frequently. When this was omitted, and the depth of the water started to drop, the Mudskipper was seen to dig a ditch with its muscular pectoral fins (which are used for propulsion on dry land) and to pile up a type of dyke towards the dry zone, thus causing the receding water to collect in the cavity. This activity took place regularly when the experiments were repeated.

Luling came to the conclusion that such a reaction might well be a natural one of Mudskippers which mainly inhabit the mangrove swamps near the mouths of rivers that are exposed to tidal movements.

The digging of these little ditches would help the fishes over any limited dry period such as those caused by low tides.

As Mudskippers are available in this country from time to time it would be interesting to learn whether any British aquarist keeping them has noticed something similar.

Freshwater "Sea-Needles"

AMONG the most unusual fishes both for shape and breeding habits are different species of the *Doryichthys* Pipefishes. Of these, several freshwater species are now being imported.

The well-known German aquarist and fish photographer, Jurgen Grobe, described his experience with several species in the June issue of DATZ. After some losses he found that they required hard, neutral and somewhat brackish water. Grobe added 2 per cent of sea-water to his tank.

These Pipefishes are masters of camouflage and when they float slowly in any direction and position they are almost indistinguishable from branches or pieces of plants.

The food is sucked into their tubular mouth, an action which is helped by an expandable skin fold behind the mouth, near their eyes. They are not easy to feed but will accept *Cyclops*, Brine Shrimps and occasional small *Daphnia*.

Their eggs are similar to those of the Sea-horse and are carried in a pouch by the male until they hatch.

Of the different species Grobe has kept he found the biggest, *Doryichthys flavilatilis*, which comes from Malaya, the most difficult to feed when *Cyclops* were not available, although the South American *D. lineatus* and the Central African species, *Syngnathus pulchellus*, would accept Brine Shrimps when other small food was not available. Worms were refused by all of them.

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BRYANT'S

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Wrexham client writes: *"I use your heaters to heat my tropical aquariums and have had GREAT SUCCESS with them."*

Plumstead, S.E.: *"I've had a model running in my fish house, day and night, continuously for over seven years, and it has never let me down."*

Letters from which these extracts are taken are open for inspection, by anyone at our address, together with 15½ lb. of others, from all parts of the world.

Horsforth client writes: *"Heater bought 1949 is most satisfactory: more effective, better built and less costly than other makes, which some of my friends have bought."*

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continued on next page

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