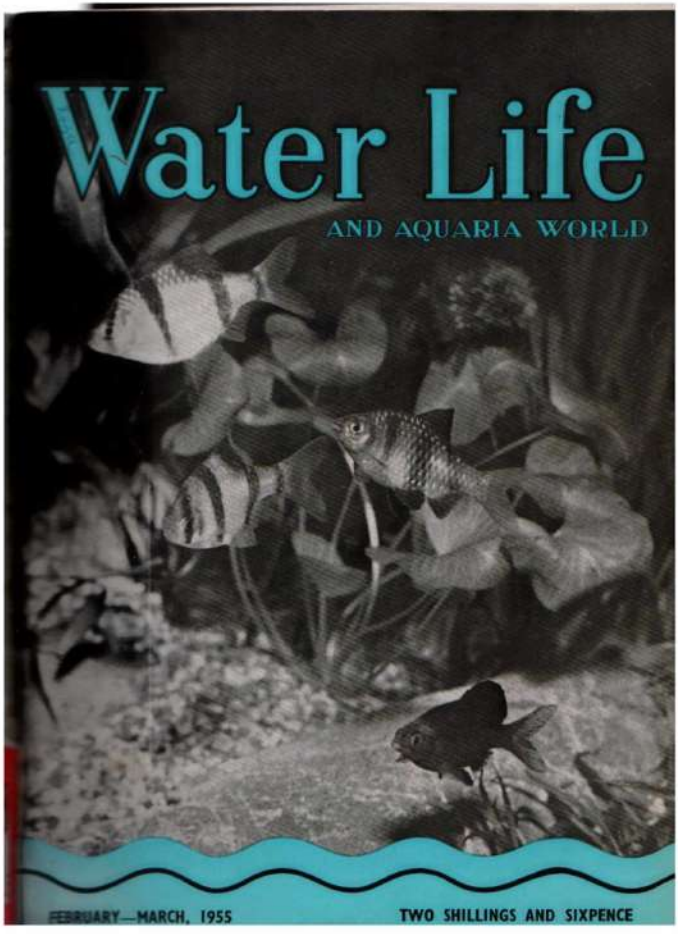
Water Life
AND AQUARIA WORLD
FEBRUARY—MARCH, 1955
TWO SHILLINGS AND SIXPENCE

Water Life AND AQUARIA WORLD

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FRONT COVER: **BARBS FOR BEAUTY.**
In the setting of their second prizewinning aquarium, Tiger and Nigger Barbs serve to remind us that the more commonplace species can hold their own for colour and markings against the choicest of newly-introduced types. The exhibit was set up by Mr. T. Atkinson (Hendon A.S.) at Olympia where the fish showed their colours brilliantly.

Photograph] *[L. E. Perkins*

EDITORIAL

Something to Learn

THERE were several pointers at Olympia last month that the serious fishkeeper should have noted and from which he or she might have received a somewhat salutary lesson. Aquarists in this country have become rather complacent of late and here they had the chance to make comparisons.

The selection of Guppies from Florida shown by Mr. W. G. Phillips, were in distinct contrast to the more usual types shown by the Federation of Guppy Breeders' Societies. We have gone far in getting shape and size. We have a long way to go to get the range of colours seen in American specimens.

Diverse Goldfish Forms

Many were impressed not only by the story told by the Goldfish Society when it displayed some of the many types of Goldfish now to be found, but also by the still more bizarre forms shown by Mr. T. Horeman, which he had imported from abroad. To the G.S.G.B., the very number of the varieties now produced is an anathema, but to the less scientifically minded it was a reminder that the coldwater side of the hobby can compare well with tropical interests for variety of shape, colour and peculiarities.

The aquariums set up in Celebrity Corner were to the liking of some but not all. The brightly coloured quartz in place of the more normal sombre rockwork, gave a new conception of furnishing single home aquariums, but to the aquarist with a more practical mind they were garish.

A Place for Seawater Tanks

Marine aquaria are a neglected branch of our hobby but here we saw some most attractive examples of miniature under-the-sea pictures skilfully conceived by South Bank Aquarium for the "Rare Fishes" corner. The corals and the seawater fishes have an appeal of their own and with a little ingenuity saltwater collections can be introduced and successfully maintained.

To laymen, the 1955 exhibition provided more things to see. To the discriminating aquarist it gave food for thought. It showed the extremes the hobby embraces, whether it be keeping Pearl-scale Goldfish, seawater Scorpion Fish, unusual Guppy varieties or, not forgetting their section, some of the amphibious or land creatures studied by the British Herpetological Society. It also showed us the extent to which we can set off our tanks, as witness the designs employed in the professional aquarists' class and the "picture frame" and "Continental front" motifs used for the celebrities' displays.

The aquarist proper tends to enjoy his hobby within a very prescribed range. If nothing else, the 1955 WATER LIFE Display made it plain that many who keep fish have less conventional ideas. Probably some of us could benefit by being less specialised in our outlook. By introducing a little more colour in our fishrooms we might make them less like fish-breeding factories and more like places which attract our friends and relatives.

False Signs of Spawning Condition

Fullness of Female Fish Can Be Due to Fluid-filled Cysts

By Dr. F. N. Ghadially

LOOK at the female Zebra Fish (*Brachydanio rerio*) in the photograph accompanying this article. A fellow aquarist on looking at this fish in my tank exclaimed "Isn't she full! You wouldn't care to part with her, would you?" He could hardly be described as a novice as he has been keeping fish for at least 10 years, and I wonder how many aquarists would spot the fish for what it really is—a female well past her prime, which will never spawn again.

Photograph [*Dr. F. N. Ghadially*

An elderly female Zebra Fish apparently full of spawn but actually having large internal cysts.

I learned this the hard way a few months after I began fishkeeping. I had bred some of the livebearers and decided that I would try to breed a fairly easy-to-spawn fish such as the Zebra. Like all novices I was in a hurry to get going; the sound suggestion given in the books and by an advanced aquarist that I should get a few youngsters and grow them up myself seemed too slow and not worth considering. Instead, on my visits to aquarists' shops, I picked up two females, like the one photographed here, and three males. Then followed literally dozens of attempts to spawn these fish.

One female died fairly early from unknown causes. With the remaining female, every device known to the aquarist was tried to induce her to spawn and after months of futile effort I suspected that something was wrong, so she was killed and dissection solved, within a few minutes, the mystery which had perplexed me for months. There was no ovarian tissue or eggs present in her and the ovaries were replaced by two large cysts filled with clear fluid.

Cystic change, sometimes called cystic degeneration, of varying degree of severity is quite commonly found in ovaries of senile human females. Such cysts (for there are others which do not fall into this category) do not give rise to any signs or symptoms and cannot be strictly called a disease, they, like the hardening of the arteries, are considered to be part and parcel of the "normal" ageing process.

Development of the Condition

Since that day I have bred large numbers of Zebra Fish and observed some growing old in my tanks and this condition develops in varying degrees quite frequently in old female specimens. It is a practice with many aquarists to get rid of their breeding stock when it is past its prime and has stopped spawning. It is unfortunate when an inexperienced aquarist gets hold of such a fish in the hope of breeding from it.

A large fat female which looks full of eggs but refuses to spawn is often called "egg-bound". The true eggbound female is one which is full of eggs but proves impossible to spawn. This condition can be produced by some obstruction in the oviduct (the tube which leads the eggs from the ovary to the exterior). In such a fish the eggs are retained for too long a period and they ultimately become necrotic (dead).

Another possible sequence of events is that a female fish which has been kept away from the male for a long time retains her eggs too long (sometimes the fish spawn in the absence of a male and get rid of the eggs this way); this is quite commonly seen in female Fighters, or two females may spawn, e.g. Angels, if the eggs are not extruded they become necrotic and once more we have an eggbound female. The necrotic eggs, however developed, may, in time, liquefy and form a cyst.

When a fish suffers from Dropsy it may lead the uninitiated to imagine that it is filling up with eggs. However, as the disease advances and the scales begin to stand out, the condition can be diagnosed quite easily. Dropsy implies the collection of fluid in the peritoneal cavity and is only a sign of some other disease, often a serious one, of the heart, liver or kidney. Fluid collects not only in the peritoneal cavity but also in other parts as the disease advances. It is this collection of fluid (often termed œdema) in the cutaneous tissues (skin) which makes the scales stand up, and not the distension of the abdomen by the fluid collecting in the peritoneal cavity. That distension of the abdominal wall by itself is not sufficient to cause scale protrusion is obvious when we consider that abdominal distension due to other causes, such as filling up with eggs or young, does not cause scale protrusion.

The lesson to be learnt then is quite plain; do not be deceived by a plump female fish, the number of eggs she may lay at the next spawning will not necessarily be proportional to her size. There are other things which can cause fullness in fish besides eggs!

Readers' Hints and Tips

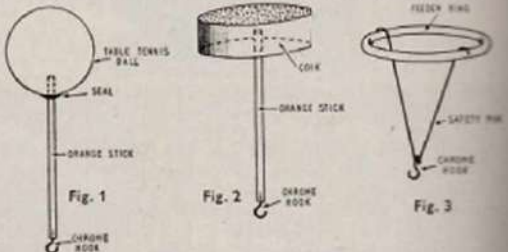
Suspended Feeders

TO add to the many foods available for fish, such items as cooked shrimp, meat, etc., may be suspended by the following method, for feeding to the smaller varieties. It must be borne in mind that the hook in each case should be quite blunt to prevent possible damage.

Fig. 1. A table-tennis ball drilled with a single hole small enough to take an orange stick. This should be inserted in the hole and sealed with a waterproof glue or sealing wax. Into the end of the stick screw a small chromium screw hook.

Fig. 2. The same procedure as for Fig. 1, but substituting a piece of cork for the table-tennis ball.

Fig. 3. A large stainless steel safety pin with the head removed. Bend to go over the feeder ring. A small chromium hook affixed to the ring of the safety pin completes the feeder. It is important that the metals used should be innocuous.—(R. N. Burges, London, S.W.19.)



(10s. 6d. is paid for all published hints and tips.)

Experiment with Wintering Veiltails Outdoors

Hardy Specimens Survive in Pond But Finnage Development Is Slow

By H. V. Lacey
(*Photographs by the author*)

AT the age of ten I was saving my pennies carefully, and counting them often and anxiously, because I had heard of a man who had a secondhand wood-framed aquarium for sale. The long-awaited day eventually arrived. I bought the aquarium, then settled down to some more steady saving until I had enough money to purchase my first Goldfish.

At the time I thought that fish became ill regularly—mine did ! But I believed I was quite a fish expert for I had read little books (which I believe cost twopence), and these explained that ailing fish should be placed into "a solution composed of crystals of permanganate of potash dissolved in water"! My fish invariably came out of this solution keel uppermost.

Besides my excursions into the field of medicine I had some unfortunate experiences in feeding the fish but, as the newness of the hobby wore off, I found that my fish were living longer—a surprising phenomenon—and my father asserted that since I had stopped "messing about" with the fish they at last had a chance of survival. There may be a grain of wisdom here for some over-enthusastic beginner reading these words.

All this took place over thirty years ago and, except for a year or so when I was in lodgings, I have never been without coldwater fish. Orfe, Tench, Carp, Perch, Sticklebacks, I have kept them all, and always alongside these there have been one or more varieties of Goldfish. No longer do I fly to my little tin containing permanganate of potash, for I have found that my fish are quite willing to live if I let them, and my early belief that they just died from spite was quite wrong.

During more recent years I have felt a growing admiration for the loveliest Goldfish of all, that mysterious exotic beauty, the Veiltail. Watching a tank of these masterpieces of breeding, I lose myself in fascination. The exquisite colouring, the rather slow grace of movement, reminds me of ballet in miniature.

The desire to keep Veils. became more and more strong. I read all I could about them and attended a few club talks and discussions. All the literature, all the lectures, brought home to me the fact that I would have to regard a fishhouse as a "must". One speaker at these lectures stated that he regarded his Veils. as tropicals; another said he had read a certain book which affirmed that the author had seen Veils. under ice. This speaker said bluntly that he did not believe it, which was rather a sweeping remark to make.

A New Problem

This talk of sheltering fish went against the grain for I had always believed that light and fresh air, sunshine and rain, heat and cold, were as essential to the health of my fish as they were to my own.

All the varieties of coldwater fish I had hitherto kept had been given the same treatment. They lived in glass fronted aquaria in shady spots in the garden, and were returned to the depths of my pool to ride out the Winter. Sometimes one or two fish would come out of the pool with an odd spot of Fungus but, with the coming of Spring and after a good feed up, I usually found that they were soon on top of the world, and eager to start breeding.

My preference for keeping fish outdoors is explained by the fact that I can use much larger tanks; an extra foot is quite a consideration indoors, outside it does not matter so much. I like to stroll in the garden after work, studying a tank here and there or sitting at the edge of the pool to see what is happening down in the depths of that watery world.

How, I mused, could I tie up the methods I had always used (with some success) with the culture of Veils.? Were they really such delicate creatures, or had they only been made susceptible to low temperatures through generations of coddling ? Could I manage to Winter, outside, enough survivors from which to pick two or three good shapes, just enough to start a strain of hardier Veils.? Should I spread the process over several generations, gradually selecting the toughest, or should I try a more direct short cut.

"Mandarin," a Nacreous fish (pictured when 14 months old) which was successfully wintered outdoors in a garden pool during its first season.

I considered this for over a year. By the end of this period of indecision I had worked out a plan of campaign. I would buy fry early in the year, turn them loose into the pool, feed them hard for a month or so, then have a check-up. After a good thinning out of runts and oddments the best would be given plenty of room in the tanks and really packed with food to build up a good reserve for the Winter.

In March, 1952, I wrote to a dealer in the North of England suggesting that he let me know when he would have free-swimming fry available. His reply, "fry ready middle to end of May", caused me to send off the necessary cash, requesting him to send 100 when ready. I was rather surprised to receive a card during the second week of April advising me that he was sending 50 Veils. and 50 Moors that day. This was rather early, but I had no option. I had not told my dealer-breeder friend that they were going into a pool outdoors !

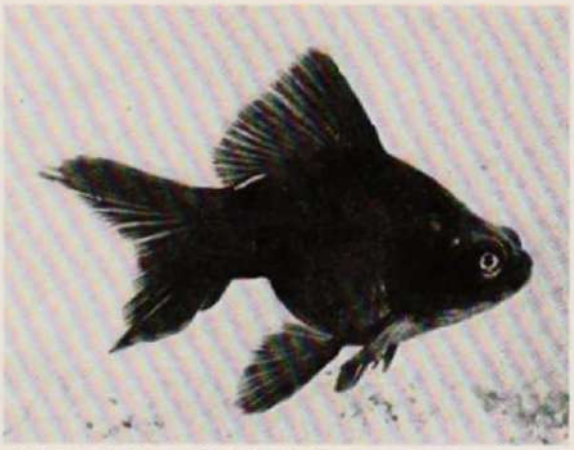
The fry arrived, all alive, and were turned into their new home with my blessing; the temperature of the pool was

58 deg.F. The water was a healthy green, with a fairly high Infusoria count, and I added to it a bucketful of Infusoria water every day, reinforced with hard-boiled egg yolk, oatmeal and a finely powdered invalid food. The fry had been a couple of days in the pool when the weather turned severe; sleet, bitterly cold rain, and a general return to wintry conditions. Tiny as they were, I could see their numbers diminishing rapidly with this change in conditions. The bad weather continued for about ten days and I was really surprised to see an occasional baby swimming around near the surface.

Second Batch Introduced

I sent for another 100 fry and on receipt of this second delivery, put them in the pool to cheer up their brethren. As there was plenty of life in the pool, and as there was about 12 to 14 days difference in the ages of the fry, I held off feeding *Daphnia* for a fortnight after the arrival of the second batch of fry. This may sound odd to those who rear in the more normal manner, with higher temperatures and fast-growing youngsters, but it must be borne in mind that mine were a slower-growing lot, and I did not want to introduce a lot of *Daphnia* to compete with the fry in the hunt for Infusoria. When I did eventually turn *Daphnia* into the pool I added plenty, figuring that the youngsters would be only too willing to do their own *Daphnia* sifting.

Gradually the weather improved. The sun became stronger and I began to see my baby fish grow. I fed them well and often; pulped worms, pulped maggots, finely ground liver, every food I could think of. I would not have dared to have fed so heavily in an indoor tank for fear of fouling the water. I have found I can put quite a lot of food into my pool; the water, being in full sunlight most of the day, is so full of life that it is difficult to foul, however heavily I feed. Clear water is naturally out of the question, but one cannot have it all ways.



A 14-month Moor Goldfish which was wintered outdoors in its first season. It made slower growth than the fish shown on the previous page but its colour was a rich velvet black.

By the beginning of July I was beginning to cheer up a little as I appeared to have some quite promising young fish and I prepared my tanks for an inspection parade. The level of the pool was lowered and all the fish were netted and counted, a mixed bag of 81—rather more than I expected.

By giving away runts and Nymphs I brought the number down to 63 "passables" and "quite goods". From these I selected 18, which were made up as follows:—one very fine brown, red and orange Nacreous fish, a big sturdy fellow which later became the family favourite and was christened "The Mandarin" by my son, thus settling the sex question without further ado. Next, in order of merit, were a really deep-bodied Moor—very promising, two Matts, one pink, the other white, but not very large, and a mixed bag of Metallics and Moors of various sizes, but undoubtedly full of vigour. These I placed in a 50-gallon aquarium. The rest, after due consideration, were returned to the pool.

My feeding programme was designed to encourage large appetites so, after a feed of whatever was on the menu, cooked fish, scrambled egg, chicken liver etc., I would shake in a net of *Daphnia*, mosquito larvæ or other live delicacy to coax them to eat just a little more. My family were continually warning me about the danger of finding burst fish in the tank but fortunately it never happened ! A few of the selected 18 specimens soon started to leave the rest behind and to my delight the Mandarin and my best Moor were amongst those that were doing well, though none was doing badly. My two Matts lagged behind the others rather conspicuously, although they appeared to feed fairly well. Perhaps these Matts worried me most. If I succeeded in bringing my Metallics through the Winter without loss, but lost my Matts, would I be satisfied with a hardy strain of Metallics? I did not think so, but it was too late to start thinking about obtaining a consignment of young fry with a high proportion of Matts at this time of the year. I must carry on with what I had and see with what success I wintered these.

Around the end of July I decided to ask my friend, the breeder, to send me along a fish from his early hatch so that I could use it as a check against mine—a kind of progress comparison. He sent me a fish about 2½ in., a wonderfully coloured Nacreous, cherry red with black splashes. This fish disappointed me—not because it was not a nice one, on the contrary, in a good-class dealer's shop it would undoubtedly have fetched a reasonable price. No, my disappointment in the fish was on account of its advanced development. Here was an immature- very immature-fish with well developed fins, a large spread of tail, in fact with everything which my fish lacked, except—and a very important exception—that big, plump, strong-looking body which most of my commandos seemed to possess. Side by side with the Mandarin, the fish certainly came a poor second.

The most advanced of my own were only just showing the first signs of "sprouting" fins and tail, but I was pleased to note that the foundation tail in most cases was stiff and well formed—plenty of "bone" in the framework. This may have been caused by the calcium in their diet; I had given this factor quite a lot of thought.

Nothing unusual happened through the late Summer and early Autumn, except the passing of my pink Matt. It sickened and went thin and, after a very little nursing it died. Quite early in November I found thin ice on my tanks and, as I was not anxious to find myself with a few breakages on my hands, I emptied them of water, returning the fish to the pool. The specimen purchased from the breeder in July died after this was done as also did my white Matt.

The third week in November brought frost, with ice on the pool getting thicker daily. Snow fell on and off for a week, and conditions were really severe. On the ninth day some ice was broken away and measured; it was 1¼ in. thick. No sign of life below, but the water was very dark anyway so I would not have been able to see even if the water had been packed with fish. The freeze-up ended on the eleventh day and a sudden thaw soon cleared the ice and snow.

During the Short, Warm Spell

For one or two days the sun shone sufficiently strongly to make its warmth felt, and I saw the Mandarin, the largest Moor, and quite a number of smaller Veils, swimming around. I admit to a sigh of relief, although I was aware that there was a long, weary Winter to face before I could breathe freely.

During this spell of Winter sunshine I fed my fish lightly. I saw they were taking food, and as I have always fed in

Winter. I saw no reason to change my methods. There are lots of arguments regarding this Winter feeding. My neighbour, a keen angler, often packs his rods for a few hours fishing in the Winter and, what is more, he does catch fish. The fish must bite before he can catch them, and I think the fish know what is good for them. So I disregard some advice on this subject and feed when they will take it.

While feeding, I was surprised to see, in a small *Daphnia* breeding pool adjoining my fishpool, a fairly large colony of *Daphnia* swimming around. Some were large specimens, others quite small. This was December 12, and we had had a quite severe spell. My conclusion was that these *Daphnia* must have taken cover under an overhanging stone which covers part of this little pool. The observation of small items, like the survival of these *Daphnia*, is about the only contact the pondkeeper has with his hobby during the Winter months.

On March 4, 1953, my tanks had been filled for a fortnight, and I had seen a few shadowy figures moving slowly around near the bottom. Most of the water had been siphoned from the pool and it was time to start netting. In the first netful I found my Mandarin, appearing as fit as ever, along with a few seedy-looking Moors, about whose futures I felt rather doubtful. In all I counted 43 survivors, which I distributed among three tanks for a closer examination. Most of these fish seemed sluggish, with signs of fin congestion and Fungus. The temperature was not sufficiently high to encourage heavy feeding, so I decided that they would get chopped Earthworms as often as they were interested for a few weeks until they showed signs of regaining vigour.

One or two fish found difficulty in keeping an even keel and this condition worsened as time went on until eventually they were killed.

Losses After the Winter

My losses during the next few weeks were rather high. In proportion to the total number, losses were the highest yet, and by the end of April the survivors numbered 21. Fungus, congestion, and various other conditions brought on by weakness caused this rapid thinning of the ranks, but one fact stood out strikingly—the survivors were fish which were inherently sturdy, for most of them just went straight ahead without a spot of Fungus or a trace of illness, even when occupying the same water as diseased fish. One survivor was the Mandarin. This fish never looked back, but went on feeding and putting on weight and, although examined very closely and frequently, not once was I able to find a trace of anything wrong. Unfortunately it had developed a longish egg-shaped body, with a head I did not care for, and fins and tail which showed little sign of progress.

This ability to resist disease after a hard Winter seems to me to be something in the make-up of the individual fish, and I do believe that, from my survivors, I can breed a hardy strain of Veiltails.

Diary of a Pondkeeper

By J. Stott

Let us sincerely hope that this year will produce better weather than did 1954. The Autumn was a trying period indeed, and I know of several aquarists who had their fishhouses damaged by the appalling gales of November and no doubt some pondkeepers did experience difficulties from the same source. In my part of the country October just managed to provide us with two days clear of rain and the ground became completely saturated.

My plans for the Autumn included the making of an informal pool with a rockery background and also the laying of several rock beds. The severe weather which persisted throughout the Autumn set back my programme considerably but, although the pond had to be left over, most of the rockwork was completed. This was made possible by putting to store under cover a fair amount of good loam, coarse sand and leaf-mould in early October. With the aid of this dry material I was able to get together a suitable mixture and, added to the required amount of wet soil on the actual site, working conditions were made possible and satisfactory results achieved. Of course, my new position, a sheltered spot low down on the side of a deep valley, helped to a great extent. By adopting this policy the planting of the alpines and other perennials was made much easier and was carried out during the actual process of building the rock sections.

Many of the perennials used in the pond surround will do better in their first year if they are planted the previous Autumn, because the roots are then given the opportunity to get firmly established before the strain of the flowering period arrives. This applies especially to those species which bloom earlier in the year. If the Autumn planting is missed, however, there is a second chance in the late Winter (if the weather is open) and, of course, the early Spring, but the shorter period of root establishment must be taken into consideration when the flowering season arrives. The results may not be quite so good the first year, compared with those planted in the Autumn.

February is a month which can bring a few surprises with the weather and, in view of this, no chances should be taken by the pondkeeper, however good the weather may be during the early days. If it commences with open weather some useful work can usually be done in the surround, but the prospects of a sudden return to severe Winter conditions should always be kept in mind and structural alterations or construction work involving the laying of concrete is better left over until a later date.

Those pondkeepers who have made use of the early-flowering Spring bulbs in the surrounds of their ponds will,

Photograph] [L. E. Perkins

Crocuses make a colourful splash of colour by the pool in the early Spring.

1954 WATER LIFE INDEX

Stapled in the centre of this issue is a four-page index to features which appeared in the issues of WATER LIFE *during* 1954. *It forms a cross-reference to all articles and special contributions and will allow easy reference to the information contained in these numbers which form Volume* 9. *An index to authors is also included.*

any time now, begin to enjoy the flowers—a welcome sight which helps to relieve the pond's somewhat sombre garb of Winter. Most likely the first to appear will be the Winter Aconites and Snowdrops, quickly followed by the early-flowering Crocus varieties when their patches of rich colour give a promise of the approaching Spring. These bulbs can be a great help to the pondkeeper who wishes to obtain early colour at the pondside but, unless carefully placed, they can, if left in position after their useful flowering period, be a source of untidiness during the late Spring and early Summer. Then their leaves begin to die down and they assume a somewhat dishevelled appearance. By planting in clusters at points where they can be seen during their flowering period but where the foliage is overlaid with the later growth of tall growing perennials of bushy habit, useful cover is formed.

If the surround contains a section of rock bed or garden, dwarf bulbs may be planted in those pockets containing *Cerastium*, *Iberis*, *Alyssum* and the like where the foliage of the Alpines forms a useful screen to hide the old leaves of the bulbs; in fact, they can be pushed under the alpine foliage, thus obtaining even greater measure of concealment.

When sheets of glass or other forms of protection have been used to cover choice Alpines I would not advise the removal of these too early in the month, however tempting the weather may be. February is capable of producing a period in which those very conditions which the true Alpines hate are present. Frost and snow have no ill-effects on these plants, it is the cold, damp and foggy weather which does the harm and especially if the mist or fog is loaded with impurities and pollution due to the close proximity of industrial towns.

I am trying one of the Gentians in the rock surround. It is, I feel, the most beautiful of them all, *Gentiana sino-ornata*, with flowers a deep brilliant blue. One must always remember, when attempting to grow this plant, that it is intolerant of lime, therefore, if local soil conditions are unsuitable, a special pocket must be reserved for it and filled with compost suitable for its requirements. A high rock pocket should be used to guard against possible seepage bringing lime into the pocket where the Gentian is. I am trying a compost containing a sharp gritty lime-free soil well mixed with an equal quantity of peat and a top dressing of lime-free gravel. Although requiring a little extra attention and care, this plant is well worth the trouble taken. It is an Autumn-flowering plant and can be set in April or May or in the late Autumn after blooming. Another calcifuge worth trying is *Lithospermum prostratum*, which also carries blue flowers.

Movement in the Pond

By March the fish in the pond should be showing signs of greater activity, if the weather is normal for the time of the year, and they will be searching for food to satisfy a gradually increasing appetite. For the next few weeks livefood, especially Earthworms, are in particular need in order to build up the fishes' condition after their Winter's torpidity. We should, of course, be on the lookout for Spring Fungus and, if any victims are found which do not quickly respond to livefood feeding, they can be given treatment. I find that the usual sea-salt treatment seems to be improved by the addition of acriflavine to the salt water. Ten drops of a 1 in 1,000 aqueous solution of acriflavine to each gallon seems to be sufficient.

Where Rudd are kept in the garden pond along with Goldfish, it is worth paying particular attention to them at this time of the year because they seem to come into feeding condition at a lower temperature than do the Goldfish and livefood is essential for their welfare as soon as activity commences after the Winter.

Rudd Feeding on Flies

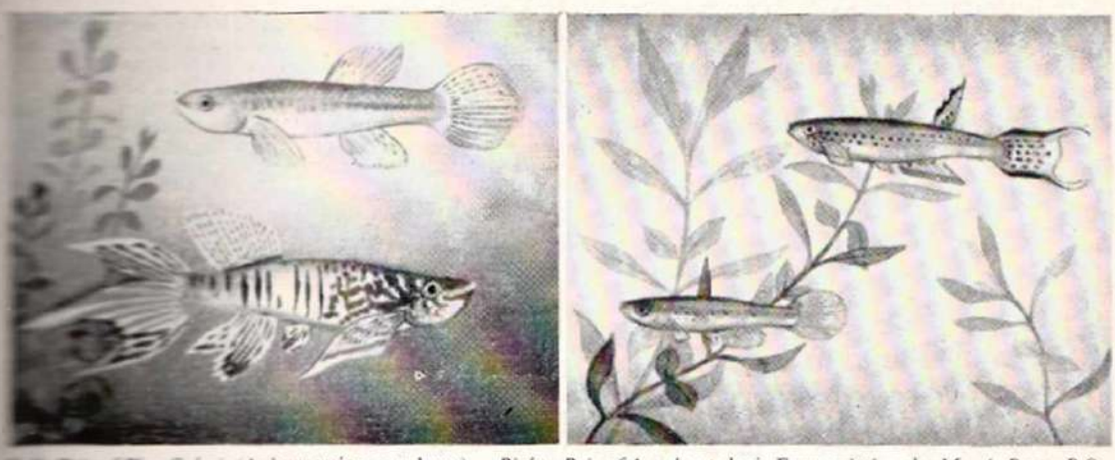
Speaking of Rudd reminds me of the happy hours I have spent in Norfolk watching the Rudd in Horsey Mere jumping to the flies at the surface. They seem almost as adept as the Trout at taking the fly and when in sporting mood I have fished for them with fly rod and line after the manner of trout fishing, with ample success for my efforts.

They make good fish, especially the golden variety, for the ornamental pool. They are extremely active, frequently at the surface where their rich, red fins show to advantage. Another species which is well worth trying in the community pond is the Bleak (*Alburnus lucidus*), for it is active and spends much of its time at the surface once it becomes accustomed to the surroundings and loses an initial shyness after the first few days in the pond. It will take the same foods as Goldfish.

Even during the Winter months it is surprising how rapidly weeds develop in the pond surround so it is advisable to make a point of giving the marsh, rockery and the ground in the region of the pond a thorough clean as soon as possible in March before the desirable plant life starts its full rate of growth. When part of the surround includes crazy paving, pay particular attention to clearing the crevices and remove excessive moss which will, if neglected, interfere with the natural spreading of carpet plants. A little moss left in here and there will do no harm if kept under control and it offers a certain amount of charm to the appearance of the paving. After weeding the crevices, it is a good plan to pack into them a 50 per cent mixture of well sieved, clean garden soil and coarse sand. By the way, there are two species of carpeting plants suitable for planting between paving stones I should like to recommend to those who have not tried them. They are *Raoulia australis*, which has delightful silvery foliage and grows into a compact mat, and *Scleranthus lydium*, which provides a rich, bronze-red foliage. Both like a little sharp sand around their roots.

Photograph] [*L. E. Perkins*

One of the most beautiful rock plants, Gentiana sino-ornata. *Its flowers are large and a rich, bright blue. The species dislikes lime and*



Left: Pair of Blue Gularis (Aphyosemion cœruleum). *Right: Pair of* A. schoutedeni. *From paintings by Mr. A. Bates, B.Sc.*

Tooth-carps of the *Aphyosemion* Genus (4)

By F. Bates, B.Sc.

BEFORE going on to discuss *Aphyosemion* species in the *Fundulopanchax* sub-genus of Myers there is one further species in the *Aphyosemion* Sub-genus. It is *Aphyosemion schoutedeni*, known until fairly recently as *A. singa*, but its true identity has recently been established and it is now believed that *Epiplatys singa*, with which it was confused, has not been available to aquarists.

Whilst *A. schoutedeni* is not one of the most brilliantly coloured of its Genus, it has a beauty and charm of its own owing to elegance of form and delicate blending of colours. The back is light olive whilst in the anterior region the sides are sky-blue which gradually shades into a dull yellow as the caudal base is approached. The sides are adorned with a number of small dull red spots which vary in intensity and which are most prominent at breeding time or when two males are sparring together. The caudal fin, whose marginal rays are elongated as in *A. australe*, is yellow with a number of red spots, while the upper and lower edges are marked by lines of a deep, but bright, red. The same colour scheme is continued in the dorsal and anal fins but the latter has a bright orange-red margin. When viewed in a good light the whole body has a beautiful silky lustre and this, together with the pleasing contrast of light blue in the body with the yellow of the single fins, gives the male a most distinctive appearance.

Difficult to Identify

The female closely resembles the females of *A. australe* and it is rather difficult to distinguish between them although in *A. schoutedeni* the dorsal appears smaller and there is a greater tendency for the caudal to show a darker edge. It is, however, safer to take care that females of the two species are kept quite separate but, if the worst occurs, and one is unable to distinguish the females, one can usually rely on the males recognising their own species.

The male attains a length of 2 in. or slightly more, while the female is a little less. I believe, however, that in the wild state the fish exceeds the sizes given.

General requirements and breeding habits are the same as for *A. australe*, listed in the last issue, but the species appears more delicate and, among the young I have raised, there has been a number which showed spine deformities. This may be due to the fact that my stock could have been from a strain which had been continually bred under aquarium conditions but I understand that freshly imported specimens, much larger than those we have, have recently been received in Germany so we may hope that stock, bred from these, will soon be available.

Fundulopanchax **Sub-genus**

The other species listed in this instalment belong to the *Fundulopanchax* Sub-genus. *A. bivittatum bivittatum* was first described by Lönnberg in 1895 under the name of *Fundulus bivittatus*.

The males, although they lack the brilliant colours of some species, are beautiful fish and there are few sights in the aquarium to surpass that of an adult male with its sail-like dorsal fully spread, displaying before its mate or a rival. Its back is olive and its sides are a pale blue-green adorned by two dark, almost black, lines; the upper one passes through the eye to the upper tail base while the lower one runs more or less parallel to the ventral edge of the fish. The large dorsal is heavily suffused with red and has dark streaks and dots along the rays and a pronounced blue-green edge. The anal is pale blue near the body, shading outwards to pink and this fin has a dark sub-marginal band bordered above and below with pale blue. The caudal, the outer rays of which are slightly attenuated, has a blue lower edge bordered above by a broad red band and this pattern is repeated in the upper part of the tail fin but in more subdued and less vivid shades; the central area is greenish-blue with a few dark streaks and dots. The ventral fins are shaded red at the base and have a light blue edge bordered inside by a dark band.

The smaller female lacks the blue-green along the sides which are of a more yellowish shade while the rounded fins are generally hyaline, although the single fins, particularly the dorsal and anal, may at times show a slight suffusion of red.

This is one of those species in which the males assume a change of colour when in breeding condition, for they then lose the two black stripes along the sides (although vestiges of these markings may remain on the head) while at the same time the blue-green shade becomes more intense. The males show certain individual variations in colour and at times some of these fish are erroneously described as

A. multicolor. In aquarium-bred specimens the males rarely exceed 2 in., while the females are about ½ in. less.

The species has been described by an American authority as a delicate fish suitable only for experienced and skilled aquarists, but in my experience—and this is corroborated by almost all those I know who have kept the species—it is at least as hardy as, and even perhaps hardier, than any other member of the Genus.

Requirements, management and breeding habits and, despite statements to the contrary, the incubation period, are as for *A. australe*.

Regarding *Aphyosemion multicolor*, Hermann Meinken, the German ichthyologist, informed me some time ago that most of the *A. multicolor* offered for sale in Germany were nothing but colour varieties of *A. bivittatum* and the only specimens I have received appear to me to be nothing more than such varieties.

Doubt About Specific Rank

The Blue Gularis, as *Aphyosemion cæruleum* is known, was first described by Boulenger at the beginning of the century but it was at first considered to be a variety or sub-species of *A. gulare*. It is, however, now accorded full specific rank.

This is the largest species of the Genus (a large male attaining a length of about 5 in., whilst the females are about 1½ in. less) and, in the opinion of many aquarists, the most beautiful. It has the same slim cylindrical body as we find in *A. australe* but it has, like all the larger members of the *Fundulopanchax* section, a certain "throaty" appearance. It is this characteristic which gives to the Yellow Gularis its specific name of *gulare*.

The general body colour of the male is a light greyish blue, though along the back there is an olive-brown shade, while there is a strong suffusion of orange extending forwards from the caudal base along the underside of the body. The sides are adorned with a series of irregular red-brown lines and spots in the front part of the body but these give way, in the rear portion, to a number of short vertical bars. The lips are bright blue.

Outstanding feature of this fish is the large bifurcate tail with its brilliant colours and beautiful patterning. The upper portion is blue-green with interrupted purple-brown streaks along the fin rays. The central area is, in the best coloured fish, a bright yellow with orange lines showing the position of the rays which are tipped with black, but in poorer specimens this portion may only appear straw yellow or even cream. The lower and narrowest section is again blue-green with a complex and variable scheme of dark markings. The dorsal fin is blue-green —though at times it appears light brown—with numerous faint dark spots. The large irregularly fringed anal is also blue-green with dark markings and the pelvics have the same colour scheme. The large pectorals are pale blue-green with pale purplish-brown markings and with a lighter margin bordered inside by a darker line. In fully mature males these fins tend to show a long extension similar to that seen in the dorsal and anal of the Lyretail.

The female is the usual olive brown with paler underparts and showing a number of faint dark spots on the body and single fins.

Special Breeding Requirements

This species may be taken as typical of the "soil breeders" and this characteristic demands special consideration in the setting up of the tank, especially as both fish and eggs appear sensitive to exposure to intense light. There are a number of alternatives for setting up the breeding tank, but it should contain water of composition approximate to that described in the August-September issue, although I have used water containing twice as much sea salt as advocated, i.e., 60 parts per 100,000. The tank may be set up as previously described, provided the plants are able to grow along the surface and so provide shade, or the tank may be left bare, except for a thick covering of *Limnobium stoloniferum* (*Trianea bogotensis*) or some other floating plant. Even these plants may be dispensed with if a sheet of newspaper is used to give shade. Another method is to have no sand or peat present, but to employ some artificial fibre, such as nylon, and when the fish have spawned in this, to remove the eggs from it and place them, covered with peat or some such material, in incubation tanks.

Conditioning the Parents

Whatever method is used it is advisable to condition the fish separately for about a fortnight and during this period to feed liberally on livefood. The larger types of larvae, such as Glassworms and Bloodworms, are perhaps preferable but I always remember that the largest spawning I have ever had from this species was from a large female which had been reared and conditioned solely on *Daphnia*.

At the end of this preparatory period the female should be placed in the tank containing the male and, if both are in breeding condition, spawning should take place immediately, i.e., within five seconds of the female being introduced. Under such conditions there is little display by the male, for indeed there is no time for it. He swims over the female, forcing her down to the bottom, where she rests turned almost on her side and, as the male presses down on her, there is a violent quivering and an egg is laid. It has been said that the female buries the egg in the peat or mulm with a flick of her tail, but I can neither confirm nor question whether this occurs.

Spawning Continues Over a Week

Some thirty eggs may be laid in a day and spawning will continue for some seven or eight days but the number of eggs laid daily tends to decrease. The fish should be removed after this period and then the method of procedure will depend upon whether the eggs are to remain in the spawning tank or are to be transferred to incubation jars. Leaving the eggs in the tank entails the least trouble and, for the average aquarist, should give him a satisfactory result, but the method of spawning on some material, from which the eggs can be removed and transferred to incubation tanks where they can be kept under closer observation and control, will tend to give a higher yield.

It is very difficult to see the young fish in a tank which, either by heavy planting or by shading, is rather dark and I have never seen any young before eight weeks after spawning, but the fish seen then appeared to be a fortnight old.

I have, however, heard of young hatching out in four weeks, but am inclined to believe that from five to six weeks is the normal period. Therefore, at the end of this time, even if I see no young, I begin to feed the finest of sifted *Cyclops* and *Daphnia* and, as the young become visible and grow, I increase the size of food provided. If fed in this way they grow rapidly and I have seen Blue Gularis spawning at three months old, but it is probable that fish of twice this age are best for breeding purposes.

Blue Gularis an Annual Fish ?

Since *A. cæruleum* has been said to be an annual fish I have been asked to what age they live, but unfortunately I can give no answer to this as I tend to use fish six months old for breeding and, when the young have grown, use these. I did keep one male, a beautiful fish, until he was over 12 months old and then gave him to a friend, but he soon died, not, however, of senile decay, but of *felo de se*, by leaping out of the tank and I can say that at 12 months he was very vigorous and that I bred from him at that age. I hope to see how long I can keep the species in the future as the longevity or otherwise of the fish should tend to shed some light on its natural habits.

In the last contribution of this series, which will appear in the next issue, I shall discuss two other species in the *Fundulopanchax* Sub-genus and a species in the *Callopanchax*.

Inheritance in Fish (1)

Colour Expectations of Gold and Grey Guppies

By R. J. Affleck, M.Sc.

A FEW breeders who have tried various alternatives of the hit-and-miss method of breeding fish are turning their attention to genetics. Of the numerous technical terms used in this branch of science, "mutation" appears to have a particular appeal and it is not uncommon to hear aquarists claim that five or six mutations have arisen in their stock during the previous month!

It is common knowledge these days that the colour, size, shape, etc., of fish are determined by genes. In the fish these genes occur in pairs and, of each pair, one is maternal and the other paternal in origin. Sometimes a particular character is controlled by one pair of genes while in other cases two, three or more pairs are responsible.

Usually genes are inherited from generation to generation in an unchanged form but very occasionally (with the accent on the very) a gene becomes changed so that instead of the expected character we find something different. This is a mutation and mutations are rare.

If mutations are so rare, how is it that aquarists are misled into believing that they often happen in their strains? An example taken from my own notebook may help to explain.

Two years ago I bought a Grey Pintail Guppy. The pin was much wider than that usually seen in this variety and, being white edged with black, was very conspicuous. This fish was mated with a virgin Gold (Blond) female obtained as a young fish from Mr. R. G. Mealand and which eventually was first in its class at the 1953 Annual Show of the Guppy Federation. All fish in the first generation from this mating were grey in colour and some of the males had pin tails. One of these males was mated to one of the females and a second generation produced in which there were forty-eight Greys and twelve Golds. One of the Grey males was then mated to one of the Grey females and the mating resulted in a third generation consisting of fifteen Goldlaced (Golden) and forty-one Grey fish.

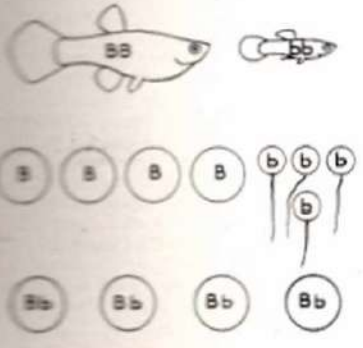


Fig. 2. Mating a male Blond Guppy and female Grey Guppy.

I can imagine readers wondering why I played about with all these crossings and how the Goldlaced fish arose. The answer to the first question is that I was trying to re-arrange the distribution of certain characters. The original Pintail had a very long dorsal fin and so did not conform to standard. In the third generation, however, I obtained some fish with short dorsals and the best fish of this group was first at the recent F.G.B.S. 1954 Annual Show. The Goldlaced fish in the third generation were not the result of a mutation and a little genetics will help us to see why they arose in the strain.

The inheritance of gold (blond), goldlaced (golden) and grey body colour was studied by Professor H. B. Goodrich and others in the United States—the names in brackets being those employed by the professor—but the experiments may be repeated by any aquarist.

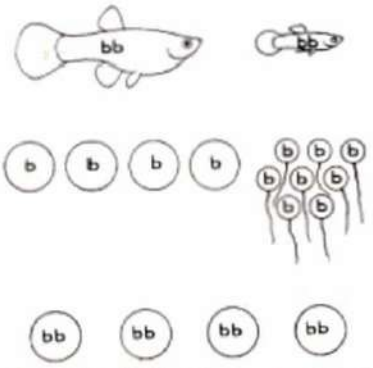


Fig. 1. Result of mating pure-bred Blond (Gold) Guppies. In all diagrams top line represents parent fish; second line, eggs and sperms; bottom line, fertilised eggs.

When a Blond (Gold) Guppy from a pure line is mated with another pure-breeding Blond Guppy all the offspring are blond. Within the cells forming these fish are pairs of genes—in this case called b—which cause the fish to be blond. When gametes (eggs or sperms) are formed the two members of each pair of genes separate so that an egg or a sperm only contains one of the genes being considered.

A typical female produces a batch of 40-80 eggs, while a male produces thousands of sperms. When fertilisation occurs one egg is fertilised by one sperm and after they have fused the genes obviously come together again in pairs. Fig. 1 shows the processes in diagrammatic form.

If we now repeat the experiment, this time using Grey Guppies, the genes we would consider are denoted by B which signifies "not blond". By substituting B for b in Fig. 1 this new experiment would be described pictorially.

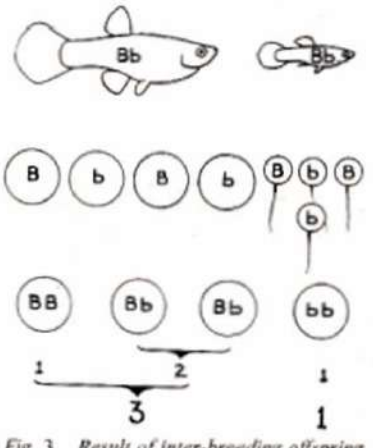


Fig. 3. Result of inter-breeding offspring from Fig. 2 mating. See notes, next page.

Now what happens when a male Blond Guppy is crossed with a Grey female? Well, we proceed as before. The blond will contain pairs of genes bb while the grey will have BB—being "not blond." When gametes (eggs and sperms) are formed the pairs separate so that each sperm will contain b and each egg B. At fertilisation a B and a b

Aquaria and Home Décor

Harmonious and Unique Effect Achieved with a Large Tropical Tank

By Denis Atherton

WHEN it became known that I intended installing a six feet long by two feet deep tank in the living room a fairly brisk opposition was aroused. "It will dominate the whole room," my wife objected, with an understandable regard for the claims to good taste of her furniture. But she was wrong. The plan I had in mind envisaged a tank placed low and in line with the general furniture level. The accompanying photograph clearly illustrates the success of the venture.

I already had the tank lying in a reluctantly abandoned fishhouse. I also had a blank wall in the living room for which no particularly suitable piece of furniture had been found. The idea of solving both problems, spare tank and spare wall, had been in my mind for a long time. It was just a question of mentally solving all the problems involved before suggesting the idea aloud.

When I first bought the tank, as a centre piece for my fishhouse, I had it made to measure with considerable forethought. Unless the depth of a large tank is just right in relation to its length, it can look either long and skinny or short and dumpy. Twenty inches was a reasonable depth in relation to six feet in length with a width of 18 in., I decided, and the finished article amply proved my point. Looked at squarely from the front it shows a satisfying body of water in pleasing proportions.

Weight Consideration

My living room is on the first floor. Before making any move to bring the tank indoors I had to satisfy myself that the floor would safely accommodate the weight—something over half a ton. A local builder who had a hand in the erection of my house expressed himself satisfied with the safety margin and the operation was begun. A stand, 14 in. high, was constructed from well-seasoned pine beams. They originally formed part of the roof of an ancient coaching house and proved as tough as the proverbial old boots. The carpenter I employed to make a professional job of the stand cursed the day he ever set eyes on my pine beams.

Since the tank is glazed with ½ in. plate at the bottom and oversize ¾ in. back, front and sides, extra lifting power in the shape of several willing and hefty neighbours had to be called in. It took six of us to man-handle it up a flight of stairs with two right-angle turns midway.

Once we had it placed on the stand the rest was comparatively easy. Hardboard was used to cover the stand and present a modern built-in appearance. Only the end nearest the adjacent wall was left open to house air pumps, power plugs and the like. In the fishhouse the tank had been on a high stand near the glass roof where it grew plants at a most satisfying rate. Indoors, however, it presented quite a problem in indoor lighting.

Determined on the best, I went right to the top of the tree and consulted a leading London manufacturer with an efficient research department. After some thought they advised, in addition to the 4 ft. 40-watt fluorescent strip-light which I had told them I proposed to use, six 25-watt tungsten lamps to provide essential red of the spectrum not present sufficiently in the strip lighting. Two weeks of this proved woefully inadequate and the tungstens were increased to 40 watts. After a further month's test, when the plant continued to fade away, I reluctantly decided, with due

Photograph] [*R. L. Gardner*

Mr. D. Atherton seated beside his six-feet long aquarium.

Inheritance in Fish (1)

(Continued from previous page.)

will come together in every case. From the fertilised eggs fish will develop and all will be "not blond" (in this case grey).

We might have expected that this first generation (F.1) would have been a golden-grey colour especially as each fish contains genes for both blond and "not blond." By looking at the fish, however, it is obvious that they are all grey and that b has been suppressed or dominated by B. Geneticists say that in Guppies, B ("not blond") is dominant to b (blond). Although the gene b is suppressed it is not destroyed as we shall see when considering the second generation.

Having produced this first generation (F.1), what happens when brother and sister are mated and a second generation (F.2) is produced? As before, when the gametes are formed the pairs of genes separate and this time each sperm will contain either B or b while each egg will also contain B or b. When fertilisation takes place eggs with B may be fertilised either by sperms with B or by those with b. It is a matter of chance as to which type of sperm fertilises an egg but, on average, half are fertilised by one kind and half by the other. In other words, out of 100 eggs with B we would expect 50 to be fertilised by sperms with B and 50 by sperms with b, but we would not be surprised to find that the numbers were 46 and 54 or even 41 and 59. The larger the number of eggs being considered the nearer to the 50/50 ratio we should get. Similarly eggs with b may be fertilised either by sperms with B or with b.

Diagram 3 shows that after fertilisation we should expect to have one lot of BB, two lots of Bb and one lot of bb. The BB's will be pure-breeding for grey, the Bb's will be grey but carrying the genes for blond and so will not be true-breeding, while the bb's will be true breeding Blonds. As the BB's and the Bb's are both grey and cannot be distinguished visually we shall see greys and blonds in the ratio of 3:1.

It is important to note that the genes for blond and grey retain their identity although the blond may be dominated and suppressed when in the presence of grey.

Aquaria and Home Décor

(*Continued from previous page.*)

regard to my pocket, to increase to 60 watts. Eventually, after months of experimenting, I am now using the following method. The strip was abandoned as useless and the tungsten lamps reduced to 40 watts again. The essential difference is that whereas they were originally on for eight to ten hours a day they now burn for at least 16.

This overcomes a major stumbling block, reaching the lower plants in the deep water without overdoing the light on tall or floating plants. It also seems to have a less stimulating effect on the algæ, a problem in a large tank.

The tungsten lamps are mounted on a batten running the length of the tank about three inches from the back.

Only two heaters are used in a room that, in Winter, has an all-night burning fire installed. I find it simple to keep an even temperature, 70-75 degrees, with the use of a small pump and filter unit which lifts water at one end of the tank and passes it out through a rubber tube at the far end, thus creating a thorough circulation. The tank holds 70 gallons of water.

A simple test showed that a complete flow of water took place inside the tank every half-an-hour. This was proved by placing a small quantity of mercurochrome solution into the filter unit and watching the green cloud which presently emerged through the far end of the rubber tube. This cloud spread out and moved slowly through the length of the tank until it reached the filter unit, its starting point, just half-an-hour later. It was rather in the form of a central strata and I estimate that the whole of the water in the tank flows through the filter every 12 hours or so.

Assembled at one end of the tank are four switches which control pump, lamps and test circuit. This latter is an arrangement whereby a small neon bulb, mounted by the switches, shows when the heaters are switched on, via the externally mounted thermostat. If this bulb remains unlit for a suspiciously long time, or the temperature drops without it lighting, I have only to press the bottom switch to discover if a fault exists in the heater circuit. If either heater has failed the bulb will not light.

The tank is planted with a wide selection of varieties in order to discover which flourish best. I have not reached positive results on this point yet since various species seem to flourish at the cost of their brethren at various times.

Last problem to be solved was the top of the tank. This had to be covered in such a way that it was attractive, added to the décor of the room, and yet could still be readily removed. After discussing many alternatives it was decided to have a local metal worker make a lightweight shallow tray that would fit in one piece over the top of the tank with a deep false bottom so that its lower edge coincided with the top of the front glass panel. This gives the impression of only one join in the whole assembly. The tray was at first filled with cacti in small shallow pots, but the heat from the lamps underneath proved too much for them. The present scheme seems ideal. The whole tray is filled with a layer of small pebbles washed out from a barrow load of ballast. Carefully arranged in this are a number of pot plants and ferns to give the impression, as indeed it is, of a deep, green bank. The general scheme can be changed from time to time to achieve various effects. This system involves a little delay in taking the top on and off and a certain amount of additional effort is involved, but we think it is worthwhile.

A little "Aquascaping" in the tank itself provides the finishing touch. Even our most outspoken critics, who predicted only disaster when the scheme was first mooted, are now loud in their praise of the finished article. It adds a distinction to the room impossible to achieve by any other method. No one agrees more than my wife.

Aquatic Plants — *Cardamine lyrata*

ONE of the most unobtrusive submerged plants is *Cardamine lyrata*. Its slender stems and flimsy light-green leaves present a frail and puny effect in the wrong setting, but when correctly positioned they have real delicacy. Near a mammouth Amazon Sword Plant or well-established *Cryptocoryne Griffithii*, *Cardamine* is out of place, but against a background of bushy *Myriophyllum* or modest outcrops of rock just the right settings are provided.

It is a versatile plant, being suitable for both coldwater and tropical tanks although, in its wide temperature range (45-75 deg. F.), the middle compass seems best. Above 70 deg. it tends to grow leggy and, whilst lower temperatures encourage a bushy growth, much below 60 deg. arrests development. Propagation is effected from cuttings, which should preferably be weighted, as rooting in the planting medium (ordinary aquarium gravel is best) is not extensive although further roots are thrown out from the leaf nodes.

It insists on clear water, but a tank which has been set up for a short time is preferable as the water and gravel then have nutrient qualities. Very hard water is disliked, but a good light is needed, preferably with some natural daylight.

Submerged in the aquarium, *C. lyrata* is somewhat out of its environment for in Nature it is a bog plant. However, it reacts quite well to totally submerged conditions and gives the aquarist another leaf form for decorative effect. The individual leaves are approximately round and up to ½ in. in diameter, with the edges slightly indented and undulating. Flowers are small and white.

Propagation from cuttings pushed into gravel is not difficult. Initially, progress may be slow but, once established, growth should be quite rapid. Large bunches of cuttings are not needed as all the individual charm of the species is lost and and it looks merely a stringy, tangled mass. In front of bushy plants two or three sprigs are ideal, but in front of rockwork the cuttings can be planted singly. When they start to grow in the latter position they soften the outline of the rock ideally, having much the same effect as ivy on the gaunt brickwork of an old house.

C. lyrata is of Oriental origin, coming from both Japan and China. The Federation of British Aquatic Societies approves its use in both tropical and coldwater competitive furnished aquaria.

It is a plant which can be dispensed with in many bold furnished tank arrangements, but where the right position is provided there are few alternatives. If the tank relies on varied plant arrangement for its effect *Cardamine* will usually be found a necessity as a delightful representative of the "fairies green" among aquarium plants.

Veiltail Top-minnows *(Pterolebias longipinnis)*

Natural Conditions Provided in Aquaria Involving a Semi-dry Period for the Eggs

By
Dr. E. Meder (Germany)
(translated by Ian D. Cameron, B.Sc., A.M.I.Mech.E.)

WHEN, some two years ago, the *Cynolebias* species were available in Germany again they immediately created great interest. Here, in particular, was posed a problem. How can a fish live in a grass steppe (Argentinian pampas) which is almost wholly dried up over many months? I occupied myself with these fish over a considerable period and by reason of that am able to make some observations which I believe will be of interest. My experiences were later extensively confirmed through a very detailed work on *Cynolebias bellottii* by Enrique E. Boschi, published in a South American aquarium journal.

Abnormal Development

It was shown repeatedly that, without there being a lengthy "almost-dry" period, the young fish did not develop normally in the egg. Since a wholly similar condition appears in *Pterolebias longipinnis* I shall first describe the biological conditions for the *Cynolebias*.

In their natural habitat water pools fill at the rainy season and the young fish slip from the eggs. They go through a rapid development and after a few weeks are capable of spawning. At this stage many eggs sink into the bottom mud. The pool dries out, then the fish die, but the eggs remain undetected on the bottom. Often cracks appear on the dry surface. After a few weeks the development of the young fish is completed, but they remain in the egg and henceforth sink into a "dry-sleep" which is ended after many months when, with the beginning of the rainy season, the pool again fills up with water.

There are many other interesting details to mention. To begin with, the young fish can only escape from their eggs through the influence of bacteria. Due to these they are able to reach the free water, penetrating the emollient clay layer with a twisting movement. They are often embedded more than a centimetre deep. During egglaying the adult fish, usually closely twined together, completely vanish into the bottom mud.

Without the "almost-dry" period the development of the egg is disturbed; from it hatches the so-called "belly-crawler" which soon languishes to death.

In addition, there occur "durable" eggs, and their appearance is noteworthy. Although fertile, they stay wholly clear and development first sets in with the next rain period.

These facts seem to be peculiarly important for the maintenance of the species, particularly at the time when, on occasion, a rain period fails to take place. Although the young fish can remain viable in the egg for a long time, yet, nevertheless, one can accept with certainty that the "dry-sleep" is limited in duration if merely because a differentiated organism places a far higher claim on metabolism as compared to a fertilised egg in which embryonic development has still to begin.

Appeal of the Species

Pterolebias longipinnis, or Veiltail Top-minnow, is a similar bottom spawner. The fish need only be seen once to be appreciated. The males are exceedingly attractive. The broad fan-shaped and fringed tail is particularly impressive and the dorsal and anal fins are also widely spread. The pelvic fins are drawn out into points, lightly nicked behind. While the body is coloured greyish-blue and is overlaid with blue-white obliquely arranged scale flecks, the fins are dark and spotted. The males are 3-4 in. long. The females are distinctly smaller and unpretentious. They lack the fin development of the males and their almost colourless fins have delicate spotting.

A noteworthy observation can be made about the breeding of this species. Whilst the wild fish were greyish-blue there appears in increasing measure with subsequent generations a rust-brown colour. There also appear carmine-red scales in the region of the nape of the neck grouped in places around black pigmented scales.

What caused these colour types to develop after breeding under aquaria conditions? For the most part this question remains open. Without doubt these symptoms must be linked with heredity. It would be very interesting if one could occupy oneself for a time with the genetics of these colour changes. Probably these types exist in the wild population of this particular species, but why do they appear, without deliberate selection, when the species is bred in the artificial medium of our aquariums? This question requires further study but it should be pointed out that a similar colour change from blue and rust-brown to gold is displayed in several *Aphyosemion* species, particularly in the fin patterns. I need only mention *A. cæruleum* and *A. arnoldi*. It is interesting that in each case a bottom spawner is instanced. In view of that, does temperature play a role?

Now it only remains to mention the breeding of *Pterolebias*. It is best if the pair is allowed to spawn in peat. The peat should have been briefly scalded or boiled for a short time and then well rinsed before use; this is on account of the humic acid which is freed to a high degree by boiling. The wet peat containing the eggs is put in glass or glazed earthenware vessels which have been provided with lids. For about 20 days storage at temperatures of about 64.5 deg. F. to 68 deg. F. is sufficient. After this time the peat with the eggs included is poured into a nylon or perlon net and carefully compressed until no more water runs out. Following this, the peat is released and put back into the small brood vessels.

Maintaining the Right Conditions

For a period of 30 to 40 days, the temperature is raised to about 77 deg. F. Over this second period of "brood-duration," which I have designated as the "almost-dry" period, the following points should be observed. Brood vessels are better with lids which are *not* tightly closed. Thus air is admitted to the peat and evaporation of the water is still possible. Never permit the peat to become wholly dried out or the eggs or young fish will die. Also the peat must not be permitted to remain over-moist, otherwise this will lead to a disturbed development of the young creatures. The carrying out of this "almost-dry" period is in no way as difficult as it may appear; one very soon discovers how the peat should be handled during the complete brood-duration. It is also important to label the brood vessel with waterproof marking, stating at least the species of the eggs, the beginning of the incubation period and its probable completion date.

When this time has expired the peat is placed in a larger glass or enamelled container and soft water of a temperature of 68 to 73.5 deg. F. is poured over it. Often the young fish are swimming in the free water within one or two hours. The water with the young fish is then carefully poured

through a fine mesh net and the net is dipped into the rearing aquarium which has been prepared with soft water and a peat filter. Under no circumstances must the young fish be pressed and damaged in this operation.

It is advisable to pour soft water once more over the peat in the larger vessel in order to produce any stragglers which quite often hatch after one or two days. After this the peat rarely contains eggs which would develop within a short period. Actually, if one had the patience and let the peat stay in the water for a few weeks longer (four to five weeks), then more young fish would hatch out, but, generally, one is content with those first born which constitute by far the greatest percentage.

Rearing is not difficult. First of all one gives Brine Shrimps (*Artemia*) or *Cyclops* nauplii with the smallest Infusoria (Mikro). Later small *Daphnia* and Dwarf White Worms and finally *Tubifex* and *Daphnia* can be offered. A peat filter is advisable. The water temperature should be about 68-73.5 deg. F. There are only a few species of tropical fish which must be kept at a higher temperature, about 82.5 deg. F., and these are chiefly the Labyrinths and the surface fish. In the case of the Characins and the layers of adhesive eggs, the temperature should generally be between 68 and 73.5 deg. F. The temperature for the bottom layers, to which group *Pterolebias longipinnis* belongs, is within 66.5 and 68 deg. F. Should these creatures be kept at a higher temperature there comes about that characteristic change of colour from blue to rust-brown or gold which I have already mentioned. I believe that the precise observation of the rearing temperature is of the greatest importance for the development and the sound state of health of our fish. Even to-day this is a point to which most aquarists rarely pay attention.

I think it is by a successful breeding of fish that the aquarist first confirms that his fish rearing has been correctly executed. It is the case that rearing and breeding can never be separated from one another. In every instance we should persevere with the breeding of a fish species until fertile eggs finally result. From this we gain the certainty that we have recognised the relationship of the particular fish species to its environment (to which it is connected in a singular manner) and that we have also succeeded in bringing this cycle of life to our aquariums. This should be the direction of our highest ambitions, namely to maintain living creatures extensively in similar conditions to those occurring naturally.

Mutation breeding, so beloved by some hobbyists, is, I believe, no art, because it neglects the collective organisation of the essential nature of life and limits itself to the fixing of single notable forms. There are many difficulties in maintaining the natural essence of the living organism and, as aquarists, I feel we should strive at all times to comply with the natural conditions of our fish.

Photograph] [*Günter Senft*

Veiltail Top-minnows (Pterolebias longipinnis). *Male is the upper fish.*

Breeding Albino Axolotls

Saving the Eggs — Feeding the Young — Growth Rate — Restricting Numbers for Rearing

By "Natrix"

THE Axolotl is one of the easiest of creatures to keep; so easy and interesting that it should be the means of introducing many people to the hobby of herpetology. Unfortunately this is not so. The name is such a tongue-twister that it puts some off; others just take one look and say "Ugh—what awful things!" and pass on quickly to the tropical fish. At first glance these creatures are not very prepossessing but that in itself can be an attraction. I have offered sixpence to each visitor who would put his fingers in and let the Axolotls have a bite. Assurances that they have soft mouths and are perfectly harmless are of no avail. They resemble crocodiles to the layman and that outweighs any assurances. I have only had to pay out once.

They really are perfectly harmless, live in cold water, require little attention and can be left for a fortnight at a time without food with no ill-effects. They cannot be taught tricks like a dog, but mine stand up on their hind legs against the side of the aquarium when footsteps are heard approaching the tank and this can be mistaken for begging.

I have a pair of Albino Axolotls in a tank 18×10×12 in. kept half full of water. There is an inch of gravel on the bottom, but no plants. It is useless having plants in the aquarium, as they are walked over, pulled up and generally not appreciated. Axolotls are liable to get skin diseases, so the water should be changed regularly, not less than once a month and preferably more frequently, as otherwise their skin may be affected. For food they are given a three-inch worm twice a week.

History Previously Detailed

The history of the Axolotl, which is very interesting, has been dealt with in an article by Mr. Alfred Leutscher, B.Sc. which appeared in WATER LIFE, October-November, 1950, issue.

It is not difficult to sex them. The mature male has a noticeably swollen cloaca, while that of the female is quite small. This is easily discernible. The head of my male is larger than the female's, which, according to all the reference books, is unusual and quite the reverse of normal. However the best method of sexing Axolotls applies also to any other

tailed amphibian. The tail/body ratio of the male is greater than that of the female. With Axolotls the male tail/body ratio is about 5:4, while with the female the ratio is about 1:1. The female also fills out with spawn and it is then much fatter than its mate.

Axolotls are brought into breeding condition in a most improbable way—by depriving them of food for a short period and a drop in temperature. Give them no food for a fortnight at a time and pour in cold water from a jam-jar. This worked like magic with my pair; several times I arrived home from the office to find pieces of jelly floating round the tank; the parents having apparently laid eggs and eaten them. I have never seen their courtship but by all accounts it is similar to that of newts.

Photograph] [Sport and General

The Albino Axolotl—an unusual and fascinating creature, harmless and easy to keep.

As the eggs are adhesive, I thought that they would stick to the glass and gravel and so could be removed, but the parents were too quick for me. The solution is to get bunches of *Elodea* from the pond and put them into the tank, making it hard for the Axolotls to move about. In this way many of the eggs should be saved. Two days after I did this the plants were covered with eggs. They were about the size of the individual eggs of frog spawn, although there was a transparent yolk to them. They appeared to be laid singly or in bunches of about six. More eggs were laid the next day. As they are really adhesive the plants with eggs can be lifted out and placed in another container. In all, my pair laid eggs six times in six weeks.

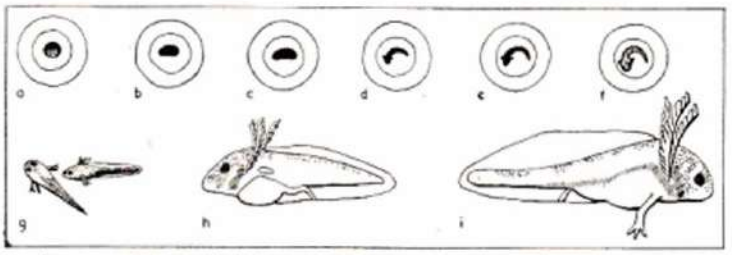
Hatching Period

As will be seen from the résumé in the next paragraph, the eggs took 23 days to hatch, which is average. When the young hatch out they are about 1 cm. long. To me, they appeared too big to eat Infusoria, so they were given newly-hatched Brine Shrimps. These were sieved through silk, and then rinsed in fresh water before being placed in the tank. For three days, although the Brine Shrimps disappeared, I could not see the young Axolotls eating. However, after that, they could be seen doing the usual "Axolotl jump" which is always made when grabbing food—a spring forward and upward. Sometimes they landed on their snouts and balanced there for up to five seconds.

After three weeks they were started on chopped White Worms and were soon growing well. As they grew bigger, whole White Worms were given, and then they were offered small Earthworms. One problem that the beginner finds hard to solve is—are the young progressing satisfactorily? So I have listed below my impression day by day, starting the day the eggs were laid. I have written it down exactly as it appears in my diary. The first day was April 22 and the 110th day, August 10. 1st day, eggs laid. 2nd day, more laid. 5th day, the young in the egg changing shape. 10th day, young shaped like young frog tadpoles. 15th day, growing bigger. 20th day, seem to be getting lighter in colour. 24th day, 10 hatched, 1 cm. long. 27th day, all hatched but cannot see them eating. 30th day, 1½ cm. 35th day, 1¾ cm., red spot visible on left side. 41st day, 1¾ cm., spot on left side becoming elongated. Body growing. 46th day, 2 cm. maximum, 1.7 cm. average. 53rd day, 2.4 cm. largest, 2 cm. average. 56th day, 2.5 cm. maximum. Eating whole White Worms. 57th day, limbs beginning to grow. 60th day, front limbs well grown, but not used. Appear to have only three fingers on each. 62nd day, definitely standing on their front limbs. 3.3 cm. largest, 2.7 cm. average. 63rd day, fourth fingers developing now. 68th day, 3.8 cm. largest, 3.3 cm. average. 74th day, 4.2 cm. largest, 3.4 cm. average. Back legs starting to grow on most of them. Getting more like the adults. 75th day, saw one crawling for the first time. The red spot has now turned purple in colour, is larger and oval in shape. 81st day, fingers on the front limbs growing longer and developing black tips. 87th day, 5.3 cm. largest, 4.5 cm. average. 97th day, 7.5 cm. maximum. 110th day, 9.5 cm. largest.

Importance of Consistent Temperature

Care is necessary when changing the water. Make sure that the temperatures are the same. Later on in life Axolotls love a change of water and within reason are indifferent to temperature change. Once the young Axolotls have grown all four limbs they should be given plenty of space. The rate of growth varies greatly and the largest are very liable to eat their smaller brothers and sisters. This is perfectly natural—the cannibal thriving, growing bigger and faster. When they grow up they often grab and pull at each other's legs and no harm is done, but when young the legs are soft and liable to come away. Let me add that the victims do not appear to be inconvenienced. I have kept a few footless ones and the feet appear to be regrowing.



Development of the Axolotl from the day eggs are laid:—a, 1st day; b, 6th day; c, 8th day; d, 11th day; e, 15th day; f, 22nd day; g, 25th day; h, 53rd day; i, 62nd day. The first batch hatched after 24 days and all had hatched in 27.

Young Axolotls eat a tremendous quantity of food and it is far better to rear a few good ones than to try vainly to rear many. I reared thirty, and this is as many as I could manage to feed satisfactorily.

The young have really beautiful colouring. The purple on the body and the pink of the gills contrast with the mainly white body. As a postscript I should like to add that I am finding little difficulty in disposing of them, and have had a number of enquiries for the stock which I successfully reared from this spawning.

Lionfish
(Pterois volitans)

By Rodney Jonklaas (Ceylon)

Of all the marine fish imported to the Continent, Great Britain and America from tropical waters, the Lionfish (*Pterois volitans*) is perhaps the most sought-after, unusual and expensive, although it is in fair supply.

Contrary to popular notions, the Lionfish is not delicate nor is it rare in its natural habitat. It is, however, not numerous in the sense that the Demoiselles are. Lionfish are encountered in many locations but are never seen in groups sufficiently large to be termed "shoals."

The Lionfish hails from the Indo-Pacific tropical reefs and is common in the South Seas, off the Great Barrier Reef of Australia, off Ceylon where I live, in the Red Sea and on the East coast of tropical Africa. In Ceylon it is popularly known as the Scorpion Fish, due to the poisonous nature of its dorsal spines and its coloration, which is similar to that of the Scorpion Orchid. In Australia it is called the Butterfly Cod, whilst in U.S.A. the more appropriate name of Turkey Fish suits it better.

Lionfish belong to the Family *Scorpænidæ*, which also embraces the deadly poisonous Stone Fish (*Synanceja*) and other tropical and temperate types. There are more than four species of *Pterois* met with in Ceylon waters, but the hardiest, longest-finned and most often found is *Pterois volitans*. *P. russelii* is also very beautiful, but rare and more difficult to keep. *P. radiata* is less attractive and is also very difficult to keep alive.

I collect a large number of Lionfish which are shipped from Ceylon from time to time or exhibited here. They can easily be netted by any amateur in shallow coral lagoons off Ceylon reefs and the smaller they are the easier they are to net. For more specimens, and bigger, better exhibits, I employ skin-diving methods. Lionfish are usually slow-moving and easily taken with a hand-net, using a long handle and gloves as a precautionary measure against getting stung by the spines. The more sophisticated Lionfish, such as those which have survived and eluded the nets of other collectors, become wary and hide their long fins, becoming impossible to net in the spectacular corals in which they hide. For them I have found that a dead octopus or even the tentacle of one is an infallible "persuader". Wave an octopus tentacle near a hiding *Pterois* and it will shoot out of its corner and then succumb to the hand-net! Night-diving with waterproof flashlight enables me to capture the most wary *Pterois* with the utmost ease. In a well-stocked location it is quite easy to obtain as many as 25 *Pterois* per hour by netting them individually while skin-diving.

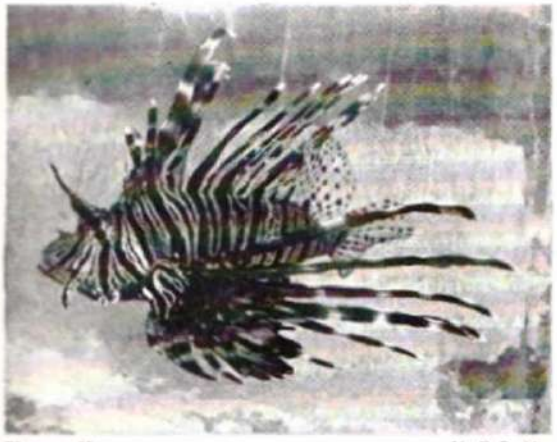
Pterois are hardy and long-lived in a marine aquarium and are perfectly peaceful towards all other fish except those small enough to be swallowed. A hungry *Pterois* will attempt to swallow a surprisingly large living fish, however and, as a result, will vomit out the semi-digested food at night, fouling the water and causing its own death. It is thus wise to feed on small livefoods.

The Lionfish grows to over 8 in., but the smaller ones from two inches upwards are better suited for the home marine aquarium. If given pure sea-water and kept at a temperature of 75 to 80 deg. F. they thrive and become quite tame. *Pterois* is a "gulper" of livefoods though it can be trained to take pieces of fresh fish, prawn or shrimp impaled on a slender rod and wiggled in front of its face. With a grand spreading of its magnificent pectoral fins, it will "mesmerise" even a piece of fish and swallow it by opening its vast mouth and letting the inward rush of water do the rest. No better disposal for runts and unwanted freshwater fish exists than a pet *Pterois*. Feed as many as the Lionfish will greedily eat in five minutes of active chasing and swallowing and do not permit uneaten food to remain in the tank for even an hour afterwards.

Feeding Times

Lionfish prefer to feed in the evening or early morning as they do in the wild. At other times they rest a good deal but once tame will always respond to the owner by keeping close to the tank front and "begging" for scraps of food.

Aeration and filtration are necessary but not indispensable for keeping alive *Pterois volitans*. As it is considered one of the hardier marine tropicals, it can survive a fair amount of mismanagement and live to a ripe old age. Several in the Monaco Aquarium have been there for years. At a temperature of 75 to 80 deg. F. a single *Pterois* can be kept in a 25-gallon marine aquarium without aeration or filtration. Dirt, droppings and debris must be siphoned out every day and at least once a month removal of old sea-water and addition of an equivalent amount of fresh sea-water is most beneficial.



Photograph] [L. E. Perkins

Lionfish (Pterois volitans) *a weird fish for the marine tropical tank. Specimens about 2 in. long are recommended for amateurs.*

If aeration and filtration are provided the fish capacity can be increased and several large specimens can be kept together. Unfortunately their price and scarcity in Western countries do not always permit the average aquarist to enjoy the luxury of owning even one, but the fact remains that *Pterois* is even hardier than the more common Clown Fish (*Amphiprion percula*) and other more popular tropical marine fish imports.

Pterois is somewhat susceptible to marine fish "Fungus", a species of *Oodinium*, which is the marine counterpart of the freshwater White Spot and, if anything, very much worse. The first signs of *Oodinium* are the listless appearance of the fish, faint white dots on the clear fins and a refusal to take food. Immediate treatment is necessary. Immersion in a solution of methylene blue (2 drops of 4 per cent solution per gallon of sea water) sometimes effects a cure. More recent methods involve the use of Brilliant Green and Malacite Green in the same strengths. A grain of quinine bisulphate per gallon of sea-water is also effective. Immersion in the dyes should be brief, and not for longer than a minute, but in the quinine bisulphate solution the infected fish can be left for days until the "Fungus" spots disappear.

(*Continued next page.*)

— Know Your Fishes —

No. 37. Pompadour Fish

(*Symphysodon discus*)

Photograph] [*W. S. Pitt*

Aristocratic is perhaps a little-used term in these see-saw times of levelling up and down of incomes, but for the aquarist to describe the Pompadour Fish (*Symphysodon discus*) as an aquarium aristocrat is no misnomer. Full grown fish have commanded up to £50 a pair, which puts them very much in the upper strata. Let us be under no illusions, the Pompadour Fish is one of the most bizarre of the tropicals, having a rounded body, very much laterally compressed, anal and dorsal fins which follow the contour of the body and emphasise its discoid shape and dignified yet brilliant colouring. All in all, a fish with a fascination made the more intriguing by its comparative rarity, its fickleness in breeding and its cost.

Basic body colour ranges from brownish-red to orange-red or olive. Underparts sometimes show more of the reddish tint. There is dark barring on the sides and generally the bar crossing the eye and the one at the tail base are the most conspicuous. In between these two, and at fairly regular intervals across the sides, six to seven others can be discerned. The head, gill-covers and dorsal and ventral areas of the body have undulating broken lines of blue-green.

In certain respects the Pompadour bears a superficial resemblance to the Angel Fish but both the dorsal and anal fins of the Pompadour lack the extreme elongation seen in Angels and the pelvics, whilst attenuated, are not developed to the same extent. The dorsal is blue-green at the base and red at the edge whilst the anal is similarly coloured but the blue-green body markings tend to extend into it. Pelvics are reddish along the front rays and blue behind. The pectorals and tail fins are clear.

Sexing the fish presents extreme difficulty. Colour is hardly a reliable indication although it has been suggested that the mature male has more pronounced blue markings. The only really effective way of being sure of a pair is to allow a number of young fish to grow up together, when they pair off naturally—an expensive method, this!

Pompadour Fish are particularly partial to *Tubifex*, but can be encouraged to take other livefood. The difficulty is getting them to feed in the first place. A hunger strike is often embarked upon and sometimes tempting with all available foods will be of no avail.

For its size the species is very peaceful and will not molest fish even considerably smaller than itself. Nevertheless, this characteristic does not mean a lot to the aquarist for if he were fortunate enough to have one or more Pompadours it is doubtful whether he would wish to detract from his gem by introducing other species. The only fish with the same leisurely approach to life and similar shape is the Angel and a community of these two would be an eye-catcher. Pompadours sometimes quarrel among themselves but come to no harm.

A fairly high temperature seems best, 75-80 deg. F. being suitable normally, but for breeding 84-88 deg. F. is not excessive. Very few breeding attempts have been successful under aquarium conditions. Off-vertical slate bars are placed in the tank and on these the eggs are laid after considerable play between the parents. The eggs are frequently infertile and, in any case, the fish usually find the flavour to their liking and make short work of them. Consequently, the ova are best isolated from the parents, either by removing the piece of slate complete with eggs to another tank, or by removing the parents and leaving the eggs to hatch in the breeding aquarium. Slightly acid water is preferable and aeration to water near the eggs must be supplied.

The ova hatch in about three days and the fry have remarkably small mouths, so only the finest Infusoria are suitable as initial food. If Infusoria of the right size and type (this latter consideration may be of importance but the exact variety for which they have a preference is not known) are provided, the fish can soon be offered very fine *Daphnia*. Generally speaking, troubles are then over for the youngsters grow apace and in six to 12 months are four inches long. Thereafter, development to maturity, when length is six inches, takes another year or two.

First Pompadours to arrive for aquarists in New York were in 1933, but they were imported alive to Hamburg in 1923 and were exhibited at the Aquarium Hamburg in 1932. The species was first collected in the early part of the last century, though, and was named in 1840. However, it has never been found in large numbers at any one time in its native waters of the Amazon Basin.

As with all fish which catch the imagination, *S. discus* has been given numerous popular names, with Pompadour Fish the most often used and Blue Scalare and Discus as joint second favourites. Class: *Pisces*. Order: *Percomorphi*. Family: *Cichlidæ*. Genus: *Symphysodon*. Species: *S. discus*.

Lionfish (*Pterois volitans*) — *continued*)

Once the treatment has been given the cured fish should be put into a tank of *fresh* sea-water and *not* into the old tank which should be cleansed and sterilised as soon as infection is observed.

It has been noticed that on some occasions *Pterois* start secreting mucus which takes the form of semi-transparent sheets floating about in the tank. The reason for this is unknown; sometimes it takes place when the fish are unhappy and correct living conditions are not given them. At other times, whilst in the best of health, there is a sudden exudation of mucus, most often during the heat of the day at noon.

Even in Ceylon, where *Pterois* are so common, their local price is somewhat high because of the few people who capture them and the poor demand there is for them from local aquarists. In the United Kingdom they fetch such prices as £10 each or a hundred dollars in the United States. It is hoped that soon the price will drop appreciably with the advent of revolutionary air-shipment methods. At any rate a high price for so splendid a fish as *Pterois volitans* is justifiable.

Water—the Basis of Fishkeeping

5. Change of Environment in the Breeding Season

By WATER LIFE Analyst

WATER containing a calcium content of 50 parts per million as calcium carbonate is capable of sustaining a high organic population of animal and plant life, and, even with this mineral salt concentration, such water could still be classified as "soft" in character. Luxuriant plant growth is therefore possible in aquariums containing "soft" water of this character and, because of the abundance of pure oxygen liberated during the daylight hours by the vegetative growth, a heavy population of fish life might also be sustained.

The concentration of dissolved oxygen present in the water of tropical aquaria is an extremely important factor for the maintenance and growth of most of the tropical species of fish; requirements usually being of a high order. Some species of adult fish may not be so sensitive to fairly low concentrations of dissolved oxygen (notably the Callichthyidæ), but during the breeding seasons most tropical fish in the wild seek and spawn in clear unpolluted water in which the dissolved oxygen content would be at a maximum concentration.

The degree of clarity of the water is also important, for suspended matter (silt) is known to have an injurious effect upon the development of the eggs. The oxygen requirements of the eggs of Rainbow Trout (a coldwater fish) have recently been studied*. It was found that the demand was low during the first stage of egg cleavage but increased rapidly during gastrulation movements. The development of the eggs ceased in water deficient in dissolved oxygen content.

Photograph] [*G. J. M. Timmerman*

Male Copeina arnoldi. *This species lays its eggs above the water level and the male parent moistens them by periodically lashing the water with his tail until the hatching occurs.*

Although spawning of tropical fish takes place in the clearest water within the species' range, brooding takes place in water which offers the most foodstuff, commensurate with the high oxygen requirements of the young fish. Thus cleanliness of breeding habitat seems to be an essential factor for the successful hatching of the eggs, and various methods are used by the parent fish to prevent the accumulation of dirt and at the same time to ensure a maximum of exposure of the eggs to water containing a high concentration of oxygen. Thus it would not be unreasonable to suppose that those species which build bubble nests make quite certain that the eggs will be given exposure to the absolute maximum of dissolved oxygen present in the extremely thin layer of surface water in contact with the atmosphere, whilst the risk from contamination by particulated matter that might be present in the water would also be lessened.

Copeina arnoldi actually spawns above the surface of the water, the eggs adhering to the overhanging vegetation are merely kept damp by the male fish violently lashing his caudal fin, which causes a spray of water to reach them. Cleanliness observed by the mouthbreeders, especially with some species of *Tilapia*, is of interest. The sexually ripe fish move out from water rich in organic matter and phytoplankton upon which they feed, to deep clear water, off rocky shores. Clean sandy patches are chosen, and sandscrape nests are made in which mating and egg laying takes place. The female picks up the eggs in her mouth immediately after they are laid and fertilised. In most cases these females carry the eggs for about a fortnight, in the clear open water until the young have almost lost the yolk sac. During this time the females eat very little and become very emaciated. Brooding of the young fish takes place in water much richer in content of organic matter and containing phytoplankton upon which these fish feed.

Role of Oxygen for Livebearers

At first sight it might appear that oxygen plays but little part in the successful spawning of the livebearers. The *Pœciliidæ* (livebearing American Top Minnows) thrive in brackish waters, but breed only in fresh clean waters in which the dissolved oxygen saturation values are higher than those present in the brackish water. Thus easier respiration is afforded to the mother fish during the "gestation period" when she is supplying oxygen from the bloodstream to the growing eggs.

Finally, to those oviparous species which scatter the eggs indiscriminately among the leaves of aquatic plants and then show no further interest, with the possible exception of eating them. Usually the eggs are shed in great abundance and, naturally, those falling upon exposed places within reach of predators do not survive, whilst those sticking upon the leaves of aquatic plants have a much better chance of survival. During photosynthesis the leaves of the plants would afford an ample supply of oxygen to the surrounding water, and to the attached eggs.

It has already been stated that in the wild many of the tropical species of brackish and freshwater fishes change their habitats during the breeding seasons, sometimes having to travel considerable distances. This urge for change of habitat is, of course, not confined to the tropical species alone for it is shared by some of our own native fishes, notably the Salmon (*Salmo salar*). In all these instances of migration during the breeding seasons the movement is away from "eutrophic" water, i.e., water rich in organic silt and nutrient salts and therefore the most likely to become deoxygenated, to "oligotrophic" (little-nourishing) water in which the organic matter and nutrient salt content will be low, and which will therefore have a much higher value for content of dissolved oxygen.

From this it would appear that whilst a sufficiency of dissolved oxygen is needed by adult fishes a much higher concentration is required to be present in the water if the eggs and baby fish are to survive. Thus the transference of sexually ripe fishes from the "show" tank to the breeding tank, as normally practised by the experienced aquarist is an endeavour on his part to simulate natural conditions which the fishes would normally experience in the wild.

*Davidian, C., and Rosenberg, J. C. R. Acad. Sci., Paris, 1953, 237, 1781–1782.

Making Your Own Non-elect

Construction

Club Descri

The actual apparatus which a handyman can construct himself. The basic container is a screw-capped honey jar with the four pipes soldered into the lid. From left to right these tubes are air outlet, siphon tube, header tube and water inlet. It will be seen from this photograph that if the assembly is effected with care the completed apparatus is extremely neat.

Photographs] [*Peter H. Jones*

THE question of whether or not aeration by mechanical means is necessary to keep fish alive in an aquarium has been much discussed. I found that the manner in which I kept Goldfish in a small indoor aquarium, and Minnows for trout fishing in an outdoor tank, required the operation of an aerating device of some kind to keep them alive, so I sought a method of compressing air and introducing it to the tank. For power I decided on mains water pressure, and my method was to use this pressure to compress the air in a container of some kind, and from it lead an air-line to the tank. A means had to be incorporated whereby the container would be emptied automatically when the compressed air had been completely displaced by the rising level of water. This was accomplished by fitting to the container a siphon tube which would allow the water to drain, and a header tube which would allow air to enter the container as the level of water fell away. An inlet for water supply was also fitted.

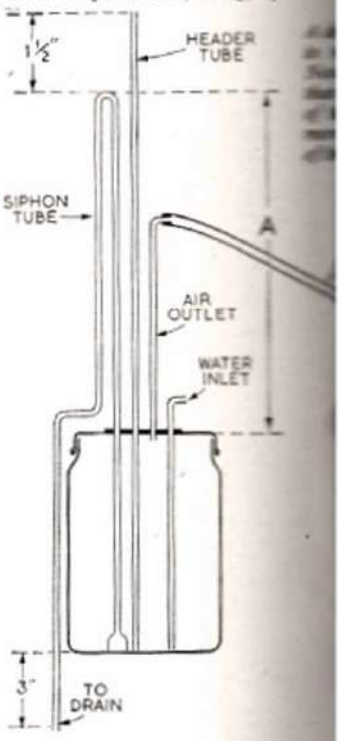
Varying Capacities

The container could be of almost any capacity within reason, and I have found that for most small aquariums of between four and ten gallons capacity, a container of about one pint capacity is most convenient. Being a scientific glassblower, I made my pumps entirely in glass and it was one of these models which I demonstrated in a recent Inventors' Club programme on television, but at the same time I showed one made from a one-pound honey-jar and some brass tubing, and it is this one which I recommend the handyman aquarist to construct for himself at home. All that is required is a few feet of one-eighth inch bore brass tubing and a one-pound, screw-cap honey-jar.

The amount of brass tubing required will depend on the depth of the aquarium which has to be aerated, as the height of the siphon-tube above the lid of the jar must be one inch longer than the depth to which the delivery-tube will be submerged in the aquarium, e.g., if the depth of water in the aquarium is eight inches, then the height of the siphon-tube above the lid of the jar must be nine inches.

Shape of the Siphon

One arm of the siphon will extend through the lid to the bottom of the jar and should be belled out as in the diagram to give a clean break to the siphon action, otherwise it will not operate properly, air and water bubbling over alternately. It would be convenient to drill a hole in a brass thimble and solder this to the end so that the open end of the thimble is about one eighth of an inch from the glass bottom. The other leg of the siphon tube is brought down to the level of the lid, bent at right angles out to the edge of the lid and again at right angles to continue down the side of the jar to three inches below the bottom of the jar. This is about the minimum extension and should be extended still further by means of similar bore rubber tubing leading to the sink or drain. The header tube should now be cut to length and must extend from ¼ in. from the bottom of the jar to 1½ in. above the height of the bend on the siphon-tube, being, of course, as in the case of all tubes, left open at both ends.



The water inlet tube should reach from the bottom of the jar and be bent over at an angle immediately above the lid. The air outlet tube should pass through the lid only enough to allow a good soldered joint and should extend upwards about four inches. To this, will, of course, be connected the air-line which leads to the aquarium.

Inlet Tube

As will be seen in the accompanying photograph all four tubes pass through the lid at one point and have to be soldered to the lid so that all joints are airtight. As it is rather difficult to make a clean round hole in the lid, it will be found much easier to drill four holes in a piece of brass or copper about the size and thickness of a penny, solder the tubes through this and then, with a hole about ¼ an inch in diameter

ctric Aerator

ction of Apparatus Shown on Television's Inventors' escribed Here by its Designer, Mr. Charles Masson

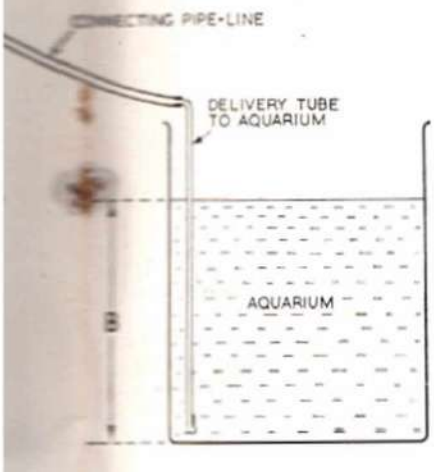
cut in the lid, pass the assembled tubes through this hole and solder the penny-sized disc to the lid. To ensure that a good airtight seal is made, drill the holes in the brass or copper disc so that the tubing is a neat fit in each hole. The four holes should be arranged thus:— with a space of about $\frac{1}{8}$ in. between each hole. Where the tubing has to be soldered it should be thoroughly cleaned by scraping, filing, or with emery cloth. The disc should be cleaned in a like manner on both sides and round the edge, and tinned. Then pass the four tubes through the disc, place them in their respective positions and bind tightly with wire an inch or so on either side of the disc.

Held in Position By Wire

They are thus held tightly in position until the soldering is completed, when it may be removed. See that the disc is at right angles to the axis of the tubes, apply a good flux and with a hot soldering bolt apply the solder to make a well run joint of all four tubes to the disc. Now thoroughly clean and tin the lid around the $\frac{1}{2}$ inch hole where the disc will fit to it. Place the assembled tubes in position and solder the disc to the lid. A small piece of wet cotton wool pressed in between and around the tubes on top of the disc will prevent them coming undone when the outer edge of the disc is being soldered to the lid.

To operate the pump fit the completed lid to the jar to make an airtight seal and install in an upright position above the kitchen sink so that water may be led to the pump and conveniently drained from it.

A detailed plan showing the position of the tubes in relation to the honey jar and aquarium. Note that height "A" should be one inch greater than height "B" and that the bend at the top of the siphon tube should have a radius of not more than one inch. The piece of tinplate at end of the delivery tube is for adjusting air-bubble size.



Alternative Position

Alternatively, it may be fitted above the hot-water system cistern in the loft as, of course, the tiny air-line may be led to wherever the aquarium is installed and is in fact less conspicuous than electric flex would be if an electric pump were used.

Connect the water supply to the water inlet tube and immerse the delivery-tube in the aquarium. This connecting air-line may be any of several kinds of tubing, for example, bicycle-valve rubber tubing or the plastic tubing such as is used for wire installation. It should, of course, end in a rigid piece of tubing immersed vertically in the aquarium. Turn on the water so that the rate of flow is a steady drip of about 100 drops per minute and in a few moments air will start to bubble from the delivery-tube in the aquarium, which is being served.

Being a professional glass-blower, the author was able to make up the above apparatus, but its principle of working is similar to the "honey-jar" arrangement described in this article.

It will continue to do so until the jar is completely filled with water and will then stop to allow the jar to empty by means of the siphon, the siphoning rate being greater than the incoming flow of water. As this is happening air will be drawn into the jar via the header tube. When the jar is empty of water the cycle of operation will automatically restart. At reasonable delivery rate with the pump described air should be delivered for about twenty minutes and then the pump will empty in about one minute, when aeration will continue.

Fixing a Valve

I found it very little trouble to fit at the back of the tap a small needle valve such as is purchased cheaply by model-makers, and took my water supply from this, which did not interfere with the normal use of the tap. It is easily fitted by turning off the water at the main, and drilling and tapping the tap behind the valve to take the little needle valve. I recommend this as it can be delicately adjusted and need never be altered. Mine has been in operation for over two years without attention. It will be appreciated that in oxygenating water with a given amount of air, the smaller the size of air bubbles, the greater will be the area of contact with the water. Do not constrict the end of the delivery tube for the purpose of reducing the size of the bubbles, but fit a piece of tinplate to the end of the delivery tube in the manner shown in the diagram, and by adjusting the space between the plate and the end of the tube, the size of the bubbles may be adjusted within limits.

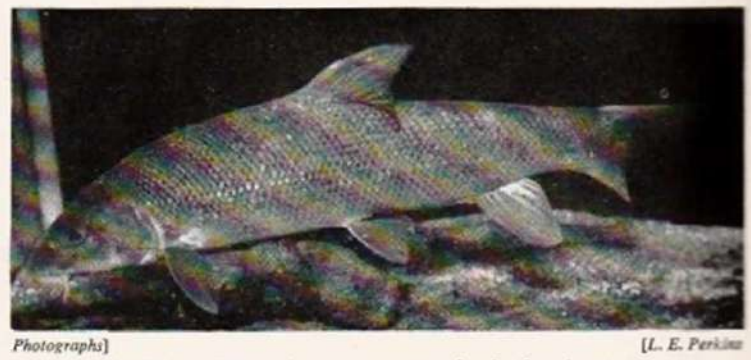
Peculiarity in Barbels

Is the Unsymmetrical Tail Fin a Result of Recent Mutation?

By N. E. Perkins

THE Barbel (*Barbus barbus*) is a comparatively common British freshwater fish found in large numbers in the Thames and Trent, and quite a lot has been written over the years on its habits, structure and gameness as a sporting fish, both by anglers and ichthyologists. I was surprised, therefore, to find that a feature of paramount importance had apparently been overlooked and that drawings had been passed by eminent scientists which were apparently incorrect.

I obtained my first specimen of approximately 1½ lb. weight for photographic purposes and, on placing it in the aquarium, was immediately struck by the unsymmetrical caudal fin and its thickened dorsal margin. Close examination led me to suppose that this was not the result of an accident or past wounds, but that it was a normal feature of the species. Bearing in mind the habits of the fish, this appeared quite a reasonable assumption, since the enlarged upper lobe of the caudal in action would tend to force the head down to the bottom, a position well suited to the ventral mouth and in keeping with the well-developed and sensitive barbels.



Photographs] [*L. E. Perkins*

Barbel (Barbus barbus), *showing its unevenly developed tail in action.*

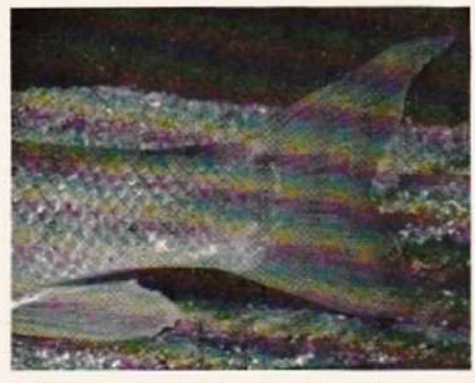
For the benefit of those who have not hitherto interested themselves in the development of the tail in fish, perhaps it would be as well to outline the salient facts. The most primitive form is that known as a diphycercal tail, this being a symmetrical form where the vertebral column is continued to the extremity of the fin, the fin itself being supported by small rays which project equally on the dorsal and ventral sides of the column.

Upward Turn of Vertebral Column

The next development, which again is a primitive form, is that known as a heterocercal tail. Here the vertebral column takes an upward turn and forms the dorsal margin to the caudal, the upper rays having disappeared.

Finally, we have the homocercal tail, common to most "modern" fish. Actually, this fin has been produced by the suppression of the original upper lobe and the development of the lower to form the existing equal lobes. It will be seen from this that the presence of unequal lobes in a near relative of the Carp is of considerable importance.

I examined further specimens and found them to possess the same peculiarity, a fact which presented me with rather a problem, for all illustrations I had seen had always depicted this fish with equal lobes to the caudal. I next examined a specimen at the British Museum (Natural History) but, apart from the fact that it was in poor condition, a repair had been made to the outer margin of the tail which prevented any satisfactory conclusion (the repair, by the way, gave the impression of equal lobes). Preserved specimens seen in various tackle shops did show this unbalanced feature, however.



Tail of a 3½ lb. Barbel. The elongated nature of the upper lobe is clearly visible in this specimen.

Consequently, the position is this:—either the feature has been completely overlooked in the past (which seems inconceivable when one considers the eminent ichthyologists we have had, such as Dr. Tate Regan, together with the interest that such a structure would arouse) or I have stumbled upon the outcome of a recent mutation. If this latter is the correct view, then surely it is a strange coincidence that a change should occur which produces a structure somewhat analogous to the heterocercal caudal of primitive fishes, living examples of which include the Sturgeon and Dogfish. It will, of course, be interesting to see if any of the type exhibiting equal lobes to the caudal can be obtained which, if this mutation is of recent origin, should not prove difficult. Perhaps the skeleton of the unequal caudal together with that of the caudal peduncle will prove of the greatest interest for the junction of the extra strengthening rays on the dorsal lobe will then be visible.

The only other members of this Family to show any sign of unequal development are the Bronze or Common Bream (*Abramis brama*) and the Silver Bream (*Blicca bjærnka*) and here the development is merely a slight extension of the lower lobe, probably to assist in balancing these deep-bodied fish. In the case of the Silver Bream, Tate Regan refers to a slight difference in the lengths of the two lobes but in the Bronze Bream he states that the lower lobe is notably longer. Now, since such differences as do exist in the tails of these fish are comparatively slight, it is evident that he could not have seen Barbel such as I have in my possession without recording their peculiarity.

I should like to thank Mr. Ronald Clark and his father, of East Dulwich, for their very great help in securing a number of these fish for me, thereby proving that this characteristic was no odd freak.

The Editor is not responsible for opinions expressed by correspondents.

HORMONE EXPERIMENT

SIR,—I have been experimenting with sex hormones on my tropical fish but without any very positive or, at least, useful results. One interesting thing has happened, however, which may be worth recording. I had, in one tank, some Blue Eye Livebearers made up of approximately twenty youngsters measuring about one inch long overall and about the same number from a previous brood that were almost adult.

The female parent was withdrawn after the second brood and there had been no male in the tank since the second impregnation. So far as could be seen, none of the youngsters was a male. All looked typical females and none of the larger ones was gravid.

In an idle moment, I dropped one tablet of methyl testosterone into the tank and it was nibbled at immediately by all the fish. Two days only had elapsed when every one of the younger fish had developed gonopodia and all the larger ones showed a thickening of the bottom ray of the anal fin as if they, too, were changing sex. They were, moreover, all much more slender than before, but remained very lively and feeding hungrily. For all this to happen so quickly is interesting and I am going to watch their development carefully. I wonder if any other readers have had similar results with methyl testosterone?

L. F. M. BAKER.

Burnham-on-Sea.

EFFECT OF AUREOMYCIN

SIR,—I read with interest the Current Research notes in your December, 1954, issue describing the effect of aureomycin on Guppies, the more so as the results reported agree in principle with my findings in regard to certain antibiotics. Perhaps you will permit me, however, to point to two matters on which one might ask for confirmation.

First, regarding the amount of aureomycin administered, this, at 20 per cent of the total food intake, is a gross overdose and well in excess of what is considered to be a poisonous level. I should say that the interference with digestive processes and with general metabolism of such an enormous dose would effectively mask any possibly beneficial action of a more reasonable treatment.

Secondly, in reference to the tables of weights, I recently killed and then weighed (fresh weight) six newly-born Guppies of normal size and found that the average weight was 18 milligrams. Unless an unusually dwarfed strain of fish was used in the experiments one cannot help viewing with some misgiving the statement that at six months of age the fish treated with aureomycin were of 35 mg. weight only.

Romiley, L. WARBURTON, Ph.C.
Nr. Stockport.

SIR,—I was more than interested in the abstract from the paper published on the effect of aureomycin on Guppies. The findings of a "profound and depressant action upon growth" does not in the least agree with my own experiments upon feeding this antibiotic to Goldfish kept under tropical conditions.

But then, of course, I do not feed with such a high concentration as 20 per cent. At such a strength, it would not in the least surprise me if elephants had been found in the tank, instead of the poor, starved Guppies.

Addington, EDWARD L. TELFER
Surrey.

SELECTIVE FIN ROT

SIR,—With reference to Mr. L. Warburton's letter on Fin Rot in your December issue, is this not the old enemy to which Tiger Barbs are especially prone? I remember listening long ago to Mr. Russell Holland giving a lecture in which he gave a cure. Most of us who have kept fish have experienced Fin Rot in this particular species.

I am surprised that your correspondent has only just found this disease and is ready to say at once, as if it were something new, that it is a bacteriological infection of the bloodstream. Can I offer him the cure? Change the water when the fish are growing, especially when they are in the fry stage.

Harrow, J. CORVELLI
Middx.

TADPOLES DEFENDED

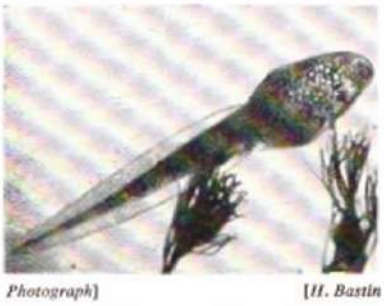
SIR,—As a herpetologist, I was interested to read the correspondence about tadpoles attacking fish. However, I raise an objection to the use of the word "attack". Tadpoles are either vegetarian or scavenger and will feed on plants, dead animals and decaying matter. They do not hunt their prey in the accepted sense.

In cases where fish are involved, these are probably sick to begin with, or sluggish, and the tadpoles find them by accident. With such toothsome meals offered to them, they will set to and dine. Tadpoles do not usually kill fish directly but scrape away the mucus and part of the skin, allowing disease like Fungus to enter.

The remedy is to keep only healthy fish, not to cramp them in close quarters and to give tadpoles as food sparingly. This is where the tables are turned. The tadpole is one of the staple meals in any pond. There is one danger, however, since toad tadpoles should never be offered. They have poisonous qualities which affect some fish and newts. Toad tadpoles hatch out of strings of spawn and can be recognised by the tip of the tail which is rounded. Frog tadpoles hatch from clumps of spawn. Their tail-tip is more pointed.

ALFRED LEUTSCHER, B.Sc.

Wanstead.



Photograph] [H. Bastin

Tadpole of Common Frog (Rana temporaria) *at intermediate stage of growth.*

LOW VOLTAGE LIGHTING

SIR,—I have tried Mr. J. E. Edwards' idea of low voltage lighting for over six months and I have found it to be extremely satisfactory. Plant growth, particularly of the Cryptocorynes, *Cabomba* and Ambulia (*Limnophila*) has to be seen to be believed.

One 36-watt, 12-volt, lamp on a 24 × 15 × 12 in. tank is ample illumination and the intense white light shows the colours of the fish to great advantage. The only problem I experienced was with the bulbs overheating in the enclosed type of shade but this has been satisfactorily overcome by providing extra ventilation.

Bitterne, H. J. GILBERT
Southampton.

SIR,—Mr. S. C. Fudge's further letter on the above subject (December issue), does not detract from the validity of my criticism of his former contribution to the discussion (August issue), in which he stated: "The tanks should always be well earthed. If a mains bulb is connected in this earth lead . . . . etc." An earth lead must have a sufficiently low resistance to ensure that exposed metal never reaches any appreciable voltage, whereas the mains bulb will not light until the voltage is considerable. Again, an earth lead should be virtually indestructible, but a defective lamp might mislead one into thinking the tanks safe when they were actually "live."

Mr. Fudge's recent letter, however, contains the following: ". . . . the earth indication lamp which I use in rooms with dry floors and non-earthed surroundings . . . . etc." Now this is quite a different kettle of fish, being descriptive of the entirely legitimate use of a warning device with an *unearthed* system in an earth-free situation and it is not surprising that Mr. Fudge's friends of the B.E.A. do not object to it. It would, perhaps, be more informative to have their opinion of his original suggestion, viz. that tanks can be well earthed through a resistance of several hundred ohms.

It thus becomes apparent that, despite his contention that tanks should always be well earthed, Mr. Fudge employs an

Cœlacanth Nomenclature Corrected

Specimen Caught in 1952 an Injured *Latimeria*

Model of a Crossopterygian Fish

Left: Photograph by E. R. Nicholls showing Mr. P. R. Chapman of Hendon with his life-size model of a Cœlacanth. The pectoral and pelvic fins of these fish have stout bases, making them look like primitive limbs. There is a strange "lobate" tail and the throat is protected by plates of "armour". Right: Photograph by L. E. Perkins showing the model as it was displayed at the Aquarium London.

SCIENTISTS, especially palæontologists, the world over were greatly interested in the catch of a Cœlacanth fish in 1952, particularly when Professor J. B. L. Smith of Rhodes University who examined it described it tentatively as *Malania anjouanæ*. We suggested in WATER LIFE (February, 1952, p.34) that the validity of the name depended on whether it was preoccupied and it is now known that the specimen is not, as was first thought, a new species demanding new nomenclature but a *Latimeria* similar to the specimen caught in 1938, identified as a crossopterygian fish and called *L. chalumnæ*. Injuries to the fish (for example, the supplementary tail fin and the anterior fan-like dorsal fin were missing but there were indications that the fish had been injured at those two points at some early stage in its life) had been mistaken for new characteristics which led to the conjecture that it was a different member of the sub-class *Crossopterygii*.

Since then, four more specimens have been caught off the east coast of Africa and an actual cast of one taken near Madagascar early in 1953 was loaned for some weeks to the British Museum by the Museum National d'Histoire Naturelle (Paris). In the meantime, a model Cœlacanth (*Latimeria*) appeared at the South Bank Aquarium, London, S.E.1, and visiting aquarists recognised it as the one exhibited at a London show. Photographs of the model were sent to Professor Smith and to Dr. E. White, D.Sc., F.G.S., the fossil fish expert at the British Museum (Natural History). Both commented on it favourably, the former suggesting slight modifications to the teeth and to the scales, to show the tubercles that were present. These alterations were made. The model was constructed in 1953 by the then vice-chairman of Hendon A.S.

New Facts Recorded

Some interesting new facts about Cœlacanths have been contributed by Professor J. Millot to the scientific journal, *Nature*. One theory which he describes as attractive but later considered not to be tenable, is that the Cœlacanths which inhabit the steeply sloped basalt rocky bottoms round the Comoro Islands flourish in the upwellings of fresh water which come from underground streams draining rain water from the Islands through the sea, well below the sea's surface.

Living Specimen Caught

Reports that a live specimen had been caught off the Comoro Archipelago were circulated a short while ago. It is hoped to keep it alive to study its habits and food requirements.

Readers' Views—*continued.*

uncarthed system. The most important point that I wish to make, however, is that should Mr. Fudge measure the resistance between an underwater fault and the frame of the tank, as I have, he will find that it is normally sufficient *to prevent a mains bulb connected between frame and earth from lighting* in the event of such a fault.

Mr. Wildy (also in your December issue), very properly brings us back to the subject in hand by pointing out where the proof of the pudding lies. For my part, I find that mains lighting at 25 watts per square foot gives me healthy fish, ample vegetation, a clarity of water which often evokes favourable comment, reasonable lamp life—and no complications.

It is gratifying to note, albeit with tongue in cheek, that Mr. Wildy, while decrying the technical approach, has deferred to it to the extent that he has installed a transformer in order to obtain a reduced voltage, thereby lending welcome weight to one of my (purely technical) suggestions for the modification of the series arrangement proposed by Mr. J. E. Edwards.

Faversham, C. W. THOMAS
Kent.

ALBINO TROUT

SIR,—As a member of a school party, I visited Thoron-les-Bains, which is a small town on the French side of Lake Geneve, and where there is a trout breeding establishment known as "Pisciculture de Thoron". Although members of the general public are not usually admitted, the party was shown round the place as a special favour.

In Thoron, they are carrying out research on the trout of the lake and the mountain streams, and from the ordinary "rainbow" variety they have produced black and albino types. Thoron, we were informed, is the only place in the world where albino trout are kept for research purposes.

When we had seen the fine trout swimming vigorously up and down their ponds we were shown round the breeding house. The trout are stripped and the eggs put into wooden trays with perforated zinc bottom; these float so that the eggs are kept just under the surface of the water. When the fry have hatched they are put into immense concrete tanks, where they grow rapidly on their diet of meat obtained from a local abattoir. We were very much impressed by the cleanlinesss and accurate records of this hatchery-cum-research station.

Waterloo, D. BEATTIE
Liverpool, 22.

FASTIDIOUS PIKE

SIR,—I was interested to read Mr. H. A. Pettit's article on "Pike for Aquaria" (December issue) for I have, at the moment, a five- or six-inch specimen taken last Spring in a six-inch net. Lest this excites comment, I should explain that when caught it was only three inches long and inexperienced, otherwise it would have escaped.

It settled down after it had been delousued. Feeding problems then loomed ahead, necessitating early morning expeditions in search of small fishes. I gave these up, however, after I found that it was consuming as many as thirteen one-inch Rudd between breakfast time and lunch. I then tried worms, but the fish ignored them; next, *Daphnia* and it deigned to swallow them; *Corixæ* and *Notonectæ*, whereupon it turned its back, permitting the Backswimmers to use its body as a landing stage; *Aselli*, which were taken into its mouth and immediately ejected, and *Gammarus* that were eagerly snapped up.

Then I made the discovery that one of my ponds contained Newt tadpoles. I dropped one into the tank and watched. The fish moved so fast, I could not follow it but the tadpole did not reach the bottom of the tank and the Pike moved its jaws as though munching. Tadpole after tadpole were offered and none was in the tank for more than a few minutes. For some weeks afterwards I fed it on nothing else and it always seemed ready for more.

This is in such contrast to Mr. Pettit's experience that I thought it worth mentioning. I might add that the pond from which I took the Pike swarms with Rudd but I have never yet seen a Newt in it, so when first offered to it, the Newt tadpoles could not have been recognised by the fish as a staple item of its diet.

Ilford, C. E. C. COLE
Essex.

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Current Research

Administering Sex Hormones to Guppies

By Alastair N. Worden, M.A., B.Sc., M.R.C.V.S., F.R.I.C., M.I.Biol.

THE Guppy (*Lebistes reticulatus*) and other ovoviviparous Cyprinodont fish are, of course, distinguished by a conspicuous disparity between male and female characters, or sexual dimorphism. Earlier work by Dr. Myron Gordon and his colleagues have demonstrated that in *Xiphophorus* (*Platypoecilus*) *maculatus* and *Xiphophorus helleri* the potentialities for most of the secondary sex characters are present in both sexes, and may be manifested by appropriate hormone treatment, i.e., the male characters may be brought out by treatment with male hormone, and the female characters with female hormone.

Inducing Secondary Characters

It has been shown by other workers that in the case of *Lebistes*, male secondary sex characters (gonopodia and male coloration) may be induced either in young sexually undifferentiated fish or in mature females by the injection or feeding of male hormones (androgens). Female sex characters (gravid spot, general body shape, larger size), however, while they may be produced in sexually undifferentiated fish by the injection or feeding of female sex hormones (oestrogens), cannot be so induced in mature males.

In a recent study published from the University of Southern California, Dr. [illegible] (*Journal of Experimental Zoology*, 1954, 126, 1-15) administered sex hormones to *Lebistes* by injection, [illegible], feeding and by suspension in the aquarium water. The greatest and most rapid effects upon secondary sex characters followed from the use of male hormone or androgen in the form of methyl [illegible]. Adult females to which the male hormone was given developed the male characters in the same order of [illegible] as that observed in the normal development of their male siblings. In all [illegible] the first change was in the modification of the anal and pelvic fins, and this was followed by the development of typical male coloration. The prolongation of the dorsal and caudal fins occurred only when the transformation to male coloration was nearly complete. Microscopic studies confirmed that, both in normal male development and in the [illegible] changes induced in the female siblings, the same caudal rays and no others were prolonged in each group of fish.

[illegible] Time Sequence

[illegible] females of various ages were found to be very similar in the time sequence in which the various male characters developed. Transformation of the anal and pelvic fins commenced about [illegible] after the beginning of treatment with [illegible]. It is of interest to compare [illegible] observations on the [illegible] of secondary sex characters in normal, untreated male fish of the stocks [illegible].

[illegible] the [illegible] condition of the anal and pelvic fins is modified so that a [illegible] is apparent at about 45 days [illegible]. Then the male colours develop in a definite sequence, beginning on or [illegible] day according to the [illegible] of fish. Typical mating behaviour generally commences shortly after the first appearance of male coloration. Finally, characteristic elongation of the dorsal and caudal fins begins to appear at about the time the male coloration is fully manifested. In one group of wild-type males, the natural sequence of colour markings was as follows:—

(1) Black marks in the dorsal fin and black margins on the upper and lower edges of the caudal fin.

(2) Three pairs of bilateral, black spots, as follows:—
   (a) on the upper abdomen just below the dorsal fin;
   (b) along the mid-line at the level of the anus;
   (c) on the upper caudal peduncle near the base of the caudal fin.

(3) Red or yellow ventral edge of the caudal fin.

(4) Three pairs of bilateral orange spots, two in the upper and one in the lower caudal peduncle.

These markings appeared on successive days, or at a few days apart, except for those noted under (2) and (3) above, which appeared concurrently. At various times subsequently, a few additional colour markings were noted, but these were not consistent among the group.

The feeding of large amounts of female hormone to adult male *Lebistes* did not produce any detectable change in secondary sex characters, a finding which confirmed those of earlier workers.

Surgical Removal of Thyroid Gland

Although the Dogfish, *Scyllium canicula*, is somewhat outside our normal range of species, it is nevertheless of interest to record that Dr. A. J. Matty, of the University of Nottingham, has successfully developed a technique for the surgical removal of the thyroid gland in this fish. His results, published in the current issue of the *Journal of the Marine Biological Association of the United Kingdom*, 1954, 33, 689-697, show that successful survival of the fish occurred. Lack of the thyroid had, however, no apparent effect upon the animals' oxygen consumption over a period of six weeks, whereas experiments with rats showed quite clearly that Dogfish thyroid had the same effect upon increasing oxygen consumption as mammalian thyroid. It seems, therefore, that the thyroid gland in the Dogfish must have some role other than that of increasing the oxygen consumption, and possibly it is concerned either with reproduction or with growth and maturation.

From Continental Journals ***By H. O. Munro***

Puffers as Aquarium Occupants

AS Puffer Fish of various species are becoming available in this country, Mr. P. Chlupaty's experiences with these rather unusual fishes might be of interest (DIE AQUARIEN-UND TERRARIEN ZEITSCHRIFT (DATZ), November issue). He has kept three species of Puffers in his tanks. *Colomesus psittacus* is a native of Northern Brazil and Guiana. Though in its natural habitat it is used to brackish water, the species adapted itself very well to tropical freshwater conditions. It proved peaceful and very attractive with black and white spotted pattern and iridescent green eyes. On a diet of Earthworms and water snails, which were cracked easily with its strong "beak," the fish owned by Mr. Chlupaty grew in 18 months from ¾ in. to almost 5 in. When it inflated itself, which it did occasionally without any apparent reason, it was done by swallowing not air but water, whilst swimming near the bottom of the tank. Unfortunately, the author does not give any details about the qualities of the water in his tank.

A second species kept by the same writer is *Tetraodon schoutedeni*, a native of the Congo area and a definite freshwater fish. It is yellow with dark brown spots and a red eye. Peaceful to other kinds of fish, specimens seemed to fight among themselves a great deal without doing any damage. Their main food consisted of small snails as well as *Tubifex* and *Enchytræ*. They did a great deal of damage to the plants, though Mr. Chlupaty never saw them actually eating plants. Temperatures of 73 to 77 deg. F. seemed to suit them best.

Finally, there is *Tetraodon fluviatilis*, the Puffer from India. It is rather similar to the last named though far more lively and also more aggressive. It was always ready for its food and literally punctured all plant leaves.

I HAVE just read a report about a new small *Corydoras* species which has been imported to Germany by Aquarium Hamburg, the well known firm of importers. *Corydoras cochui*, which was first discovered by Mr. F. Cochu of Paramount Aquarium, New York, in 1953, comes from Rio Araguaia, in Brazil, and is a definite dwarf with a maximum size of 1 in. General body colour is light brown with an irregular black band from the eye to the tail and a number of square black marks on the head and back. The whole of the lighter parts of the body have a golden hue. All fins are transparent with rows of small spots on the caudal fin. The new species gives a rather checkered appearance and has therefore been called "Schachbrett Wels," i.e., Checker Catfish, in Germany.

Similar Habits and Needs

In its general habits and requirements *Corydoras cochui* does not vary greatly from the more common *Corydoras* species. Mr. U. Friese, whose report in DATZ, December, 1954, issue, I have before me, noticed that the little newcomer never comes to water surface for air, though his fish of this species love to swim up and down the glass sides of the tank. The new dwarf Cats. are very lively all day and search the floor of the tank incessantly for food. Their small size is a great advantage as they do not stir up the sediment in the tank. Let us hope that they will soon be available in this country as a welcome addition for all "cat" lovers.

Timothy—the Pet Alligator

WHEN walking down a garden path in this country, one hardly expects to stumble over an alligator which, moreover, is so tame that it refuses to move aside. It would be even more surprising to find it curled up in the drawing room hearth like any fireside pet.

Yet this is the contented lot of Timothy, a Mississippi Alligator, which now lives at the home of Mr. Lionel E. Day, F.R.P.S., A.I.B.P., A.P.S.A., the well-known photographer.

Actually Timmy belongs to Mrs. Day, who first had him nearly four years ago. His story really begins in the far-off Mississippi valley, where he was caught as a year-old baby about 20 in. long. Because of the dollar restrictions he came to England in a roundabout way. From his home in the swamps he travelled north to New York, was then flown across to Vienna, and so across Europe to England, where he finally landed at Heston Airport, close to London.

This was four years ago. Timmy is now four feet long and growing steadily. He conforms to the average rate of growth in young alligators, which is about a foot every year. His life at Westcliff, Essex, has settled into a well-defined routine. All Summer he spends in the garden, free to roam and do as he pleases. Actually he rarely strays, and spends most of the time sprawled out on the warm flagstones which border the garden pond. This latter measures 12 ft. ×6 ft. and is 3 ft. deep. It now belongs exclusively to Timmy whereas at one time it was the home of Goldfish.

Livefood is given regularly to the alligator in this pond where, strange to say, there are some of the original Goldfish, recognised by Mrs. Day, which are never touched.

As evening approaches Timmy slides noiselessly into the water and settles down for the night. Next morning he is back again as soon as the early sun reaches the flagstones, having crawled out by means of a series of bricks arranged as steps. Humans can approach him quite closely and he does not move but as soon as Spot, a lively terrier, comes near, Timmy is gone in a flash. Mrs. Day informs me that in spite of his sleepy appearance, Timmy always has a weather eye open, and invariably faces the pond when at rest, ready to dart in when danger threatens.

Demise of a Sparrow

One day Timmy caught a sparrow! These garden birds are so used to him that they hop around quite unconcerned, but one morning a certain sparrow came too near. There was a lightning flash of teeth and that was that. Mrs. Day was so surprised that she was too late to save it. One can well understand how easy it is for a large "killer" crocodile to catch an animal or human unawares at the river bank, and then drag the victim into the water. Timmy always takes his meals into the water before swallowing them.

During the cold months he spends his days in a large, heated tank in the conservatory. He is then fed on horse-meat and raw fish. Sometimes he spends an hour or two indoors, in a box of straw by the fire.

Timothy has an uncanny "feel" for the weather. From his Winter quarters, in a steacy temperature of about 75 deg. F., he can sense whether it is a warm, sunny day outside, and becomes restless. As Spring approaches he makes repeated attempts to crawl out of his tank, and

Photograph [*L. E. Day*

Mrs. L. E. Day with Timothy, a five-year-old Mississippi Alligator now four feet long.

sometimes falls to the conservatory floor with a squelchy flop, doing himself no harm. He then tries to clamber over the wire-netting gate of the door, in order to reach his pond.

By now he is well-known in the neighbourhood, and often visited by the children. He, in turn, has been to their schools and has appeared at local shows and television. Timothy is now a fat and lazy, but contented, alligator, and there is no reason why one day he should not reach the size of famous George, the London Zoo alligator, who died recently at the ripe old age of some 100 years.—Alfred Leutscher, B.Sc.

Aquatic Press Topics ***By L. W. Ashdown***

Ensuring You Have a Pair of Fish

POOLS enthusiasts—not garden but football—will no doubt be *au fait* already with their chances of achieving affluence during this season and may even have applied similar mathematics to their fishkeeping, but for others an article in THE AQUARIUM (U.S.) should be of interest. An earlier contribution had said that "the mathematicians tell us that six is the smallest number from which there is a reasonable assurance of obtaining both sexes (of fish)." Naturally, one can never be 100 per cent certain of obtaining a pair from six fish of one species which are either too young to sex or cannot be visually identified as male or female. Nevertheless, James W. Beach, who is in the mathematics department of a N. Illinois College, says that many mathematicians would agree that there is reasonable assurance of getting both sexes when the probability is 95 per cent or more. With a sextet of fish the chances are approximately 97 per cent, with a quintet they are below 94 per cent. The more sets of six fish one has the greater the possibility of approximating to these figures.

The moral seems to be that if you like to buy young fish and grow them on yourself, or if you see a tank containing an unusual species and want to try your hand at breeding them, then a purchase of six fish will give you a reasonable possibility of obtaining both sexes. You may be one of the unlucky ones, but there is a 97 per cent chance that you will not be. Good luck!

REFER to the article on page 24 dealing with Pompadour Fish and you will reason that one American aquarist had a heart beating quite a bit faster than normal one evening. Thinking it unnaturally warm when feeding his fish he found the water in one tank had shot up to 102 deg. F. Among the fish were three prize Pompadours. Heater unplugged immediately and tray of ice cubes floated in the water resulted in the temperature coming down to 85 deg. in four hours. At the peak the fish had been lying horizontally on the bottom. Gradually they recovered and by 1 a.m. they took shreds of steak, seemingly none the worse for their excursion nearly half-way to boiling point. The story is told by Estelle Mason, associate editor, in an issue of THE TROPICAL FISH MAGAZINE, produced by Pioneer Valley A.S. (Massachusetts).

"CONSIDER the lowly snail," says Mr. F. E. Lowell, in the November issue of THE AQUARIUM JOURNAL (U.S.). He develops quite a case against keeping these molluscs in community aquaria, not because of their mutilating effect on the plants, but because the snails themselves are being asked to exist in a hostile environment where fish are often all too ready to give them unwelcome attention. This is an opposite viewpoint from the one we usually hear when snails are vilified as damaging denizens of our tanks although they do contribute to the spring-cleaning a little by eating old plant leaves and unwanted algæ.

Mr. Lowell, quite rightly, I feel, says that snails are worthy of a tank to themselves. They are not everyone's choice, obviously, just as appreciation of their edible brethren's succulent qualities is, for the most part, restricted to just a section of Continental gourmands. The author says that "snails, particularly Red Ramshorns, grow much bigger, acquire a clear, red colour, and move boldly about, waving their long graceful tentacles and exhibiting many other charming attributes" when kept by themselves. For maximum development they should have ample space and food. Cereals, tinned salmon and spinach, are excellent alternatives for tender plants and dead matter eaten in the wild. Young Red Ramshorns are best nurtured on algæ. Here Mr. Lowell suggests a novel method of encouraging algæic development by mixing a small quantity of a plant nutrient with two teaspoonfuls of plaster of Paris. The mixture is poured into a jar and allowed to dry, after which aquarium water is added. A growth of algæ soon covers the plaster base and young snails thrive on it.

Small types recommended are Red Ramshorns, Paper Shells and Australian Red Snails.

PROBLEMS ANSWERED

Queries are answered free of charge by a panel of experts. They should be sent to "Water Life," Dorset House, Stamford Street, London, S.E.1, together with a stamped, addressed envelope for the reply. All queries are answered direct but a small selection of general interest is published below.

Breeding Age

At what ages can Common Carp, Golden Carp, Golden Rudd, Orfe, Golden Tench and Green Tench be expected to breed?—(H.N., Portsmouth).

Age is not the principal factor which determines when any of the coldwater fish you enumerate breed. It is a matter of development in which water conditions and the abundance of the right foods are the main factors. Given optimum conditions any of the fish you mention will breed in their third year.

Differentiating Earthworms

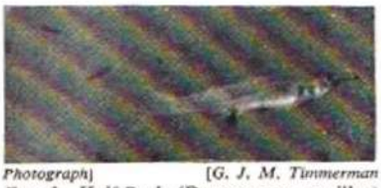
Can you tell me which types of Earthworms are unsuitable for Goldfish and at what size a fish should be before it can take unchopped worms?—(J.A.B., Formby, Lancs.).

Most Earthworms found in gardens are acceptable food for Goldfish. The only one to avoid is the Brandling Worm which breeds in manure and can be recognised by yellow cross segment stripes and a rancid odour when pulverised. The size of worm to be fed is governed by the size of the fishes' mouths. Usually worms have to be chopped up to be readily taken by the average fish.

Half-beaks

I should appreciate information on breeding Half-beaks (Dermogenys pusillus).—*(J.S., Upper Norwood).*

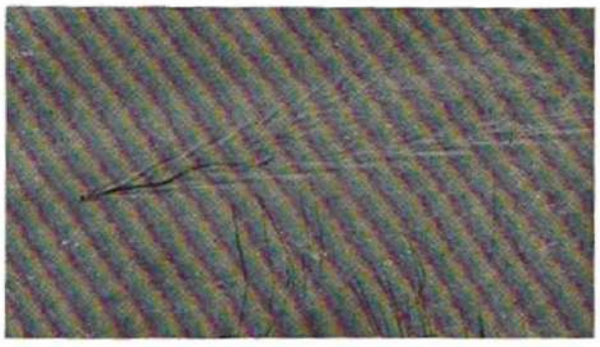
Half-beaks (*Dermogenys pusillus*) are one of the more unusual of the livebearers.



Photograph] [G. J. M. Timmerman

Female Half-Beak (Dermogenys pusillus) *with some of her newly-born youngsters.*

Their natural habitat is S.E. Asia and they are found in the lower reaches of the rivers. The "beak" is actually an extension of the lower jaw and this extension is only fully developed in adult fish; in the youngsters it is hardly discernible. Great care should be exercised when handling these fish as damage to the "beak" can be fatal. The male is much slimmer and smaller than the female and his anal fin is modified to form a gonopodium. They are very peaceful fish doing extremely well in a community of small varieties but are one of the more difficult livebearers to breed as often the young are born dead. If you intend to breed these fishes keep a tank for this species alone, fairly heavily planted and with a reasonable cover of floating plants. A teaspoonful of block salt or Tidman's Sea-salt added to each gallon will be of benefit.



An unusual photograph showing a Grass Snake swimming. The photographer, Mr. Peter Heath, says there appeared to be no reason for the snake to enter the water.

The gestation period appears to be rather variable but is in the neighbourhood of six weeks although subsequent broods from the same fertilisation appear at quite short intervals. Our own experience with these fish has been that broods are very small in number, rarely exceeding eight and sometimes consisting of only two or three. Success depends mainly on keeping the parent fish in first-class condition both before and during breeding and the best foods are mosquito larvæ, chopped White Worms or Bloodworms, alternated with a good dried food.

Effect of Freezing

I have a semi-circular pond, 10 ft. × 5 ft. but only 10 in. deep. Last Winter it cracked on the bottom during a severe frost. It was repaired but I want to avoid trouble in the future and wonder whether you could tell me of any heater I could use on the very coldest nights to prevent freezing right over the surface?—(Mrs. G. J. D., N. Cheam, Surrey).

There is no reason why four 150-watt aquarium heaters, judiciously spaced, should not prevent the pond from freezing over entirely. You might get small areas of ice develop but the pond would never freeze solid. Of course, it would be better if you could get 200-watt heaters but this is an unusual wattage. The most satisfactory way of getting over the problem would be to build a partially raised pond on the existing one, giving walls about 2 ft. to 2 ft. 6 in. deep and about 6 in. thick. The bottom, too, would have to be reinforced to give a thickness all over of 8 in. The walls can be done a little at a time, that is to say, 2 in. a day all round. This does away with the need for shuttering but the layers must follow on consecutive days. The concrete should be of three parts sand, two ballast and one cement, well mixed both dry and wet. If you use heaters make sure you have heavy cable from the house to the pond to prevent short circuits. The addition of an aerator would not only circulate the heated water but oxygenate the water. If your pond is exposed, a windbreak would probably prevent frequent freezing.

Livebearing Snakes

Could you advise me on the proposed purchase of a pair of livebearing snakes? They should be fairly docile and likely to breed.—(H.W., Bolton, Lancs.).

Breeding snakes in captivity is by no means easy, unless one is prepared to give them plenty of room and pay careful attention to proper feeding and their surroundings. An outdoor reptiliary is usually the only suitable home if breeding is hoped for. A livebearing snake which is most likely to breed in a reptiliary, or a large cage, is one of the North American Garter snakes. These are sometimes imported and vary in size from about 18-30 in. In habits they behave like our Grass Snake, and are also good swimmers. Food consists of various amphibians, Earthworms and slugs. Surprisingly, large families of 40 or over are produced by wild specimens, but it is largely a matter of luck in captivity.

WATER ANALYSIS

Samples should be sent in a clean pint bottle, well packed, to Water Life Analyst, 12, Featherbed Lane, Addington, Surrey, together with a fee of 5s. per sample. The name and address of the sender and details of prevailing conditions should accompany each sample which is submitted.

Sample received from A.F.J., Nr. Bury St. Edmunds, Suffolk. Taken from a 20 × 15 × 12 in. tropical aquarium set with a variety of plants. The tank had contained fish for a number of weeks and then two Angel Fish, four Wagtail Platies and two Harlequins died. As the tank then showed signs of what appeared to be a Brown alga, it was cleared and refilled. After standing for four days it was restocked but a further three fish were lost, although no more died in the fortnight prior to forwarding the sample.

Test for impurities:— Appearance: clear. Odour: none. Total mineral content: 0.0200 per cent, satisfactory. Organic matter: 0.0180 per cent, extremely unsatisfactory (high organic pollution); Nitrogen compounds: 0.0001 per cent, extremely unsatisfactory. Ammonium compounds: 0.00004 per cent, unsatisfactory. Poisonous metals: none detected. *p*H: 7.5, satisfactory. Chlorine, as salt: 0.0047 per cent, satisfactory.

Suggested corrections:— The results obtained from the chemical analysis of this sample of tank water reveal that it is highly contaminated with organic matter. The build-up of this pollution may be due to feeding the fish with too much foodstuff having a high content of concentrated protein matter and/or with foodstuff that is rejected by the fish. Such gross feeding nearly always produces the formation of purple red streaks in the gravel below the water line and may be observed close to the side of the tank away from the light. These streaks are caused by the purple-coloured sulphur bacteria and, whilst these organisms are not in themselves harmful to plant or fish life, they do indicate a most serious lack of oxygen in the water. Rather less feeding and ample aeration of the water, especially during the night, should put matters right.

In and Around the Aquaria World

— By W. J. Page —

Photographs] [WATER LIFE

The successful 1954 National Exhibition of Cage Birds and Aquaria was held at Olympia on January 6, 7 and 8. Here is a view, taken shortly before judging commenced, of the enlarged aquaria section which was staged along one side of the spacious gallery of the National Hall.

DESPITE bitterly cold weather at the beginning of the week commencing January 3 and the threat of a railway strike at the end of it, the lure of the National Exhibition at Olympia proved as great as ever. There was a record entry in the bird section of 9,007 and an increase of nearly 100 per cent in the number of entries made for the WATER LIFE Display.

The cold weather did keep a few of the bird entries away and one or two entrants in the aquaria section could not get to the hall to set up their tanks because of the heavy fall of snow which lasted over the two days when they were eligible to get to work. Nevertheless, a very fine show resulted and the attendance too was a record, the figure being well over 30,000.

Making its debut at WATER LIFE Show, the F.B.A.S. Talking Fish dispensed much sound advice in reply to the many questions which visitors put to it during the event.

THE customary opening lunch provided by WATER LIFE and "Cage Birds" for the judges, stewards and officials at the National Exhibition was again well attended. There is much competition to get invitations to this gathering and, since the number of seats is strictly limited, inevitably some who would like to go have to be disappointed.

Last year, the chairman, Sir Richard Haddon, C.B.E., happened to make no mention of the aquaria section in his speech, an omission that was regretted by the aquaria section committee. The sole reason was, of course, that he was unwell at the time and cut his intended remarks drastically. This time, Sir Richard made amends handsomely and went so far as to draw particular attention to the Goldfish Society's twelve-feet-long aquarium.

During the show, one comment made to me, not by an aquarist, was that the cost of the lunch would absorb any profits the show might otherwise make. This compels me to reiterate that the expense of entertaining those who contribute so much to the success of the annual exhibitions is borne entirely by the two journals sponsoring them. None of it falls on the separate accounts of the shows, which are run in aid of charities. A profit of nearly £350 was made on the 1954 event and that sum was duly reserved for the selected charity. Just how we stand in respect of the 1955 show will not be known for some little while yet.

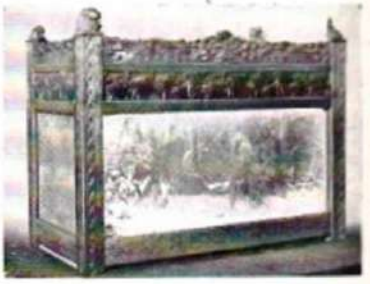
* * *

AS will be seen from the report in this issue, WATER LIFE Display included a number of new features and the use, this year, of one side of the capacious gallery permitted the lay-out to be attractive yet leaving plenty of space round each bank of staging to see the exhibits in comfort.

Once again, furnished aquaria classes were the backbone of the aquaria section but the addition of classes for breeders' teams gave visitors the chance to see the achievements the more serious aquarists have made during the past year. Shubunkins and Fantails deservedly led the Goldfish breeders' classes and some good Tuxedo Platies won the class for Tropical Livebearers. Perhaps the most interesting class was that for teams of young Tropical Egglayers in which a sextet of Neon Tetras from Birmingham won the red ticket for Mr. L. Naylor, closely followed by Mr. L. E. Lane's remarkably well matched Angels which were very big for their age, their date of birth being 8-9-'54.

New names appear among the leaders in the interclub furnished aquaria classes and congratulations are due to the Twenty Club whose team set up the coldwater tank that won the WATER LIFE Trophy for best Club furnished aquarium. Runners-up, with a tropical tank, were Thameside A.S., the society formed a short while ago by the amalgamation of Hornchurch Aquarium Society and Dagenham A.S. Last year's trophy winners, Stoke Newington A.S., also with a coldwater tank, were second in the same class this year and sixth in the tropical class. The year before, another coldwater entry won the cup, the exhibiting society being West Middlesex A.S. whose teams this year set up entries in both the coldwater and tropical classes but were unable to regain the trophy.

The observant will notice, as have the runners-up this year, that whereas they gained 79 points in Class A1, the Twenty Club have been awarded the trophy, yet were given only 77 points in Class A2. They do not dispute the award but have queried the conditions under which the best aquarium is determined each year. Assuming that the 100 maximum points were the yardstick, then the tropical tank should have won automatically but, as hitherto, the judges in Class A1 and those for Class A2 judged as a panel for the trophy and, after bringing in a fifth opinion, were agreed by a four-to-one majority that the coldwater tank was the better of the two.



A handsome hand-carved surround for an aquarium exhibited at Olympia by Mr. H. H. Duncan, Chelsea. The excellent workmanship excited much comment.

My personal view is that this indicates either harsh pointing by the coldwater judges in reaching their decisions in Class A2 or liberal pointing by the tropical class judges and that such ought not to be. The opinion of my colleague, Mr. L. W. Ashdown, is that such apparent inconsistency is always liable to occur when different judges award the points in the two classes and that therefore the award is not incongruous. This view, which I can see, highlights the fact that points awarded cannot very well be measured in more than a general sense against pointings in other classes or shows without the qualification that the points gained were those due in the estimation of the particular judges officiating.

Twelve-feet long, this aquarium loaned to the Goldfish Society, was used by it at the WATER LIFE Display to present at a glance some of the many varieties of Goldfish that have been produced, either by planned or indiscriminate matings. The weight of the aquarium, when filled, was 16 cwt.

STEWARDS at this year's show were drawn from London clubs, the majority having practical experience of previous events at Olympia. Under the capable leadership of Mrs. W. M. Meadows, chief steward, they carried out their duties efficiently. Before the show, from Monday morning to Wednesday night, they worked hard assembling the staging, and washing and benching the tanks which had been delivered on the Sunday, and readily undertook the hundred and one odd jobs that cropped up.

During the show, they were ever willing to look after the fish, to answer visitors' questions and to settle any problems that arose. Special credit is due to those who stayed overnight on the Wednesday, Thursday and Friday, checking the temperatures and ensuring that the fish were in good condition, ready for the judges to start on the Thursday morning at 9.30 a.m. prompt and for the public to see the exhibits in good condition on the Thursday, Friday and Saturday.

Shortly after 9 p.m. on the Saturday evening, a most dignified exit was made by the Goldfish Society who, having emptied their oversize tank, picked it up and departed silently down the stairs, bareheaded and as solemn as undertakers removing a body to its last resting place. I thought I overheard Capt. Betts encourage members to lift the tank with the words "Come on, boys, let it rip." Possibly I misheard him. It could have been "Let him R.I.P." There was the impression, too, that incense was being used as the obsequies were about to commence, but I found out afterwards that it was Mr. R. Birkenhead contentedly puffing away at his pungent briar as he lent a willing hand, and the anxious look on his face and his murmurings of "Be careful," with frequent appeals to Heaven above, made me think for one minute that it was not Mr. E. G. Weatherley, who had organised the G.S.G.B. display, but an apprehensive cleric about to perform the funeral rites that accompanied the party in the regions below.

* * *

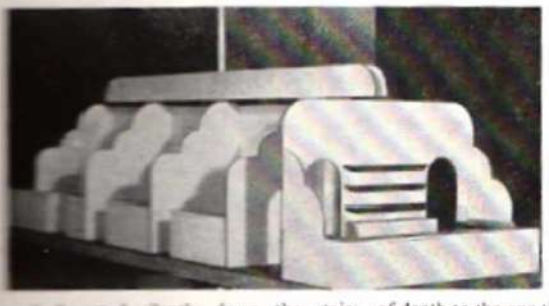
MR. PHILIP DEE of Clapham accepted an offer to give a talk on the B.B.C. television service on January 31st, when he agreed to describe the art of fishkeeping to young viewers in elementary terms. This well-known personality in the fish world was responsible for setting up two aquaria at the Packaging Exhibition held at Olympia. One tank was to catch the eye only. The second, 5 ft. long, 30 in. high and 15 in. wide, told an interesting story.

We all remember the epic of the "Flying Enterprise." Not many know that typewriters packed in polythene bags were salvaged from the vessel and were found to be virtually undamaged by seawater, thanks to the water-resisting qualities of the packaging. At Olympia, fish were seen happily swimming round a typewriter, again protected by polythene, which had been placed underwater to show visitors to the exhibition that this particular plastics material is particularly impervious to water.

* * *

THE "New Look" has arrived in furnished aquarium classes, the F.B.A.S. having approved in principle the use of exterior backgrounds. The idea was tried out at Olympia and the results were not displeasing to the eye. The innovation, however, disturbs me as it will others who are responsible for planning the staging for future shows on a national scale. Such backgrounds can make or mar the appearance of a tank, depending on the artistic skill of the exhibitor, but that is not the point at issue.

There is no limit to the depth these backgrounds can be and unless a modification of the recommendation is introduced, we can foresee some "bright sparks" employing a second tank to effect a sense of depth to the one they are actually setting up. The trouble is, of course, that staging is limited and expensive to hire. That being so, no show organisers can look forward without some degree of concern to receiving entries that require staging of greater depth than is usually available. With double row staging, an extension of the popularity of deep backgrounds could reduce the capacity of that staging by as much as one half. Certainly, with the metal staging we use at Olympia, we may have to consider imposing restrictions for future years.



A model of the new stand which will form the main centre-piece of the next and subsequent shows of the National Aquarists' Society. Approved by the N.A.S. Council, the structure is now being built. The N.A.S. will use the large end section and the other compartments will be offered to the trade.

* * *

THE picture at the top of this page was taken by a WATER LIFE Staff photographer just as a special messenger from Harrod's handed in to No. 10 Downing Street, a can containing an Angel Fish. As all our readers know, the Prime Minister shows keen interest in the aquaria hobby and has accepted gifts of fish from abroad. His collection includes tropicals as well as coldwater species.

Exclusive WATER LIFE *photograph showing a special messenger handing in a can containing an Angel Fish to No. 10 Downing Street.*

The picture, however, was of a special occasion in Sir Winston's career as a fishkeeper. The whole country had had its interest aroused in the preparations made for the Premier's 80th birthday and gifts of all kinds were showered upon him. It was only right that a personal friend of his should offer him a fish for his tropical tank. Happily, the W.L. photographer was on the spot when the present arrived. The specimen was a particularly good one and I understand that it was specially imported from America. I am happy to know that, in this way, aquarist interests in this country were associated in an appropriate manner with the tributes paid to the country's octogenarian leader.

* * *

I HEAR that the layout for the next show of the National Aquarists' Society is going to be fundamentally different from that of previous years. The staging is to be centred round the prefabricated range of stands, a model of which is shown on this page.

The N.A.S. exhibition is the biggest event of the South to be held in the Summer months, and the organisers deserve the support of aquarist exhibitors, the trade and the public. It goes without saying that the cost of staging a show of N.A.S. calibre is high and that entry fees do but little to offset the outlay. If the promoters are to break even, they must be backed up by trade stands and must attract a good public. I hope that fishkeepers will support the event with a bumper entry and that as many societies and individual exhibitors will make the 1955 event a record event.

Mr. W. G. Phillips points to some of the unusual Guppy types sent to him from Florida, to be shown at Olympia. Attractive to the lay public, to Guppy breeders they were examples of fish that could introduce new colours and fresh shapes into British strains.

Opening of Marineland of the Pacific

By Gene Wolfsheimer

Aerial view of the Oceanarium in South California. The two largest tanks are clearly discernible, one being oval and the other round. There was an attendance of 24,000 during the opening weekend and the amphitheatre around the circular pool was crowded.

PEOPLE of Southern California are very fortunate in having the largest oceanarium in the world built right on their doorstep. This mammoth project is located on a 65-acre tract of ground on the cliffs of the Palos Verdes Estates. It overlooks the Catalina Channel and the Pacific Ocean and was opened in early Autumn.

The main building, one of extremely modern and unique design, houses the two largest tanks, smaller aquariums, laboratories, offices and divers' quarters. The chief points of interest are the two tremendous saltwater tanks. These will house thousands of large and small marine creatures which will live under natural conditions. They will be observed by the public through 358 large glass, double-walled windows from three different levels.

The largest tank is circular in shape—some 80 feet in diameter and 22 feet deep. The temperature of the water will fluctuate with the season and an open system of continually filtered, circulated water will connect with the ocean. In this tank will dwell fish and marine life native to Southern Californian waters that do not migrate when water temperatures change.

The second large tank is oval in shape, 100 feet long, 50 feet wide and, again, 22 feet deep. This will be in a closed system, not continually circulated with the ocean, but instead passed through a special filtering and heating plant. The temperature will be maintained at 68 deg.F. This tank will contain certain migratory creatures the year around which normally seek warmer waters with the change in seasonal temperatures. Other smaller aquariums will contain little exotic coral reef specimens from various parts of the world. These are heated tropical tanks.

About 5,000 specimens are expected to be continually on display. They will include giant rays, sharks of many species, bass, groupers, porpoises, turtles, moray eels, etc. and many smaller species, some of them in large schools.

Much of the feeding will be done by divers in regulation shallow-water diving outfits.

Located between the two main tanks at this surface level is a smaller holding, or introductory tank. Specimens are brought in to the 250 feet pier by Marineland's own collecting vessel, the "Geronimo".

My personal experiences at this new oceanarium are many. Two weeks before the regular public opening, as an officer-member of the Los Angeles Aquarium Society, I attended a field-trip here together with an estimated 400 other members and guests. We enthusiastically trooped over most of the Oceanarium's facilities even though construction was still under way at the time. We were divided into two huge groups, one of these under the supervision of Mr. David Brown, my good friend, who is formerly of the London Zoo Aquarium and now is the Chief Aquarist of Marineland of the Pacific. It is Dave's job to introduce the new specimens into their confined surroundings and keep them alive. All staff are controlled by Mr. Kenneth Norris, Curator of Fishes.

During the collecting period, before the opening, I was asked to receive and store some of the many Hawaiian specimens being collected by Mr. Jack Bitterly, President of the Los Angeles Aquarium Society. Jack was commissioned by Marineland to collect these fish and he spent 40 days on Oahu, the main island of the Hawaiian group. For about 18 of these days he was assisted by Mr. Dick Wilson.

With ample assistance by Dave Brown, Ken Norris and some of the divers, about seven large glass-fronted cement aquariums were set up to contain marine fishes in one of my hatcheries. For about one month I had an assortment of both beautiful and bizarre Hawaiian fishes to maintain, including Butterfly Fish, Moray Fish and tangs.

Messrs. P. Schyler, J. Bitterly D. Brown, and G. Wolfsheimer pictured at the South Californian Oceanarium's preview.

Further Notes on the Belgian Conference

THE Belgian Federation staged an International Conference of aquarists which was reported briefly in the October issue. Members assembled in the National Antwerp Zoological Gardens, and were received by Mr. Dubois, chairman of the Belgian Federation.

On the first day they met at the Federation's "Wonderland" Show, and were received by Mr. F. Brans, chairman of the show committee. After a luncheon, given by the Belgian Bond, they assembled in the Hall of the Zoo, and many points relating to the World Federation were mentioned and fully discussed, this meeting being only a preliminary one, any resolutions that were put to those present being carried forward to the full meeting on the Sunday.

Netherlands Aquarists

On the Sunday morning a visit was made to the Town Hall of Antwerp. In the afternoon colleagues from Holland arrived and therefore a much larger meeting was held. All the matters raised on the previous day were again fully discussed and it was agreed that, as this meeting could not be officially described as a meeting of the World Federation Council, any resolutions agreed upon would be submitted to the next Council meeting of the World Federation. This, it was hoped, would be held in England. It was suggested and agreed that a sub-committee of the World Federation be formed to cover the interchange of slides, prints, films, etc. Also, it was felt that, if there were a correspondent in each country in direct contact with the general secretary of the World Federation, it would help him in his work.

To both of these items Council members of the World Federation who were present agreed. Other items were discussed and noted by the general secretary of the World Federation for submission to the Council at their next meeting.

After the meeting the members assembled, together with a very large number of the Belgian Federation, in the Marble Hall and saw an extremely good film entitled "Our Aquarium Fishes." The film, entirely in colour, showed a great number of aquarium fish. A running commentary was given by one of the photographers. This film was followed by one of Walt Disney's, "Beaver Valley." Dr. Schmidt, of Germany, then gave a talk on "Fighters."

World Federation Council

The members of the World Federation Council who were present were: Dr. Lodewyks, the President (Holland); Mr. Dubois, treasurer (Belgium); Mr. Veldhuizen, general secretary (Holland); and Mr. Keller (Germany), Dr. Richarz (Austria), Mr. Routhembourger (France) Dr. de Wit (Holland), and Messrs. A. Fraser-Brunner and C. W. G. Creed (England). Also present were: Mr. Allen (Egypt), Mr. Feigs (Saarbrucken), Mr. Brans (Belgium), who was nominated by the Belgians to the Council in place of Mr. Copin, Mr. Kokclenberg (Belgium), Dr. Gery (France), and Messrs. Merckens, Prager, Hoedeman, of Holland, and Drs. Mader and Schmidt, of Germany. Mr. Creed was nominated as the English correspondent for the World Federation.

Around the Shows

Good Response at Plymouth

AS a result of the show put on by **Plymouth A. & P.S.** at the Young Plymouth Exhibition recently a number of new members were enrolled. For their benefit Mr. R. P. Ackland (press secretary) gave a talk on "Setting Up an Aquarium" at the society meeting which followed. First prizewinners were Mrs. Ryder (Shubunkin) and Messrs. B. Jackson (Barbs and Guppies (shield)), T. Coslett (White Clouds, Danios, Platies, A.O.S. Tropicals, A.S. Egglayer and A.S. Livebearer), C. Cross (Neons or Glowlights, Serpæ or Rosaceus), V. Summers (Beacons and Anabantids), S. Ryder (A.O.S. Characin, Fighters, Cichlids and Mollies), R. Kenny (Swordtails), S. Hodge (Catfish), J. Nicholls (A.V. Fancy Goldfish and coldwater furnished aquaria) and D. Baldry (Goldfish and A.O.S. Coldwater). In addition Mr. A. T. Coslett came first in the senior furnished aquaria and Master M. Williams in the junior furnished aquaria. Mr. F. Gibbons, the judge, said that a high standard had been set.

Banbury A.S. fifth annual show was judged by Mr. H. V. Jones (tropicals) and Mr. T. L. Dodge (coldwater). Mr. Jones thought exhibits in the tropical section were good and in some classes there was little to separate the leading fish. One of two entries in the breeders' class were of particular credit to their owners. In the coldwater classes Mr. Dodge found the variety good, but quality fair. Shubunkins were an exception, there being some fine fish of this variety. Generally, the furnished aquaria failed on technique. Both judges said the layout of the show was attractive. B.D.A.S. Trophy for best fish in show (open) and Fox Cup for best coldwater fish (members) went to Mr. G. B. Scott with a Moor. In addition, Mr. Scott won the Founders' Shield for highest points, and a WATER LIFE Diploma. Best tropical fish (members) was shown by Mr. E. Fergus (*Aphyosemion australe*) who took the Rueben Hunt Cup. Members breeders' class was headed by Mr. and Mrs. D. Thomas's Mollies (Peake Trophy). The same exhibitors also won a WATER LIFE Diploma, the Mather Cup for best members' Angel Fish and the Fergus Trophy for best members' Cichlid other than Angel Fish. Charles Hunt Shield for senior furnished aquaria went to Mr. J. S. Scragg and the Bolton Cup for junior furnished aquaria to Miss F. Simmonds.

National Exhibition of Cage Birds and Aquaria

Successful Innovations in Enlarged WATER LIFE Display

COMPARED with the 1954 total of 73 competitive entries, this year's WATER LIFE Display, which formed part of the January 6, 7 and 8 Exhibition at Olympia, attracted the highly satisfactory entry of 136, plus 38 non-competitive specimens. There was, too, a commendable increase in the bird section from 8,240 to 9,007. The show was patronised better than ever before, the number of people being admitted to the show being in excess of 30,000 as against last year's figure of 26,777.

The section was staged along one side of the Olympia gallery, occupying an area of approximately 9,650 square feet. Last year, our position on the ground floor covered about 4,800 square feet. The extra room this time permitted us to accommodate more features and to give plenty of room round each bank of staging. Other parts of the gallery were occupied by the fine show of foreign birds and the talking birds, two popular sections. The result was that there was every incentive for the public to visit the gallery and it was noticeable that the aquaria sections commanded the attention of everyone.

Before the show came along, fear was expressed in some quarters that there was likely to be lack of support for the furnished aquaria classes, but this proved groundless. Admittedly, some of the clubs that have been regular supporters of this competition dropped out but the entry was virtually the same as last year in Classes A1 to A7 (1955, 64; 1954, 61). Additions to the schedule were challenge classes for Goldfish and Guppies and four breeders' classes.

[WATER LIFE

Messrs. R. Russell Holland and R. G. Mealand compare notes when judging their classes.

Of the appointed judges, Mr. C. E. C. Cole had to withdraw at the last minute owing to illness. His place was taken by Mr. J. H. Gloyn. The classes were judged as follows:—Class A1, Messrs. R. Russell Holland and R. G. Mealand, Class A2, Capt. L. C. Betts, M.B.E. and Mr. C. J. Saunders, B.Sc. Class A3, Messrs. Russell Holland and W. L. Mandeville. Class A4, Capt. Betts and Mr. J. H. Gloyn. Class A5, Messrs. Gloyn and Saunders. Class A6, Capt. Betts and Mr. A. Boarder. Class A7, Messrs. Boarder and Saunders. Class A8, Messrs. C. W. G. Creed and Mealand. Class A9, Messrs. Creed and Mandeville. Class A10, Messrs. A. Fraser-Brunner and Saunders. Class A11(a), Messrs. J. Pearson and W. Howe. Class A11(b), Messrs. E. Roach and J. Little. The judges in Classes A1-A9 were nominated by the Federation of British Aquatic Societies. Those in Class A10 were selected by the Aquaria Section Committee, and in Class A11 by the Federation of Guppy Breeders' Societies. The F.B.A.S. Star scheme was in operation in Classes A1-A4 and A6-A10.

Trophy Winners

Leading awards went to the Twenty Club (Burton Life Trophy for the best Interclub Furnished Aquarium) and Battersea Grammar School (F.B.A.S. Junior Trophy for the best Interschools Furnished Aquarium). Awards of Merit for the Interclub Points Competition went to Hendon A.S. and Stoke Newington A.S. (tie with 56 points each). Awards of Merit go to the winners of each class with WATER LIFE Diplomas to the runners-up.

As last year, the facilities offered to aquarists were not only adequate, but were available from the time the competitors came to set up their exhibits. Constant hot as well as cold water was close at hand, from the Tuesday before the show onwards, and compost was provided where requested. For the coldwater tanks, aeration was laid on and the tropical tanks, each heated by individual immersion heaters, were kept at the requisite temperatures by means of thermostatic control. Top lighting to each tank gave a most pleasing effect and showed to full advantage the different hues of the fishes, plants and rocks.

Neat Appearance

With WATER LIFE Office at one end of the display and the imposing aquarium used by the G.S.G.B. at the other, the section presented an extremely neat appearance. Near to the banks of staging containing the interclub and individual furnished aquariums, which in themselves were a great attraction, was the display sponsored by WATER LIFE and set up by Fish Tanks, Ltd., of fishes owned by celebrities. Here the tanks were furnished in a way that made a colourful contrast to the more formal designs. Brightly coloured quartz was used in lieu of the softer greys and browns of the rockwork normally employed, and the tanks themselves were enhanced in appearance by the superimposing of "picture frame" and striped "Continental" surrounds. It did not need much imagination to conjure up pictures of such tanks taking their place amongst contemporary furniture in modern houses and flats. Apart from the appearance of these tanks, which drew much comment, the fish in them were looked at with considerable interest for they had been loaned for this exhibition by such well-known personalities as the Marquess of Bath (Monodactylids and *Labeo bicolor*), Winifred Atwell (Angel Fish), McDonald Hobley (Neon Tetras), Sir Carol Reed (Harlequins and Platies), Michael Rennie (Veiltails) and Harry Roy (Veiltails).

Talking Fish Performs

Nearby were the stand and tanks reserved for the Federation of British Aquatic Societies. The F.B.A.S. has moved with the times and has now decided to issue guides, rather than full-blooded standards, for fishes that cannot be said to be man-made varieties. A preliminary copy of the guide to members of the Barb group was displayed and the accompanying tanks contained specimens of *Barbus conchonius*, *B. cumingii*, *B. nigrofasciatus*, *B. semifasciolatus* and *B. tetrazona*, the tanks being set up and the fish provided by members of Friends A.S., an affiliated society. It was at the Federation stand that we were introduced to "Timothy," the talking fish, a Li-Lo creation specially made for this exhibition and which, thanks to the enthusiasm of Messrs. Fraser Brunner and Mitchell and, later, other F.B.A.S. officials, including Mr. F. H. Riddle, the new chairman and Mr. R. O. B. List, the secretary, answered many questions, most of them serious, some not so serious, put to it by members of the public. At times the responses were pertinent, particularly when the questions were facetious. At others, "Timothy" entertained his listeners with brief lectures and many were able to hear and see the lip-moving inflated rubber creature give much sound advice. No doubt the talking tiddler will go the rounds of many shows in future. Wisely used he can dispense much useful knowledge and at the same time draw attention to the aims and functions of the F.B.A.S. An interesting trade display was that of Fernwood Aquarium and Nurseries, Ltd., where cacti, other succulents and house plants were offered for sale. These subjects are becoming increasingly popular as decorations for fish-rooms.

Photograph] [*L. E. Perkins*

The Goldfish Society's prizewinning exhibit in the open invitation Challenge Class for Veiltail Goldfish

Snakes Handled

Each year the British Herpetological Society is represented by members of the London Group who stage creatures that are not hibernating at the time of the show. On this occasion, they furnished nine large tanks containing specimens of White's Tree Frog, Glass Snake, Corn Snake, Nile Crocodile, Iberian Newt, Rainbow Boa, Blue-tongued Skink, Claw Frogs and a Bull Frog. Every so often, live snakes were mysteriously produced from zip-fastener carriers and before long, their nervousness overcome, visitors were persuaded to handle them freely, expressing surprise at their weight, their dry skins and readiness to droop themselves round necks and across arms.

The Interschools entries were disappointing in number but the standard was high and it is worth mentioning that the two schools which came first and second were from the same part of London, the leaders, Battersea Grammar, beating Emanuel School, their rivals in other fields, both academic and sporting.

G.S.G.B. Challenge

A class of significance to aquarists proper, more than to the lay public, was the invitation class in which clubs were asked to compete against the G.S.G.B. with Veiltail Goldfish. The winning fish was a good specimen selected by the Goldfish Society to represent it only after a number of specimens had been inspected. It was considered by them to be a near approach to the ideal F.B.A.S. Veiltail so far as physical limits of Goldfish will allow. As the society is working to its own standards it could be excused had another club, responding to the challenge and, favouring the Federation's Veiltail pointings and outline to the Goldfish Society's Twintail requirements, beaten the specimen championed by the G.S.G.B. But, no, Messrs. Fraser Brunner and C. J. Saunders first

"EYES DOWN—LOOKING"

Messrs. J. Little, E. Roach, J. Pearson and W. Howe, the four judges appointed by the Federation of Guppy Breeders' Societies, check over the points that have been given by them to exhibits in the two Guppy classes. The entries were teams from members of societies affiliated to the F.G.B.S.

Photograph] [WATER LIFE

Popular Vote Competition

Chiswick Aquaria Tops The Poll

CONSIDERABLE attention was focused throughout the National Exhibition on Class A12 in the Aquaria Section, hundreds of visitors being attracted by the popular vote competition to determine the best professional aquarist's exhibit.

A very satisfactory entry was received from the public who were invited to place in order of preference the seven exhibits staged. Nearly 2,000 competition forms were taken and almost half of them were returned. After eliminating those which were spoiled for different reasons, e.g., incomplete and, in many cases, giving the same exhibit number twice, 840 effective entries were judged.

The popular vote resulted in the professional aquarists' exhibits being placed as follows: 1st, No. 7; 2nd, No. 6; 3rd, No. 8; 4th, No. 4; 5th, No. 3; 6th, No. 1; and 7th, No. 5. No. 7, exhibited by Chiswick Aquaria, gains an Award of Merit; No. 6, exhibited by Sterling Fisheries, a WATER LIFE Diploma and No. 8, Ascot Aquaria, a prize card.

Competitors in the voting contest showed general preference for the more orthodox layout and exhibit No. 7 led by a good margin. The second and third places were very close and over the whole competition none of the entries was disgraced, each getting a fair proportion of votes for the higher as well as the lower places, the final position being determined in each case by a few votes either way.

Cash prizes of £5 and £2 were offered for correct or nearest correct placings to coincide with the popular vote and one entrant gave an all-correct return and is awarded the first prize. Twelve forms contained two errors, and these competitors divide the second prize.

£5 Prizewinner :
Mr. J. H. TREUSE,
35, Bryan Avenue,
Willesden.

Runners-up : *Miss P. M. Traynier, Shooters Hill; Mrs. Burns, Bideford; Messrs. W. E. Barker, Hersham; V. J. Braybrook, Roehampton; R. Morris, W.11; D. Gooch, Hanwell; W. H. Neuff, Tooting; B. Richards, Croxley Green; J. Price, Halesowen; F. T. Soubrand, Wandsworth; W. Forsyth Whaley, London, W.1; G. Wilson, Alnwick.*

judged the entries separately and then compared points, afterwards coming to full agreement on the final placings. Initially, the first-mentioned awarded the following points:1st, No. 4, 72; 2nd, No. 2, 71; 3rd, No. 6, 64; 4th, No. 5, 63; and 5th, No. 3, 62. Mr. Saunders' independent judgment was: 1st, No. 4, 71; 2nd, No. 6, 66; 3rd, No. 2, 64; 4th, No. 5, 63; and 6th, No. 3, 62. Ultimately, the placings agreed upon were:— 1st, No. 4, 72; 2nd, No. 2, 68; 3rd, No. 3, 65; 4th, No. 5, 63; and 5th, No. 3, 62. Exhibit No. 1 was passed over as it was considered that it showed Oranda characteristics. Where were the fishes of such coldwater strongholds as Bristol, Birmingham and Nottingham, to mention only three? Surely there are some more good Veiltails about?

The tropical breeders' classes drew some very fine teams and the excellent Tuxedo Platies which led the Livebearer class were followed closely by some Sunset Platies from the strain which have given a good account of themselves at more than one show. The Egglayer class was outstanding for quality and variety. The fact that the two judges gave a range of points over 17 entries from 84 to 70 shows that they regarded the teams as all of commendable standard. Out of the cards were some good Fighters, Angels, Rosy Barbs, *Pyrrhulina rachoviana*, Dwarf Gouramies, *Aphyosemion bivittatum*, *Nannostomus* and X-ray Fish. The coldwater Singletail breeders' class was monopolised by high-class Shubunkins. In the Doubletail class, Lionheads, Moors and Veiltails were beaten by Scaled Fantails.

The continuous stream of interested viewers in front of the professional aquarists' class was not caused solely by the appeal of the Popular Vote competition in which visitors determined the winner of the class. There was equal attraction in the differing styles of tanks and stands used by the competing traders. On its own as a piece of furniture was the well-made cabinet aquarium brought all the way from Falmouth. Close inspection of the fittings was an eye-opener for the design carefully hid from view numerous electrical controls and gave adequate space for the usual paraphernalia of nets, tins of food, thermometers, culture jars and the like which all aquarists acquire. Chromium-plated finishes, wrought-iron scroll work and bow-fronted tanks each had their champions when the votes were cast in the competition and we were intrigued by the cunningly contrived underwater scenes including the exotic, with the liberal use of genuine Chinese porcelain ware and the ingenious use of all kinds of picturesque models to hide the diffuser blocks of aerators.

The interclub and individual coldwater furnished aquariums, always at a disadvantage when seen immediately next to tropical furnished tanks, were placed beyond the centrally sited WATER LIFE stand where our range of books was on sale. These two classes produced some very good efforts and, generally speaking, the selected fish were of just the right size and colour to fit in with the designs chosen.

Galaxy of Goldfish

For sheer size, the tank used by the Goldfish Society was outstanding, but not only that; it caught the eye because of the excellent furnishing, employing the use of appropriate rockwork and plants to create the impression of a long sweep of water in which were gathered a large collection of Goldfish, with representatives of more than twenty varieties. That the society had a drum to beat was not appreciated, perhaps, by many lay visitors, who saw in the tank some varieties that they had never seen before, but the keen coldwater men could see the force of the society's argument when, by assessing the many diverse shapes and forms in one tank, they could take in at a glance the simplicity of the scheme whereby the society aims to get its members to concentrate on only four basic varieties.

A little way away was another display of Goldfish that, as it so happened, supplemented the G.S.G.B's effort, and which was, in itself, a self-contained range of the more unusual and bizarre Goldfish types that caught the fancy of a number of Goldfish enthusiasts. These were the fish exhibited by Mr. T. C. Horeman, of Tachbrook Tropicals. All in first-class condition, they included Scaled Orandas, Pearl Scales, Globe-eyes, Pompons, Bramblehead, Celestials and Bubble-eyes. They were fish either imported directly by Mr. Horeman or were specimens bred by aquarists from stock he introduced.

South Bank Aquarium drew on its resources to put on an instructive display of unusual types. The *piece-de-resistance* was a fine Scorpion Fish. Others on view were *Amphiprion percula* and *Dascyllus carneus*. Corals gave a bold appearance in these marine and brackish water aquariums. Also in this section were some good quality Goldfish including specimens that came very near to the Demekin variety produced in Japan, and some outstanding Celestials.

Once again, the Federation of Guppy Breeders' Societies staged a varied display of recognised types of *Lebistes reticulatus* and by putting on two classes, one for males and one for females, drew teams from members of affiliated societies. Additional Guppy tanks were set up by Messrs. Phillips and Stanley. Mr. W. G. Phillips exhibited teams in four tanks consisting of: 1, 2 Comet-tails, 2 Ribbontails and 2 Albino hybrids; 2, 6 Japanese Green-laced; 3, 2 male and 2 female young Albinos; and 4, 6 American Red Guppies. They proved a most interesting collection and included some fish which have not been seen in this country before. They were sent to Mr. Phillips for display at this exhibition by Mr. A. Bacorn of Florida, U.S.A. Mr. Phillips is already busy planning to produce his own strains from the stock he holds. The tank set up by Mr. A. P. Stanley contained five Lyretails and Doubleswords, having a leopard spotted body pattern with a preponderant iridescent green colour. They were sent here for the show by Messrs. Horak and Schikirsch, of Austria.

FURNISHED AQUARIA CLASSES

CLASS A1. INTERCLUB TROP. FURN. AQUARIA (32): 1 (79 pts.), Thameside A.S. Lush plant growth, *Ludwigia*, *Vallisneria*, *Cabomba* and Cryptocorynes, fine shoal of Harlequins and excellent bottom layer set seal of excellence on this exhibit. *Cabomba* formed the focal point. Good impression of depth. Failed a little on originality. 2 (76 pts.), Twenty Club. Unusual design threw emphasis on the extreme left. Quite effective. Lovely plants. Group of full-grown *Chilodus punctatus*. 3 (75 pts.), Hendon A.S. Unique set-up, but not everyone's choice, perhaps. Modest but telling use of plants and bold arrangement of rock. Stocked entirely with Tiger Barbs. 4 (74), Hendon A.S. Orthodox but good. An ideal "home" aquarium and something for visitors to attempt to emulate. Grey bottom layer. Quality mixed Characins. 5 (71), Hendon A.S. Neons set against rich green and russetts. Large swim area. Rocks to the left a little unhappily arranged, but a good Neon tank. 6 (70), Stoke Newington A.S. Advantage taken here of the new F.B.A.S. ruling which allows backgrounds in other than self-colours. Here there were realistic "paper" plants in a "sunset" background. The effect was pleasing with complementary planting in the tank. 7 (69), Hendon A.S. Reasonable plants arranged high at the back, but plunging too low in linear fashion in front. Quite effective but not outstanding. CLASS A2. INTERCLUB COLDW. FURN. AQUARIA (14): 1 & WATER LIFE Trophy (77 pts.), Twenty Club. Bold tank *not* overplanted. Two good Veiltails. Bottom layer might fail in any other set-up but clever plant choice exploited its unusual character. Genuine coldwater tank with no attempt to copy tropical layout. 2 (73), Stoke Newington A.S. Fuller use of plants in orthodox arrangement. Primarily dark green plants contrasted well with bright young Veils. Open swim area in front. 3 (71), Hendon A.S. Generally lacked contrast in plants and rock although pleasing. Overall effect medium green and brown. Two nice Scaled Fantails. 4 (67), Hendon A.S. Too much fine-leafed plant growth made tank lack "body." Clean set-up with grey bottom layer and one quality Common Goldfish. 5 (65), Willesden A.C. Rather let down by plant quality, and with dark grey rock, the effect was somewhat sombre. Two quite good Scaled Veiltails. 6 (64), Hendon A.S. Ample good plants, but overall effect jumbled. Fish only fair, but fine colour. 7 (63), Hendon A.S. Lost points on clarity and distinctiveness. Fish and plants reasonable. CLASS A3. INDIVID. TROP. FURN. AQUARIA (9): 1 (78), R. H. Wood. A very pleasing set-up with good plants for an individual entry. Bottom layer, fawn-pink — most attractive. Formed a bright setting for good Tiger Barbs. 2 (76), T. Atkinson. Pleasing

In confident mood after placing the cards in the WATER LIFE *classes*

Left to right: Messrs. W. L. Mandeville, J. H. Gloyn, A. Fraser-Brunner, F.Z.S., L. C. Betts, M.B.E., C. J. Saunders, B.Sc., C. W. G. Creed, F.Z.S. and A. Boarder, all F.B.A.S. nominees.

but a little heterogeneous. Plants of good quality. Nigger and Tiger Barbs. 3 (72), S. Brown. Another attractive tank, but overall effect too light. Design was good, but Harlequins, Cherries and White Clouds, not in full colour, rather added to the light appearance. 4 (62), G. Purcell. High shingle at back tended to disguise lack of height in plants. More plants needed, but Red Platies good. 5 (59), S. Rabjohn. Artificial rockwork spoiled this exhibit. Design fair. Nice Albino Paradise Fish and small Checker Barbs. 6 (48), L. Bowd. Unfortunate mixing of large and small fish although good quality. Poor selection of rock. CLASS A4. INDIVID. COLDW. FURN. AQUARIA (4): 1 (76), H. Batey. Clever grey rock background and grey gravel. Modest use of quality plants. One Calico Veiltail. 2 (71), C. R. Parslow. Evidence of thoughtful design, but not brought through to fruition. Good plants and two nice Calico Fantails. 3 (60), R. E. Bevins. *Fontinalis* was main characteristic and coarse bottom layer gave overpowering effect. 4 (57), R. N. White. Poor quality plants and design not too effective. CLASS A5. INTER-SCHOOLS FURNISHED AQUARIA (5): 1 (62), F.B.A.S. Junior Trophy, Battersea Grammar School. Plenty of plants and well set up although not the colour contrast in the plants. Mixed collection of quite good fish; 2 (56), Emanuel School. Not a great deal to choose between this and the 1st, but points lost for lack of finishing touches, e.g., clarity and planting. Design more unusual. 3 (49), John Perryn County Sec. School. Smaller tank rather overstocked with fish.

BREEDERS' CLASSES

CLASS A6. BREEDERS' SINGLETAIL GOLDF. (4 FISH) (6): 1 (78), W. J. Burns. Very well matched Shubunkins. 2 (75), R. Oxenham. Smaller Shubunkins, but good quality. Failed a little on colour and not so good for matching. 3 (72), C. F. Whitehead. Large Shubunkins and quite well coloured, but heavy bodied. 4 (71), J. R. Franklin (Shubunkins). 5 (70), W. F. Watson (Shubunkins). 6 (69), A. Hastings (Shubunkins). CLASS A7. BREEDERS' DOUBLETAIL GOLDF. (4 FISH) (7): 1 (72), J. R. Franklin. A good team of Scaled Fantails, main failing being on matching. 2 (66), F. T. Barry. Well matched. Veiltails of rather variable colour. 3 (62), H. Batey (Veiltails). 4 (58), C. F. Whitehead (Moors). 5 (56) W. W. Pearce (Lionheads). CLASS A8. BREEDERS' TROP. LIVEBEARERS (6 FISH) (13). 1 (80), R. H. Duncan. Well developed team of Tuxedo Platies. Good markings and beautifully coloured. 2 (78), Mrs. P. Franklin. Sunset Platies of very large size. Good fish but failed a little on shape and matching. 3 (77), H. G. Bundle. Sailfins with pleasing colour sparkle and developing well. 4 (76), Mrs. M. A. Holland (Red Swords). 5 (75), F. Tegmere (Red Platies). 6 (73), A. Hastings (Red-eyed Swordtails). 7 (70), R. Yexley (Wiesbaden Swords). CLASS A9. BREEDERS' TROP. EGGLAYERS (6 FISH) (17): 1 (84), L. Naylor. Neon Tetras were a worthy first in this strong class. They were well sized, coloured and conditioned. 2 (82), L. E. Lane. Another excellent team, this time of Angel Fish. Well matched, and beautiful condition, size and finnage development. 3 (81½), J. L. Sheen. *Pachypanchax playfairii*. Lovely colour, quality and size. 4 (81), Mr. E. Allen (Lyretails). 5 (80½), D. R. Butler (*Hemigrammus pulcher*). 6 (80), F. V. C. Read (*Corydoras paleatus*). 7 (79½), S. Brown (*Apistogramma ramirezi*). CLASS A10. INVITATION CHALLENGE CLASS, VEILTAILS (6): 1 (72), Goldfish Society of Great Britain. A clear winner, but could have had better colour. 2 (68), Stoke Newington A.S. Nice finnage, but not condition. 3 (67), Portsmouth A.C. Scaled Veil. Sound fish, but conspicuous caudal fork. 4 (63), London Transport (C.R.S.) Sports Assoc. (Aquaria Section). 5 (62), Walthamstow A.S.

GUPPY SECTION AWARDS

CLASS A11 (a). CHALLENGE CLASS (MALE GUPPIES) (10): 1 (76), 4 (tie) (68), 6 (67), Mrs. G. White, Bottomswords, Goldlaceds, Topswords; 2 (74), 3 (73), L. G. Hayward, Scarftails; 4 (tie) (68), Fulcham, Doubleswords; 7 (66½), A. Prior, Black Veiltails. CLASS A11 (b). FEMALE GUPPIES (11): 1 (81½), A. Prior, Golds; 2 (80), 3 (79), 7 (64), D. Johnson, Coloureds; 4 (73), 6(67½), H. Gartrell, Coloureds; 5 (70), Mrs. G. White, Gold-laceds.

Points in Furnished Classes at WATER LIFE Show

Exhibit No.	COMPETING SOCIETY OR INDIVIDUAL	Fish: Selection	Fish: Size	Fish: Quality	Plants: Selection	Plants: Quality	Design and Technique: Design and Gen. Effect	Originality	Permanency	Clarity	Compost, Rockwork	Planting	Points Awarded	Prizes
	Max. Pts.:—	5	8	12	10	15	15	5	5	5	10	10	100	
	CLASS A1—INTERCLUB TROPICAL FURNISHED AQUARIA													
1	"57" Club	2	5	6	5	8	9	2	4	3	6	6	56	—
2	Hendon A.S.	3	6	7	8	10	9	3	4	4	8	7	69	7th
3	The Twenty Club	4	6	9	8	12	11	3	4	5	7	7	76	2nd
4	Hendon A.S.	4	6	8	6	7	7	1	2	5	4	6	56	—
5	Absent													
6	Hendon A.S.	4	6	10	8	10	9	3	4	5	8	7	74	4th
7	Amersham Grove A.S.	2	5	7	6	11	7	1	4	3	5	5	56	—
8	Hendon A.S.	4	7	11	8	12	9	3	4	4	6	7	75	3rd
9	Stoke Newington A.S.	3	6	9	7	10	9	4	4	5	6	7	70	6th
10	Hendon A.S.	3	5	6	6	9	8	2	3	4	5	6	57	—
11	Arnold Aquarists	3	6	9	5	7	6	1	2	4	4	5	52	—
12	Hendon A.S.	4	7	10	7	10	9	3	4	5	6	6	71	5th
13	Kingston A.S.	3	5	6	5	7	6	1	2	4	4	5	48	—
14	Surrey A.C.	3	6	8	6	10	9	3	2	4	8	7	66	—
15	Fulham A.S.	4	7	10	7	9	8	2	3	4	5	7	66	—
16	Walthamstow A.S.	3	5	7	5	7	7	2	3	4	5	6	54	—
17	Absent													
18	Thameside A.S.	4	7	11	8	12	11	3	4	5	7	7	79	1st
19	N. London A.S.	3	7	8	6	7	7	2	2	4	5	6	57	—
20	Catford A.S.	4	6	9	6	8	6	1	3	4	5	7	59	—
21	Lambeth A.S.	4	6	9	5	9	5	1	3	3	4	6	55	—
22	Absent													
23	Spelthorne A.S.	3	7	8	6	8	8	4	3	4	8	8	67	—
24	Willesden A.S.	2	6	8	7	9	8	3	3	4	6	7	63	—
25	London Transport C.R.S.	3	5	6	6	8	10	4	4	4	7	7	64	—
26	West Middlesex A.S.	3	5	7	7	10	9	2	2	4	7	7	63	—
27	Absent													
28	Spelthorne A.C.	3	6	8	6	8	7	2	2	5	7	6	60	—
29	Southall A.S.	3	5	7	7	10	9	3	3	5	7	6	65	—
30	Aquarium Club, Fulham	4	6	10	5	9	8	2	2	4	4	6	60	—
31	Chelsea A.S.	2	6	9	5	7	5	1	2	2	3	6	48	—
32	Portsmouth A.C.	3	5	6	4	7	6	1	2	3	4	6	47	—
	CLASS A2—INTERCLUB COLDWATER FURNISHED AQUARIA													
1	Hendon A.S.	3	5	9	5	7	9	4	4	5	8	8	67	4th
2	Surrey A.C.	3	5	7	8	9	7	3	4	3	6	7	62	—
3	Hendon A.S.	4	7	10	7	9	9	3	4	3	7	8	71	3rd
4	The Twenty Club	4	6	10	8	11	10	3	5	5	8	7	77	1st
5	Hendon A.S.	4	6	7	8	10	7	3	4	4	6	5	64	6th
6	Stoke Newington A.S.	5	7	10	8	13	7	3	4	4	5	7	73	2nd
7	Hendon A.S.	5	7	8	7	10	6	2	4	3	5	6	63	7th
8	North London A.S.	3	5	6	6	7	9	3	3	5	7	5	59	—
9	London Transport C.R.S.	5	7	10	6	7	7	2	3	5	5	5	62	—
10	Absent													
11	Willesden A.C.	5	6	8	5	8	9	3	4	5	7	5	65	5th
12	London Transport C.R.S.	5	6	7	7	8	6	3	2	2	5	6	57	—
13	West Middlesex A.S.	4	6	7	5	7	8	3	3	4	5	5	58	—
14	Aquarium Club, Fulham	4	6	6	5	7	6	2	3	3	5	5	52	—
	CLASS A3—INDIVIDUAL TROPICAL FURNISHED AQUARIA													
1	Absent													
2	Bowd, L.	2	6	9	4	8	5	2	2	2	4	4	48	6th
3	Wood, Mrs. R. H.	3	7	10	7	11	12	4	4	5	8	7	78	1st
4	Absent													
5	Brown, S.	4	6	9	6	10	11	4	3	4	8	7	72	3rd
6	Absent													
7	Rabjohn, S.	2	5	8	6	9	9	3	2	4	5	6	59	5th
8	Atkinson, T.	4	7	9	7	12	10	4	4	5	7	7	76	2nd
9	Purcell, G.	2	6	8	5	8	10	3	3	5	7	5	62	4th
	CLASS A4—INDIVIDUAL COLDWATER FURNISHED AQUARIA													
1	Parslow, C. R.	3	6	9	7	12	10	1	3	4	8	8	71	2nd
2	Batey, H.	2	6	6	8	12	13	4	4	5	8	8	76	1st
3	White, R. N.	2	5	5	5	7	8	1	3	3	6	6	57	4th
4	Bevins, R. E.	4	6	8	6	7	8	1	3	5	6	6	60	3rd
	CLASS A5—INTER-SCHOOLS FURNISHED AQUARIA													
1	Battersea Grammar School	4	4	8	7	8	8	1	3	4	8	7	62	1st
2	Absent													
3	Emanuel School	3	4	8	6	7	7	1	3	3	8	6	56	2nd
4	John Perryn County S.S.	2	3	6	7	6	6	1	2	3	7	6	49	3rd
5	Absent													

Result of Interclub Points Competition :—1st (tie), Awards of Merit, Hendon A.S. and Stoke Newington A.S., 56 pts. each ; 2nd, WATER LIFE Diploma, Willesden A.C., 27 pts. ; 3rd (tie) Twenty Club and G.S.G.B., 26 each; 4th, Enterprise A.S., 17 ; 5th, London Transport C.R.S., 15 ; 6th, Thamesside A.S., 14 ; 7th, Portsmouth A.S., 10 ; 8th (tie), Surrey A.C. and N. Hants A. & P.C., 9 each ; 9th (tie), Bideford C.B.S. and Chelsea A.S., 7 each ; 10th, Walthamstow A.S., 6 ; 11th, Southall A.S., 4 ; 12th (tie), Aquarium Club, Fulham, Hornsey A.S. and Chelmsford A.S., 3 each : 13th, (tie) Chelmsford A.S. and Feltham A.S., 2 each.

News from the North-west ***By "Aquaticus"***

New Species of Water Mite Discovered

WE are fortunate in having Windermere, Britain's largest lake with the Freshwater Biological Association's station at Far Sawrey, as the centre of biological research into aquatic life, for there are some amateur aquarists whose interests go deeper than fishkeeping and fish-showing, fascinating though it is to encourage a keen and healthy competition. Water Mites, for instance, have their special clan of students and recently Mr. J. Green, of Bedford College, described to the Zoological Society of London his discovery, when collecting with a plankton net in Lake Windermere near Crow Holme, of a Water Mite new to Britain, *Porohalacarus alpinus*, and an entirely new species which has been named *Lohohalacarus dolgaræ*. Both kinds are probably more widespread in this country than literature implies.

The aquarium curator's job is a varied lot, and Mr. R. E. Legge, curator of Blackpool Tower Aquarium, had a novel task one night last December when policemen brought him a young seal with an injured tail, which a schoolboy found stranded on the North Shore. The tail was treated by Mr. Legge so that the seal could be placed on a Fleetwood trawler for liberation at sea.

Exotic Visitors

The marine aquarist should be interested in one of the results of the persistent south-westerly winds which have blown upon our shores so often this Autumn and Winter. Not only has the English Channel been visited by unusual numbers of that fascinating relative of the jellyfish, the Portuguese Man of War, but also the Irish Sea. At the end of November specimens reached Cardigan Bay, and one was found stranded at Aberdovey. In December others reached the Isle of Man, apparently for the first time on record. They are visitors from warmer, more southern seas, but this is not their first visit to the Irish Sea, by a long way. As far back as February, 1860, numbers of these beautiful animals were cast up on the Southport shore, following strong westerly gales.

The other year I mentioned in these notes the salmon observation tank built into the banks of the River Alwen, a tributary of the Welsh Dee, so that naturalists from Liverpool University and the Dee Fishery Board could observe and film the natural spawning behaviour of the salmon. Dr. J. W. Jones, who was responsible for most of that work, has recently been studying the male trout's courtship display in a six-foot long tank constructed in the zoology department of Liverpool University, in Brownlow Street, which probably has the most complete aquarium of British freshwater fish of any University.

This Trout tank is rather different from the average home aquarium, for its aim is to reproduce, complete with stones, the ecological conditions of a typical Welsh trout-spawning stream, with a controlled flow of water. It has already revealed a similarity between the spawning habits of trout and salmon, and several trout have spawned in the tank, and their eggs have been hatched out, and reared there.

Not everyone has the facilities and the funds available for such elaborate studies, much as one may envy the opportunities of modern students. Nevertheless, fishkeeping purely as a hobby, plays a useful part in life today, as was exemplified when R.Q.M.S. Jack T. Byrne, of Bolton (East Lancashire) recently returned home from the Far East to rejoin civilian life after 22 years' Army service. During his last ten years, in which he has several times travelled round the world on troop ships, his hobby has been Goldfish breeding. On arrival from overseas he remarked that in the quieter life of a civil occupation he was looking forward to being able to indulge in his hobby on a much larger scale.

The Potteries has long been a centre for the typical hobbies of industrial regions, such as fishkeeping, pigeon racing and cage-bird breeding, but, apart from the purely natural history societies, it is only in comparatively modern times that its aquarists have been organised. The North Staffordshire Aquarist Society, now in about its seventh year, recently moved its headquarters from The Bell and Bear at Shelton, to The Marquis of Granby, in Hanley, the most central and influential of the "Five Towns", and with a following of some forty members, it meets there on the second Wednesday each month.

The society lost a good member when its former secretary, Mr. H. Crooks, a pharmaceutist, specialising in growing bog-plants in pots and in line-breeding Guppies, etc., for certain colours, went to live at Rock Ferry in Cheshire. But his successor, Mr. J. Perks, of 6 Radford Road, Cliffe Vale, Stoke-on-Trent (a motor coach-builder by trade) is maintaining the interest in the society, ably supported by Mr. K. Durose, a Tunstall ironmonger, who is its chairman, and Mr. Vyes, the President. The society holds monthly table shows, and has had some outings to Belle Vue, to the Shirley Aquatics at Birmingham, "Joe" Grasby's Tarporley fish-farm in Cheshire, and it hopes to reach Blackpool and to expand the social side of its activities. It has also entered in the shows of some of its nearest societies, at Macclesfield, Chester, Stafford and even Bury, in Lancashire. One of its ideas for publicity has been to put eight or nine tanks on show in a local cinema for about a week, and in return the cinema has projected a slide on to the screen, advertising the society.

The problem of lectures is one that confronts most aquarium societies, and the North Staffs. meets this by giving each member of the committee a subject to speak upon, with several months notice so that he has time to prepare his material. This has produced talks on breeding and rearing Barbs, and one on marine life by Mr. Durose, who hopes to stimulate interest in that line although Hanley is so far from the sea. Incidentally, I should think that the society could arrange short series of visiting lecturers through the very virile North Staffs. District of the W.E.A., which sometimes provides lecturers for a local natural history society at Newcastle.

Five Members Have Fishhouses

The members of the North Staffs. Aquatic Society have about 200 tanks between them and about five members have fishhouses. The Chairman told me recently that he had built himself a small glass fishhouse for eight to ten tropical tanks. Until recently, Mr. Durose has specialised in Mollies, but now he is aiming to pair off fish which others have not got and is interested in Combtails (*Belontia signata*). The society has only five or six active lady members, by the way, and one of the difficulties of meeting in licensed premises is that they can only arrange outside activities for their few junior members. Unfortunately, one of the town's keenest aquarists, a doctor, breeding Guppies in the hope of attaining a perfect blue, is not a member.

In Clapham, Tutin and Warburg's "Flora of the British Isles," now the standard authority on our country's wild plants, *Cotula coronopifolia* (a small, yellow-flowered South African plant which is one of the rarer bog-plants of our countryside, but better known in cultivated bog-gardens), is given a flowering period of July-August. However, it was still flowering at the end of November and early in December, in pools, when the Merseyside Naturalists' Association held a field-meeting behind Moreton embankment (Leasowe Common) on the Wirral coast of Cheshire. This has also been noted in previous years. Nearly a century ago this plant was introduced by Lady Cust into Leasowe Castle gardens, nearby, whence it was put into these pools and has been established there over 50 years. Some years ago specimens were transplanted to Bromborough Pool and elsewhere, for it propagates readily in a watery situation, but it is not particularly showy, producing a profusion of light green, succulent foliage, but hiding its rather tansy-like flowers.

Belgian "Wonderland"

BELGIAN aquarists held their annual show in the Autumn and once again they gave it the appropriate title of "Wonderland."

To us in England it was a luxurious type of show. The event was held in a large hall with subdued blue lighting obtained by completely covering the roof with blue material. Again, from the roof downwards to the top of the fixtures, was draped the same blue cloth. Altogether it formed an effective and harmonious scene.

The centrepiece was a series of pools, stepping down from a height, with running water. The "hill" effect was covered with rocks and greenery, and when it reached ground lever there were beds of flowers and orchids. In the pool was a collection of flamingoes. The lower pond was diverted into a smaller hall and in the centre of this pool was an "ark" into which one entered via the gang-plank to see the collection of aquaria "on board." Also in the hall were groups of tropical vegetation, among which were stuffed animals and birds, giving a very natural yet exotic appearance. Another group was a moorland heath showing most of the wild animals and game birds, etc. that one would most likely see in various parts of our own countryside. Yet a further area showed an expanse of sand representing the Red Sea, complete with shell corals, etc. Other displays in various parts of the hall were collections of butterflies, moths, insects, stamps (zoological types) and, in the gallery, a selection of canaries—showing all colours—and other types of birds.

Regarding the aquaria, these were set around the hall in sets of three, each divided by banks of greenery.

Among the tanks were glass fronted aviaries, built to the same size and design as the tanks.

The aquaria contained many species of fish and the specimens were of excellent quality. Most just housed a shoal of one species, or at the most a few closely related types. The plants decorating the tanks were excellent for growth and were well chosen, not only to create a pleasing picture, but also to display the fish to the best advantage.

A number of the fish were showing very much higher colouring than is usually seen in Gt. Britain, and I was told that Belgian aquarists rely on peat in the aquarium to bring out these bright colours. Some of the aquaria were set up with water levels about two-thirds of the way down the tank, thus they were able to show plants with aerial leaves.

The male Fighters were ingeniously displayed in one tank with partitions so fitted that the glasses were invisible.

The organisers and the team that helped to put on this show, and the Antwerp Borough Council who supplied all the fixtures, are to be heartily congratulated.—C.W.G.C.

The series of well-designed pools where flamingoes disported themselves at the Belgian "Wonderland" show. Photograph by Mr. C. W. G. Creed.

By Air to the Antipodes

Founder Member of Torquay A. & P.S. Emigrates to New Zealand

PHOTOGRAPHS of Mr. R. Perrett in his [illegible], and of his garden ponds at Wellington, New Zealand, were reproduced with a short explanatory note in the June issue of Water Life. Mr. Perrett, who is taking a keen interest in fish photography, and has established himself as a Goldfish breeder, has given us an interesting account of his experiences on emigrating from the Mother Country.

One of his friends who had decided to go to New Zealand showed Mr. Perrett booklets issued by that country's Immigration Department. He and his wife became interested and decided that they, too, would like to try life there. Finding shipping space at a premium they [illegible] and experienced some unexpected delays.

The scheduled flight was a six-day one via Canada, Honolulu and Fiji. Leaving Heathrow in mid-October, 1951, they were informed by the stewardess, after one-and-a-half hour's flight, that they were turning back to Scotland. They stayed at Troon overnight. Next day, the flight commenced soon after 8 a.m. but instead of reaching Canada direct, bad weather made them make for Reykjavik in Iceland. The route was over Greenland and then Canada. After passing over Quebec, the plane landed at Montreal at [illegible].

Thanks to the delays, the connecting plane had gone but later a twin-engined Douglas flew them to one of the junction aerodromes where they transferred to a transcontinental airline.

From Vancouver a D.C.6 aircraft took them on their next stage. Normally it would have meant heading straight across the Pacific but they were fated not to run to schedule, a call being made at San Francisco to pick up an urgently wanted cargo of drugs for Australia. A few hours stay on U.S. soil gave them the idea of visiting the famous Steinhart Aquarium but on reaching its doors, the driver of the coach in which they and others were touring the city decided he could not risk making the party late so they drove away again!

Mr. Perrett writes of the next stage of the journey:— "That afternoon we left 'Frisco for Honolulu. We landed just after midnight and owing to our diversions had only one day there instead of two as promised. We saw all we could in the time available and walked along the grassy parklands at the back of the famous Waikiki Beach until we reached Honolulu Public Aquarium. It is set in the palm trees within a few yards of the shore and is mainly marine in nature. Formed in the shape of a cross and with a pool at the intersection of the arms, it makes the most of the space available and though outside it looks a poor place, it has a wealth of beautiful tropical marine specimens inside. Fish of all colours and all shapes glided around tanks, in communities mainly, and one thing that I can recommend to other public aquaria, and which I appreciated immensely, was a large tank fitted with special high powered lamps for colour photographs. This set-up is for cine-camera owners, but the curator let me take colour pictures with my ordinary camera. He was very interested to hear of the zoos and aquariums in the U.K. and the hobby generally. He has some 200 12 in. tanks dotted around with fish he caught locally in streams, including Mollies and other livebearers".

Taking off at midnight, the next stop was Canton Island, then Fiji and, after that, Auckland, N.Z. Mr. Perrett writes:— "The next day was a public holiday, not of course on our behalf, but merely to make things a little more difficult for us. We boarded the train for Wellington at 9 p.m. and endeavoured to get some sleep. Next day after a poor trip of many halts, some scheduled, some not, we arrived at Wellington, at 12.30 p.m. and were met by the President and Secretary of the N.Z. Aquarium and Water Garden Society. This was very much appreciated and we began to feel more 'at home'. They found us temporary board and generally assisted in every way they could. We spent a week going round all the house agents next and found the housing problem as difficult as at home, but one agent had what seemed a reasonably good place and we closed with him (it had a greenhouse in the garden).

"As soon as we were a little more settled, we had a look around for aquarists' shops but found only two that stocked accessories and a few fish. All fish of any interest must be obtained from other aquarists. Size for size, fish in New Zealand are dearer than at home and all equipment is also somewhat higher in price as it is all imported, mainly goods from the United Kingdom and fish from Australia, which lies 1,200 miles away to the W.N.W.

"Fishkeeping here has developed slightly differently in some respects from that in Britain, mainly in the heating and methods of stacking tanks. The usual way is to build a 'cupboard' of insulating board. This has one or more doors for access. Shelves are built inside and the tanks are enclosed with as many as possible, sometimes all of them, facing a hole cut in the board in line with the front glass for viewing. Some of these set-ups look very impressive in a darkened room, and it would seem more economical than the separate stands for two or three tanks as practised in England. Sometimes one or two tanks can only be seen by opening the door so that breeding is not disturbed by movement, and the heating is done usually with the bulbs supplying the light, aided in many cases by a small tubular heater, 2 ft. 6 in. long, as used for airing cabinets.

Different Type of Heating

"Many aquarists rarely use standard gluss tube heaters but employ the above set-up of boxes beneath the tanks holding one or more electric light bulbs. For controlling, the favourite device is the large water heater type of thermostat with the long brass stem. Most of the more usual fish are obtainable here but there are lots of notable exceptions. Neons are £7. 10. 0 per pair from Australia and few are to be seen in New Zealand.

"The tanks are usually 24×12 in. or smaller and are made not from angle iron but the thinner pressed mild steel, soldered or welded at the corners. Glass is dear and thinner than that normally used in Britain, yet with safety it seems.

"We were soon members of the New Zealand Aquarium and Water Garden Society and after a few weeks had gone by had acquired two tanks and some fish. All subsequent tanks were made, frames at work, and glazed at home. A so-called sun porch housed our collection indoors; by November 1953 it consisted of 18 tanks, and, in the garden, a pond 20×6 ft. in three sections. The greenhouse has a tub and an old bath and one concrete pond so far, but all operations take time and cash and we are going more steadily after this initial burst". (As will be seen from the June 1954 issue, Mr. Perrett has now an indoor fishroom.—Ed.)

"We have had some success with Calico Fantails (Telescope-eyed variety) and have also three very good Moors to try next season. On the tropical side, only a few fish have yet been acquired, Zebras, Nigger and Rosy Barbs, Albino Swords., Black Platies, Angels, etc. We have bred the Zebras, Albino and Black Platies and sundry odd ones and will start on the Niggers next. Only a state registered electrician can run plug points and the mass of wiring needed for aquatic life. The ordinary citizen is not even supposed to change a fuse over. I am working on this situation now, having taken one examination, but results are not yet known. As I was an electrician in England, I have hopes. Working for an electrical firm has meant that I could always call on new friends who were registered to help me out, and this they have done willingly. At the moment then I am fixed up aquatically and expansion will come in good time."

Lectures at South Bank

TWO of the four lectures previously announced have now been given at the South Bank Aquarium, London, S.E.1, the remaining ones in the initial programme being those by Mr. L. R. Brightwell, F.Z.S. ("Marine Aquarium Keeping for the Beginner and Advanced Aquarist") on February 15, and by Mr. F. C. Katritzky ("Aquarium Plants, Their Uses and Cultivation") on February 23. The fifth in the series, just announced, is to be given by Mr. A. Boarder ("Coldwater Fishes") on March 15. The lectures all commence at 7.30 p.m.

The Aquarium is to feature marine tanks and it is hoped to have regular imports of coral fishes with which to stock them.

Show Guides for Barbs

THE Federation of British Aquatic Societies will shortly have on sale show guides for fifteen Barb species. Their publication follows on the recent printing of a tropical breeders' class points list (4d. per copy), in operation from January 1, 1955. Both these booklets have been produced by the Judges' and Standards Committee. Mr. J. H. Gloyn, secretary of this Committee, gave the information to delegates attending the F.B.A.S. annual general meeting on December 11. He also said that Messrs. Bentley, Fox, Jones and Rawlinson, Guppy Federation judges, had been registered as F.B.A.S. "A" class judges and that six further judges, Messrs. Bartlett, Knight, Matley, Goles-worthy, Rider and Smythe, had been obtained through the South Coast classes. The Redhill society, seconded by Nottingham, requested that the Committee should progressively prepare standards for coldwater fish. This was agreed. Speakers commended the Committee for work done and Mr. J. Carnell paid tribute to Mr. H. J. Gloyn's efforts as secretary.

The result of election of officers was Mr. E. H. Riddle's appointment as chairman by 31 votes, compared with 8 obtained by Mr. S. G. Lake. Mr. R. M. Baylis was re-elected treasurer. New services secretary is Mr. L. Coatman, 10a Parkhill Road, London, N.W.3, who succeeded Mr. S. T. Jelly, to whom a presentation was made at the meeting. In view of Mr. Riddle's election to the chair five Council members had to be appointed, four for two years and one for a 1 year period only. Voting was as follows:— Mrs. Meadows (33 votes), Mr. Creed (37), Mr. Mellish (32), Mr. Moore (28), Mr. Meyer (22), Mr. Filmer (18) and Mr. Lake (17). Accordingly, Mrs. Meadows and Messrs. Creed, Mellish and Moore were elected to the Council for two years and Mr. Meyer for one year. Earlier in the meeting a proposal expressing confidence in the Council was unanimously passed. The retiring chairman, Mr. T. E. Butt, received an overwhelming vote of thanks.

Photograph) (R. L. Gardner
Mr. E. H. Riddle, new F.B.A.S. Chairman.

Two further applications for affiliation were considered. They were from Cambridge F.C. and Spelthorne A.C.

South-western Bulletin

UNDER the title of "Pisces," a bulletin now appears as the official organ of the S.W. Aquatic Societies' Association. Its policy is to give news of aquatic happenings in its district with particular emphasis on reports from member-societies. The publication appears six times a year and, commencing with the February issue, it is hoped to enclose the duplicated sheets in a printed cover.

Wembley Amalgamation

TWO of the three aquarists' societies in the Wembley area, the Wembley Aquarists' Society and Wembley and District Aquarium & Pool Association, have decided to amalgamate and will be known in future as Wembley and District Aquarists' Society. Meeting place will be Terry-Watson's Restaurant, Harrow Road, Sudbury, where gatherings will take place on the first and third Tuesdays of each month at 8 p.m. The inaugural meeting of the new body is scheduled for February 1. Future programme includes interclub shows, lectures, film shows, visits to neighbouring clubs, etc. All enquiries should be addressed to Mr. H. O. Munro, 41, Park Lane, Wembley, Middlesex.

Club Notes and News

The Editor invites clubs to send brief reports of meetings and announcements of forthcoming events. Items for the April-May issue should reach this office no later than Wednesday, March 9.

MR. R. F. THURSTON, 48 Whitehill Road, Cambridge, was elected secretary at the January 3 meeting of **Cambridge F.C.** Later in the evening Mr. Mason Smith put on a film show.

ANNUAL dinner and dance of the **Hants & Sussex Section of the Goldfish Society** was held at the Sandringham Hotel, Southsea, on December 11. Mr. J. O. Shaw, the area secretary, welcomed the guests.

THERE was a quiz session at the December meeting of **Norwich F.C.** Mr. L. Collins was question master. The society staged a small show in conjunction with the annual event of the Norwich Alliance Cage Bird Association.

MR. BURWELL has presented a cup to the **East Midlands Section of the Guppy Federation** for competition in the Roundtail Class at the Group's annual show. The first winner was Mr. J. Rudkin. The same exhibitor won both classes at the November table show and Mr. W. Burwell took three first prizes at the December event.

TWO WATER LIFE diplomas were presented to the most successful table show exhibitors at the annual general meeting of **Forest Hill A.S.** held on January 14.

PRESENT meeting place of **High Wycombe A.S.** is the Oakridge Road Baptist Church Schoolroom, Oakridge Road, High Wycombe, where gatherings are held on the third Wednesday of each month. The secretary is Mrs. F. Watts, 2 Leigh Street, High Wycombe, Bucks.

FOLLOWING the successful show held by **Plymouth A. & P.S.** in conjunction with the Young Plymouth Exhibition the awards were presented at the club's annual dinner on January 15.

MR. B. CALROW, 6 Axholme Avenue, Edgware, Middlesex, is now dealing with publicity for the **Hendon A.S.**

"The World Aquarist"

IT is now over two years since the World Federation of Aquarists came into being, but from the first the question of producing a journal had been considered. The aim was to publish a periodical giving details of the World Federation's activities, news items covering the fishkeeping hobby which were of international importance, personalia, bibliographies, reviews of literature and original contributions of a technical nature. It was intended that the publication should be of a specialised type and not a purely hobbyist's paper.

Now the first number has appeared and issues will be produced quarterly in January, April, July and October. The subscription is 7/6d. per annum and should be sent to the Administrative Centre, W.F.A., c/o Mr. W. Veldhuizen, 37, Stieltjeslaan, Hilversum, Netherlands.

The first issue is well produced and appears under the title of "The World Aquarist." Its editors, Dr. H. C. D. de Wit, A. Fraser-Brunner and H. Meinken have followed closely the policy laid down and have achieved a coherent editorial approach with material, which, whilst of considerable value to the enthusiast, could have appeared disconnected and difficult to follow if it had not been put together with care. Incidentally, most of the text is in English, but other languages, particularly French and German, may be used from time to time.

FOR the sixth time Mrs. W. Gascoine was elected secretary of the **Leicester A.S.** at the January 6 A.G.M. Mr. W. F. G. Meese is President.

ON January 5 there was a good attendance for a film show put on by the **Belle Vue (Manchester) A.S.** Next meeting will be on February 2 when Mr. G. T. Iles gives a lecture entitled "Poisson Exotique."

DR. C. W. COLE was a lecturer at a recent meeting of **Midland A. & P.S.** The next meeting will be at the Midland Institute, Birmingham, on February 24.

PAST and future Guppy standards were discussed at the December 6 meeting of the **Lebistes Study Group, Surbiton, Surrey.** This was followed by a talk on "Feeding." Mr. J. E. Edwards saying that he had found red garden worms eminently suitable for his Guppies and other livebearers. The group is studying and breeding Doublesword Guppies, Golden and Grey Roundtails, Robrons and Pintails, although the latter are only just beginning to be produced. In 1955 there will be discussions on water softeners, coloured lighting and base heating.

AT recent meetings of **Guildford A.C.** members have spoken on their methods of raising livefood and Mr. J. M. Carrington has given a lecture.

ON November 20 **Greenwich A.S.** staged a show at Charlton House in which there were over 100 individual entries, 20 furnished aquaria and four clubs entering for the breeders' class. Judging was undertaken by Mr. C. W. G. Creed. WATER LIFE diploma for best coldwater fish in show went to Mr. J. H. Brokenbro with a Sun Bass and a similar award for best tropical fish went to Mr. S. S. Savage with a Brown Acara.

FURNISHED aquaria were displayed by **Perth A. & P.C.** behind an attractively designed fascia at the local chrysanthemum show. Mr. Ewing, of Dundee A.S., has spoken on "Aquarium Plants."

THIRD annual Christmas party of the **Kettering A.S.** was held on December 18.

MR. C. D. ROE of Shirley Aquatics gave a lecture at the January 25 meeting of **Nottingham A.S.**

NEW secretary of **Surrey A.C.** is Mr. W. F. Walters, 41 Manor Drive, Hinchley Wood, Esher, Surrey.

WHILST "Killers of the Sea" was being shown at a local cinema the **Hampstead A.S.** had on view in the foyer a furnished aquarium containing Neons, Glowlights and White Clouds. The annual social was held on January 4, and the A.G.M. is scheduled for February 1.

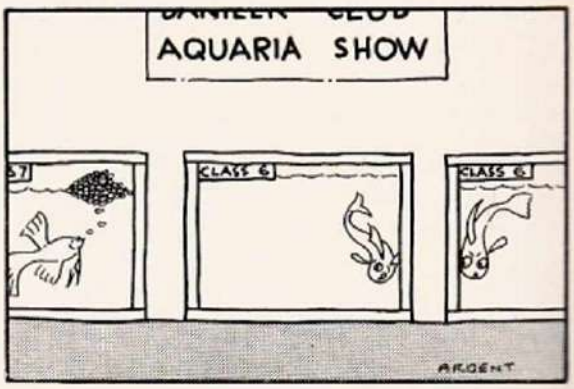
THE Christmas social of **Peterborough A.S.** was held on December 20. The A.G.M. night was January 17.

MEETINGS of **Hastings & St. Leonards A.S.** are now held on the first Wednesday of each month. On December 1 Mr. L. R. Brightwell gave a lantern lecture on "Sussex Marine Fauna and Flora."

NEW secretary of **Sunderland A.C.** is Mr. C. Theakstone, 52 Strand Street, Monkwearmouth, Sunderland.

THE following officers were elected at the A.G.M. of **Riverside (Hammersmith) A.S.**:—chairman, Mr. R. Barnes; vice-chairman, Mr. S. Holmes; show secretary, Mr. E. Daynes; treasurer, Mr. E. Owen and secretary, Mr. N. W. Webb.

ALDERMAN T. W. Slader, J.P., was re-elected President at the annual general meeting of **Exeter A. & P.S.** Other officers appointed were Mr. P. E. Parish, chairman, and Mr. A. W. Chapple, 185 Heath Barton, Whipton, Exeter, secretary and treasurer. Following the A.G.M., films were shown. On February 1 the title of the talk will be "Diseases of Fishes."



"HIS OWNER IS IN THE SPIRIT LEVEL BUSINESS!"

THERE was a good attendance for the A.G.M. of **Cambridge A.S.** The chairman is Mr. B. K. Elkerton, the vice-chairman, Mr. J. Tingey, the treasurer, Mr. H. Waugh, the publicity officer, Mr. R. A. Grant and the secretary, Mr. C. P. Gibson, 100 Sedgwick Street, Cambridge.

FINALISTS in the South West Middlesex Aquarists' Association competition for the Mrs. Charles Memorial Trophy were **Slough, Windsor A.S.** and the Uxbridge society.

THE **Dartford A.S.** has been inaugurated and Mr. K. G. Downs, 26 Chastilian Road, Dartford, Kent, is its secretary.

A SOCIETY operating in the Shirehampton area is the **Avon A.S.** Interested fanciers should contact Mr. R. R. Brooks, 7 East Shrubbery, Bristol 6.

THE A.G.M. of **Burnley A.S.** resulted in Mr. D. Loder being elected chairman and Mrs. D. Loder being re-appointed secretary.

NEW meeting night of **Bath A.S.** is the first Thursday of each month. Mrs. M. I. Crisp, 3a Bartlett Street, Bath, has been elected secretary.

THE Mayor of Middlesbrough judged furnished aquaria put on by **Middlesbrough A.S.** members in conjunction with the

Club Notes and News

(continued from previous page.)

Middlesbrough chrysanthemum show. Exhibits were assessed from the artistic point of view only and silver cup and first place went to Mr. V. Bennington. An award card was taken by Mrs. J. Bowyer, who was second, and also by Mr. F. Tuffnall, who was third.

MR. J. BURGE took first award in the December table show for Siamese fighters arranged by **Lambeth A.S.** and judged by Mr. J. Vosper. Mr. A. Fraser-Brunner spoke at the December 15 meeting.

RECENT lecturers at meetings of the **Dunstable A.S.** have been Messrs. H. Russell Holland and W. L. Mandeville, who spoke on "Characins" and "An Aquatic Investigation," respectively.

FIVE tanks containing Goldfish and tropical fish, and a 3 ft. vivarium, provided the display of **Aylesbury A.S.** at the 1954 Aylesbury Association exhibition.

FIFTEEN new members were enrolled at the second meeting of **Horbury A.S.** held on November 29. There was a show for livebearers won by Mr. G. Outhwaite. The society is to install an aquarium in the Stanleyburn Hospital. On January 24 there was a table show for egglayers.

AT the A.G.M. of **Balham A.C.** it was decided that future meetings would be held on the first and third Mondays of each month. All officers were re-elected with the exception of the chairman who did not wish to continue in office.

ON November 29 the **Southern A.A. Brighton** held its "Best Bred Fish of the Year Show" judged by Mr. Cheale. Winner of the Richardson Cup was Mr. J. H. Wilson and three members tied for first place in the breeders' egglayers competition. They were Messrs. F. Braby, W. Glyde and R. Coldman. Winner of the livebearer section was Mr. F. Braby.

A NEW society has been formed in Essex under the title of **Thurrock A.C.** Its secretary is Mr. E. Couchman, 134 Palmerston Road, South Stifford, Grays, Essex.

NEW secretary of **Doncaster A.S.** is Mr. C. Dinsdale, 10 West Grove, Doncaster. Meetings are now held on the first Thursday of each month in the Art Gallery and Museum, Waterdale. Mr. Dinsdale informs us that 13 aquariums containing tropical fish and two holding native fish and Goldfish are now on view in one of the rooms in the Waterdale Museum. In addition, there are two special exhibits.

FOLLOWING the resignation of the founder-chairman of **King's Lynn A.S.** Mr. A. J. Claxton, he was unanimously elected an honorary vice-president. Mr. W. Baxter is the chairman, Mr. D. W. Everitt, the treasurer and Mr. A. Wakeham continues as secretary. At the February meeting Mr. M. Courts will speak on "Fish Foods" and a table show is arranged for March.

MR. R. E. SKIDMORE, 36 Bruce Street, St. Helens, Lancs., is the secretary of newly-formed **St. Helens A.S.**

WINNER of the secretary's cup for the highest points scored at table shows organised by **Bridlington A.S.** was Mr. L. Wardill. Table shows are to be held monthly and a plaque will be provided for juniors.

IN conjunction with the Hobbies Association Exhibition, **Blackpool & Fylde A.S.** are staging furnished aquaria in a local store from February 5-12.

SERVING Herne Bay, Tankterton, Whitstable and Faversham, the **Herne Bay A.S.** has been formed, with Mr. E. J. Pascoe, 77 Poplar Drive, Herne Bay, Kent, as its secretary. Meetings are held on the third Thursday of each month at the Royal Hotel, William Street, Herne Bay.

Aquarists' Internationale

Further Items from Correspondence Received by Mr. R. W. Andrews

PROFESSOR C. W. EMMENS (Sydney University, Australia), writes:—"The Dwarf White Worms you sent are doing very well.* I have given away several sub-cultures and I particularly like them because they are fairly clear and flourish at a higher temperature so that they can be kept in the fish room. I find that, if fed on a mixture of about 10 per cent yeast in Farex, they multiply so rapidly that a daily feeding is possible from a small culture. This is the same mixture basically as I use for my Mikro-worms, which also do very well. Although livefood is not a particularly acute problem here and we can obtain some all the year round, it is very nice to have a guaranteed non-infected source for particular purposes, and so I am also trying to grow up Brine Shrimps to adult size. It looks as though they can be extremely crowded and that fairly small culture tanks with aeration are enough to supply a fair amount of livefood."

MRS. N. du Breuil (Hong Kong), writes:—"My marine tank is something of a fancier's nightmare. I know it is part beginner's luck and mostly the locality, but my tank gets crowded with all sorts of incredible fishes and other denizens of the sea. This morning I had brought in the diver a very large sole of sorts, much sought here as food-fish, so of course I had to have that to satisfy my amah. Three little Chinese urchins brought, in a beer bottle with a broken neck, a very handsome Demoiselle type fish, chestnut brown with a white collar, and the ugliest angler fish I have ever seen, with appendages all over it. It was a bright yellow colour and had a wicked mouth. Recently I also got a long gargoyle-like fish which is yellow when it is not pink and opens a mouth one could almost drive a cart through. I have three largish *Dascyllus* which are deep velvet brown, shading to bright orange on the underparts and snout and their two bars are blinding white, becoming palest blue at certain times. The fish take *Tubifex* quite willingly while most other fish eat some small fry the size of Danios, so there is no problem with the feeding so far. I have also got a couple of Gobies, some groupers and two very wicked neatly-black fish and with hermit crabs and snails, it is a perfectly mad dream of a tank.

*Professor Emmens had informed me that, to the best of his knowledge, no cultures of Dwarf White Worms existed in Australia. Consequently an experimental culture was packed in a small plastic box and despatched by air mail—although, of necessity, the package had to be sealed tight, the miniature worms arrived in good condition.—R.W.A.

Revised Guppy Standards Booklet

A REVISED edition of the popular Standards Handbook of the Guppy Federation has been produced and available at the WATER LIFE Show in January. Actual basic body colours are shown for Grey (to be called Guppy Green), Gold (to be known as Buttercup), and Goldlaced fish. Guppy Green is British Colour Council No. Z52; Buttercup, British Colour Council, No. 53, and Goldlaced body colour (Gold), British Colour Council No. 114. Copies of the new booklet can be obtained from Mr. H. S. White, 203 Kempton Road, East Ham, London, E.6, price 1/7½d. post paid.

The Judges' and Standards Committee of the F.G.B.S. has ruled that in future the number of judges allowed per Section shall not exceed one quarter of the Section's membership. The Committee has also decided that show jars should be clear with no colouring permitted, apart from the red cap.

Bedford Area Group

IN our last issue we reported the proposed formation of an aquatic societies' association for the Bedford district. Additional news now comes from the Bedford A.S. secretary, Mr. R. R. Pope, that the 30-mile radius around Bedford over which the group will operate is an elastic distance and societies interested should contact him at 51 Aylesbury Road, Bedford. He adds that it is not the intention of the member-clubs to break away from the F.B.A.S.; each will continue its affiliation to the national body.

London Group of B.H.S.

OFFICERS elected at the A.G.M. of the British Herpetological Society's London Group were chairman, Mr. B. M. Smith; treasurer, Dr. J. F. D. Frazer; committee, Messrs. J. D. Thompson and R. L. Johnson, and secretary, Mrs. M. Green, 49, The Greenway, Colindale, N.W.9.

Film Strips

ON page 308 of our last issue reference was made to a new film strip entitled "Life in Ponds", prepared by Marian Ray, of Surbiton, Surrey. We now learn that the individual frames were prepared from Marian Ray paintings and the commentary, in the form of a booklet, was written by Mr. J. Clegg, F.R.M.S.

Traders' Dinner

FIFTH annual dinner and dance of the Pet Traders' Association (previously the Aquatic Traders' Association) will be held at The Windsor Castle Hotel, Victoria, London, S.W.1, on Wednesday, February 2.

THE bulk of the aquariums, light shades and sectional metal staging used at WATER LIFE show at Olympia were on hire from the National Aquarists' Society. The electrical apparatus (heaters, thermostats and aerators) were loaned by Angel Electrical Industries Ltd. The ready co-operation of the N.A.S. and the makers of Angel products contributed in no small way to the success of the exhibition.

Photograph] [J. L. Anderton

Members of Rochdale A.S. with some of the 60 odd trophies they have won over the past year. They have taken over 170 prizes in that time. A major success was at the last F.N.A.S. event.