

The AQUARIST AND PONDKEEPER

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F. A. Reuter

Mr. Churchill visited this year's National Aquarist Society's exhibition in London and revealed that he had kept fishes for 40 years. Other pictures taken at the exhibition are on page 108

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1952

Editorial

GADGETS appeal to most of us, and their appeal is, if anything, greater for aquarists than for other people. Show the fishkeeper a new siphon, a tricky filter or a device for removing empty snail shells "in one deft movement" and he will, as a rule, fall for it before you can reel off the name of a single characin. In fact, most fish-houses are littered with gadgets, some invented, some borrowed, some bought; some working, some discarded and some in the process of hatching.

The man who has the inventive gift however is seldom he who also possesses facilities for manufacturing and marketing his gadgets on a commercial scale. This may even be a good thing for the pockets of we inveterate gadget-buyers, but the monotonous presentation of gadget variations on the same theme which may be detected in price lists suggests that a few new ideas might be welcomed by those who make. Our contributor in this issue, for example, who claims that his spawnings are influenced by atmospheric pressure, would doubtless be pleased to have a handy built-in aquarium barometer. And there are numerous other instruments we would buy with alacrity were they available.

How about a nice automatic gadget for removing algae from the leaves of plants? This might be modelled (we suggest in all modesty) on the lines of an electric razor. A compact fish sex-detector would be extremely helpful, and so would a gadget which would whisk away fertile eggs from prolific parents as fast as they were laid. Useful too would be a device for attracting every daphnid in a pond to the water flea net when it was wielded. For the beginner, something that would cluck like a hen whenever he adds an extra ladle-full of dried food or strains the aquarium's fish-supporting capacity with yet another trio of fishes should not be beyond the genius of a physicist. Maybe these suggestions can be met in the future; such pieces of equipment we would be proud to place beneath our tanks with all the other items which once seemed equally wonderful.



AQUARIUM SCIENCE



LIVE-BEARING tropical fishes have often been used in scientific studies because of their small size and the ease with which they may be kept in the laboratory, and, of course, because their frequently produced yet sizeable broods of young allow many generations to be followed by the geneticist in a relatively short time. These fishes have also been studied closely in attempts to elucidate their mechanism of fertilisation.

The extreme rapidity of the sexual act in the guppy, for instance, defies the eye to follow all that happens. It is now universally agreed, however, that in the livebearers the male organ (gonopodium) does not need to enter the female's vent for fertilisation to occur. The essential part of the mating act is that the tip of the gonopodium is brought somewhere near the vent of the female at the time of the "thrust" and a sticky packet containing living sperms is then shot out to gain entrance and bring about fertilisation.

A study of the swordtail made in America revealed that direct vent contact by the male lasting as long as a second occurs once in several hundred thrusts, and in the platy one thrust in 200 may result in the fishes clinging together for two or three seconds. The odd thing is that this direct contact does not appear to secure proper fertilisation. Of 16 female platys which had experienced this lasting contact with the male only one fish was found to have been fertilised. This would indicate that the "clinging" or "locking" is an abnormal or accidental happening, not an essential feature of the sexual act.

It may seem that the mechanism of the act as described is a rather haphazard kind of reproduction but it must be remembered that the males of the livebearers are continually mating and that once a packet of sperms is successfully deposited these can live for some time in the female, long enough to fertilise eggs giving rise to as many as five or six broods. The arrangement is certainly an advance on the promiscuous shedding of sperms and eggs together into the water indulged in by other fishes.

One of the diseases of fishes most feared by Continental fish farmers is the one which produces bloating of the bodies of carp, popularly known as dropsy. Despite much research work there is still controversy about the causative organism of this infectious disease. In Russia, workers claim that a virus produces the complaint. German research workers are agreed that a bacterium does the damage, but they disagree between themselves about the number of types of dropsy in carp and whether the same germ is responsible for all dropsy or whether several different germs are involved.

Most commonly the disease is accompanied by abscesses on the swollen bodies of the fishes but whether the absence of these means that the dropsy is of a different type is not clear. The bacterium usually blamed for carp dropsy is *Pseudomonas punctata*; a recent examination of a number of diseased fishes did not show this species but another bacterium, and the suggestion has been put forward that various kinds of *Pseudomonas* all produce similar symptoms. Treatment of the condition has not been successfully worked out for use on fish farm scale but control measures include draining, drying and treating infected ponds with lime. In 1948 approximately three-quarters of the total 5,000 acres

of fish ponds in Germany's most important pond culture region were found to be infected with fish dropsy.

Among the many characters of a fish taken into account by ichthyologists when describing and defining a species are the number of separate bones (vertebrae) the fish has in its backbone and the number of rays in its various fins. It has been thought for some time that when fishes of the same kind are found to differ in these numerical characteristics this indicates that they are distinct varieties from populations isolated from one another geographically or in some other way.

The results of experiments carried out at Danmarks Akvarium during the past 10 years throw new light on this matter. Using sea trout in laboratory aquaria the Danish

scientists have shown that influences in the surroundings of a developing fish can alter the number of vertebrae or fin rays it will form. Eggs "stripped" from a single female trout, fertilised with milt from a single male, have been taken for each experiment. Temperature was one environmental factor studied, and in these experiments the eggs were divided into batches of

equal size and kept at varying temperatures between 37° and 57° F. until they hatched. Then the fry were taken at the end of the yolk sac stage and examined under the microscope to count fin rays and vertebrae. It was found that fishes from eggs kept at the higher temperatures had more vertebrae than those from lower temperatures; the fin rays were seen to be constant in number in fishes hatched at one temperature and that others reared in temperatures higher or lower than this particular level had less fin rays.

Next the effect of transferring the developing eggs to water of a different temperature from that in which they were first placed, at varying time intervals after fertilisation, was tried. The newly hatched fry were examined as before and after a large number of experiments had been performed in this way it was seen that for each temperature level there was a period of development of the eggs beyond which transferring them to water of a different temperature did not produce changes in the number of vertebrae. It was also discovered that just before the "eyed-egg" stage there exists a "super-sensitive" phase during which sudden changes of temperature produced the greatest effects. Thus, fry from eggs subjected to large temperature changes during this phase were found to have three or four vertebrae extra to their brothers and sisters who had been kept at a steady temperature throughout development. These experiments showed as well that the time at which the future number of dorsal and pectoral fin rays is determined is later than that at which the vertebrae number becomes fixed.

Factors other than temperature were found to affect the eggs' development. Lowering the oxygen content of the aquarium water surrounding the eggs produced fry with greater numbers of vertebrae; increasing the carbon dioxide content of the water caused a reduction in the number of these bones in the fry.

Earlier laboratory work has shown that guppies raised at higher temperatures have more dorsal fin rays than normal, and that the amount of salt in the water bears some relationship to the number of plates developed on the sides of fresh water and salt water forms of the stickleback.

by
ANTHONY EVANS

A Cichlid for the Community Aquarium

by F. L. HOWE

A PART from the angel fish and some dwarf cichlids, most members of this family are usually considered unsuitable for the community tank. This is undoubtedly true of the larger and pugnacious species, but I should like to recommend the Egyptian mouthbreeder (*Micropogonias multicolor*) to aquarists as an exception. I have found this species exceptionally well behaved, the males are very colourful (especially when viewed in natural light from the side) and the breeding habits are most interesting.

I have kept two males and four females together in a large community aquarium for about nine months with no trouble. The tank contains about 40 other fish, different species of all the usual families being present. The only sign of pugnacity towards other members of the community has been shown when a pair have decided to spawn, and then no damage has been done, either of the pair simply chasing away intruders from the selected breeding spot. Fry (which one would not expect to find in a community tank) and young guppies or other very small livebearers are usually considered "fair game" by these fish, but they are not alone in this respect!

Smaller Sized Cichlids

The species does not grow large; specimens are usually about two to two-and-a-half inches when fully grown. The body colour of the females is a yellowish-grey colour; the male also the ground colour of the males but other colours such as blue and orange are present on the body and fins. The name *multicolor* implies, however, the colouring of different specimens is very varied. The caudal and anal fins of both sexes have markings rather like arcs in them, these markings in the specimens I have being blue in the males and white in the females. Both sexes have a black spot behind the gills.

Spawning, according to some authorities, is by means of a red spot on the anal fin of the males. I cannot vouch for this, however, as neither of my two males show it, but their bright blue and yellow scales and the blue arcs in the fins make seeing an easy matter, as the females have no such ornamentation. Both sexes have the large head and mouth characteristic of all the mouthbreeders. I find them very accommodating in their food requirements, taking both dead and live foods, but as one would expect, preferring the latter.

Breeding the species I have found an easy matter, but a word of warning here. As with all cichlids, males are fussy about their mates, and unless a true breeding pair can be obtained, the best method is to purchase half a dozen youngsters, grow them on and let them pair themselves. I selected what I considered to be my best pair, on one occasion, gave them a tank to themselves and endeavoured to encourage them to mate by feeding liberal quantities of live food. Nothing resulted after about two months so I abandoned the idea. In the meantime, however, the male left in the community tank had mated with one of the three females, having selected his own wife. Once mated a pair will usually remain so for life, although



Photo: L. C. Monderville
Male (lower fish) and female Egyptian mouthbreeders

a male may mate with more than one female.

My method of breeding is as follows. The pair are allowed to mate in the community tank, and when the female is observed with eggs in her mouth she is removed to another small tank and left on her own. The eggs appear rather like small mustard seeds in the mouth, which is considerably enlarged. It is often rather difficult to see if the female has eggs in her mouth; unless the spawning act is observed, three useful indications are that during the incubation period the female remains at the water surface, refuses all food, and when viewed from the back, the gills stand out from the head due to the stretching of the mouth.

The mating process is most interesting, the pair either digging a depression in the sand or cleaning a flat stone, and driving away all intruders to the spot in the meantime. The eggs are then deposited by the female and fertilised by the male, the female then taking them up into her mouth, where they remain in the buccal cavity. The female keeps up a chewing motion whilst carrying the eggs and fry to ensure a circulation of water. The tenacity with which the female retains the eggs is remarkable, and providing the netting from the community tank and transfer to the breeding tank is done carefully, she will neither swallow them nor spit them out.

I know of a case where a female carrying the eggs was netted, transferred to a can and taken to the home of another aquarist and there in due course produced an excellent brood! I find the depth of water in the breeding tank should be about three to four inches, as if deeper, the smaller and weaker fry inevitably develop swim bladder trouble and become "bottom shufflers."

The female retains the brood for about 15 days, the actual time varying with the temperature, something between 75° to 78° F. seeming to suit best, although I have had results at 70° F. The fry will, however, swim back into her mouth for safety if danger threatens. The female may be removed after three or four days, when the youngsters can look after themselves. Infusoria is necessary for the fry after they leave the mouth of the female, but providing the water in the breeding tank is old none need be added, as there usually seems to be sufficient already present. In any case the fry will take micro worm from the first day and fine dried food, but any fry which may be a little backward undoubtedly benefit if Infusoria is present. After about 10 days the

(Please turn to page 92)

Fish Breeding by the Barometer

by CHRISTOPHER FRAME

FISHKEEPING has many aspects relevant to it, such as the study of antibiotics, genetics, etc., but I have found no one with what I have discovered to be a winning double—fishkeeping and meteorology. Yes, it's quite true, and from the results I have obtained by my breeding-by-the-barometer methods, I think it is a hobby worth some serious study by other aquarists.

I found that weather and aquaria are really well and truly tied up in success or failure. We can measure everything in some way or other, but no one has yet weighed up the weather and its effect on fish, plants, water, and—results. I know your aquaria look the same whether it is raining, snowing, or howling a 70 m.p.h. gale; warm or cold outside, the temperature of the tank water just goes on fluctuating between 72° and 77° or whatever you like it to be. But is it? I am beginning to think quite differently on this point.

Forecasting Spawnings

We all have our own methods for spawning the various fishes and from experience firmly believe that we can and do provide the right conditions. In many cases we are successful. But my opinion is that these are cases of sheer luck. Can you promise large spawnings of large fish nearly every time you spawn? Can you forecast to a day when a pair of fish will spawn? Can you aim at 90 per cent. quality and get it? I have discovered a way, quite accidentally, which in the future may enable me to provide some of those questions with an answer of "yes."

About a year ago I repeatedly tried to spawn a pair of beacons (*Henigranomus ocellifer*) which had in the past spawned without any difficulty. They are ready spawners and ideal for the beginner. They are a particular favourite with me—ever seen a large shoal of them moving in and out of the aquarium plants? I did everything I had done previously and which had brought good results. The set-up was correct as far as I knew and conditions, visibly, were ideal. On this particular day they were having the usual chase round the tank when suddenly they ceased. I thought at first they had spawned but closer examination proved otherwise. There was nothing in the tank but two disappointed-looking fish.

This strange event became a family joke as I repeatedly tried over and over again. Eventually, they did spawn. I took full credit for the happy event. Doesn't every breeder? Anyhow, it was over and I had no record of anything happening during the two months of failure. During this same period I had tried unsuccessfully to spawn *B. oligolepis*, *B. titteya*, *H. scholzei*, *H. flammeus*, and *Pristella riddlei*. I thought at first that my luck was out or that I was losing my technique at being a match maker. I consulted aquarist friends who all agreed that I had "hit a bad spell."

Then it happened. I had moved four pairs of fish into the spawning tank while I pondered over selling them or waiting for advice. Each pair spawned within one hour. From the spawnings came a mixed batch of extremely good fish consisting of *B. titteya*, *B. oligolepis*, *Pristella riddlei*

and *H. flammeus*. I never recorded the number; there were so many that I disposed of a large percentage of them.

That very morning I had tapped the barometer, commenting that the bad weather—and it was bad to say the least—was over. The needle was rising almost visibly. My wife rounded it off by saying: "No wonder the fish are full of life." That was it. I started experimenting with every kind of fish I could lay hands on. In addition to seeing they were in good condition I made the spawnings "dead certs" by watching the barometer. In four months of success after success I felt I had proved my point. You can do what you may, but a new phase of the aquarists' world has been born. Simply—barometric pressure.

I tried the same method with livebearers. Virgin females were paired with quality males when the barometer needle was highest. If this was done when the moon was full and pressure high the results of the first birth were really astounding. They were unusually large, deep bodied, and in larger numbers than we normally expect. This was the case with the various platys, mollies, and American type guppies.

But was it barometric pressure? Was it possible that it could affect the fish? The unusual thing was that the most successful spawnings in high pressure periods (about 30.5 ins.) were lower temperatures, sometimes as low as 72°. Good results have also been obtained in bad weather but again the barometer was the ace card. I waited until the needle stopped falling and the moment it began to climb—a big spawning. This was done at the usual breeding temperature.

I found, too, that fish would not spawn if the pressure fell after they were placed in the spawning tank. If it was falling slowly they did, but the results were below the general average of barometer breeding. Some fish will spawn in any pressure—low or falling—but they are the odd ones out. The most amazing results were noted when the needle hit bottom and started to rise very rapidly. It was almost impossible to stop the fish spawning. I believe a writer some time ago wrote in *The Aquarist* of such an event with two angels who would not cease spawning. In my experience it was certainly a case of a rapidly rising needle—nothing else but that.

Stimulating Effect of Pressure

The barometric pressure appears to affect the water and to cause the fish to be stimulated in some way. I have not yet discovered how but maybe the future may reveal it. Maybe it is the same thing which causes grandma's leg to ache when rain is on the way or uncle to have a headache when the moon is full.

Of course, I have touched only the edge of something which may well be a part of every aquarist's routine in the next few years. There is more to it than meets the eye. There is more in it for me too. I have taken meteorology seriously and use it for planning outings and holidays. My strange double has paid off in more ways than you would expect because, you see, to-morrow's weather means success or failure for both holidays and fish breeding. And I know what to-morrow's weather will be.

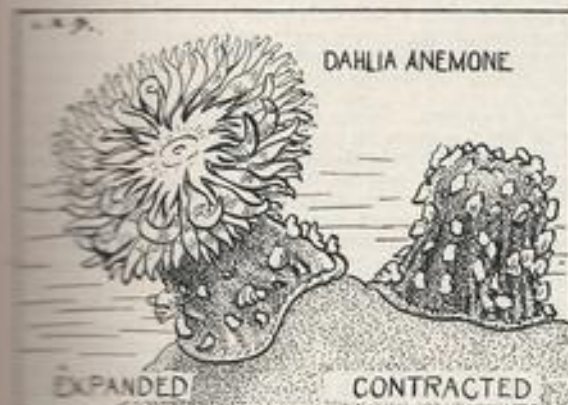
(A pressure of 15 lbs. to every square inch of surface exerted by the atmosphere and this pressure will support a column of mercury approximately 30 ins. high in a barometer. Atmospheric pressure fluctuates as the masses of air covering the earth's surface move about so that the rate and direction of change of barometer readings—not just a single reading—can be used to predict coming weather.)

Journal of a MARINE AQUARIUM

by L. R. BRIGHTWELL

SINCE my last notes appeared the shore has undergone a striking change. Peacehaven, marked "Danger Point" on the charts, is still relatively poor as regards its coastal fauna, apart from limpets, mussels, rock whelks and immense numbers of *Actinia*. But Rottingdean, only a few miles to the west, presents another world. The pools teem with small hermits, and the rocks have provided me with two anemones new to my tanks.

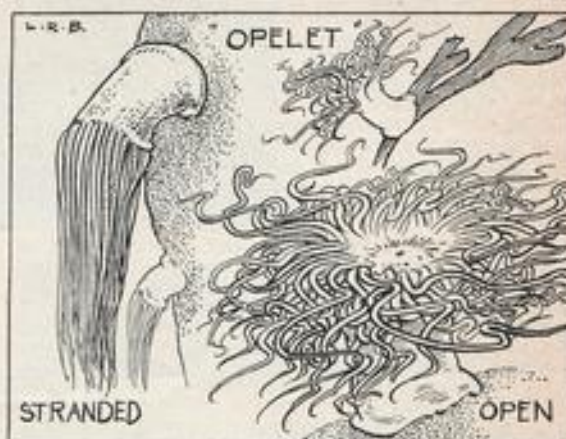
One is *Anemonia sulcata*, the snake-locked or opelet. It is a lovely creature, with long jade green tentacles delicately tipped with lilac. It never seems to close, but it can do so on occasion, and is unique amongst anemones in that it glazes in direct sunshine. It always affects the margins of pools, and when stranded its long tentacles hang down in a



straggling bunch, like a lady's hair on shampoo night. The opelet will perch on weeds, or a bamboo stuck upright in the gravel of the tank floor, and is a voracious beast, making short work of the liveliest prawn.

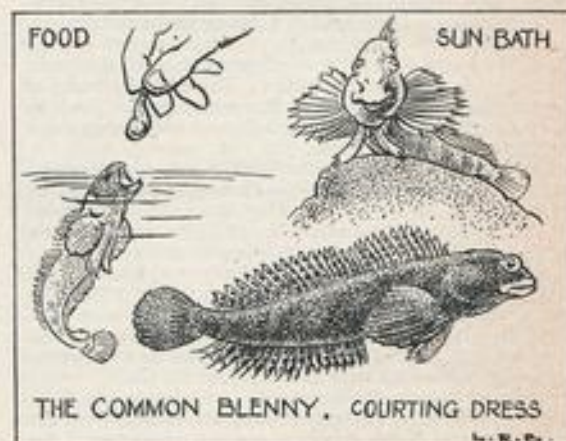
My other newcomer is a specimen of the dahlia anemone, *Actinia telma*. These inshore examples are about as big as a hen's peep, but deep water specimens may stand eight inches high and measure at least ten across the crown. Such a monster will engulf a whole whelk in its shell. The age of a sea anemone is unknown, but there is a record of a *Actinia* that has been in the possession of the Nelson family over a century, and is still apparently in its heyday. It is fed, like mine, on shelled mussels and garden worms.

The inshore form has the column, thick as one's wrist, encased with large warts or tubercles that collect quite considerable pieces of shell grit and small stones. When the anemone contracts it passes for a heap of debris, and so escapes the notice of many large fishes which wander about at high water. In the north this splendid anemone is used as bait for long lines, and in France it is sun-dried and fried in butter. The flavour recalls that of lobster.



The blenny tank is very lively these days. Blennies dislike cold, and hide if they can in such snug retreats as empty *Pholas* borings, favourite refuges also for many kinds of crabs besides the tasty little "clovice" or pullet clams *Tapes pallastra* and *T. decussata*. The blenny loves sunshine, and in bright weather actually basks on an exposed rock like the well-known "mud skipper," the desideratum of all "trop-fans." A near neighbour keeps blennies in a four-foot tank with no other aeration than a daily stir with a glass rod. My fish feed with such avidity that they seize a whole mussel from one's fingers, and show a strong desire to include a piece of fresh finger into the bargain. The blenny will live in a tank for up to five years, and was first bred by Saville Kent at the old Manchester Aquarium.

For promiscuous destruction the almost amphibious shore crab is in a class by itself. It can open mussels, and does, and will kill on sight anything it can master, just to test its edibility. Lately I painted the seams of a tank with bitumastic paint. The crabs had this stripped off in no time,



and inundations, all over my workroom floor, resulted. Now I have given the tank a deep flooring of gravel, in which the crabs burrow. In the sea they must do much to aerate the ocean floor, but my flooring, in so confined a space, will of course have to be renewed from time to time. This also obtains in most large public aquaria.

Swarms of sea slugs, *Doris* and *Eolis*, are coming inshore to lay their egg ribbons, also the sea hare, that covers its tracks by dyeing the water for a yard round with royal purple. Prawns, too, are in evidence. They make delightful aquarium pets, but the tank must be kept covered for they are great jumpers. At night, when they are specially active, their eyes glow like hot coals.

One of my infant hermits has cast its shell. This, of course, is the common lot of all crustaceans, but the situation, tricky enough at any time, is aggravated in the hermit's case, since he dare not leave his borrowed home to disrobe. It must be like undressing in a barrel. Once clear of his old suit, changed even to the gills and stomach with its millstone-like teeth, the house-hunt begins afresh, with

redoubled vigour. Some of my Rottingdean hermits look very smart, got up in shells from the Indian Ocean and the Barrier Reef. Colour, or such adornments as spines and tubercles, seem to raise no objections, provided only the fit is right.

An aquarium is full of handy hints for the fisherman. Thus mine show clearly that the prawn loves to perch head downwards on any available upright, which explains why jetty piles are ideal hunting grounds for such as use gins or other trap nets. Also the fouler the food the more it whets his appetite. Recently I made a fine bag in Shoreham Harbour, using as bait a fortnight-old dog-fish head. It had to be carried to the scene of operations in a sealed jar.

The young edible crabs and adult lobsters are working inshore, also gobies, bullheads, rocklings and fifteen-spined sticklebacks. The wrinkle now enjoys a four month's rest, by law, but my last year's diary says that whitebait is due in a fortnight. As the late Mark Sheridan used to carol . . . "You can do a lot of things by the seaside that you can't do in town."

Some Floating Aquarium Plants

by JACK HEMS

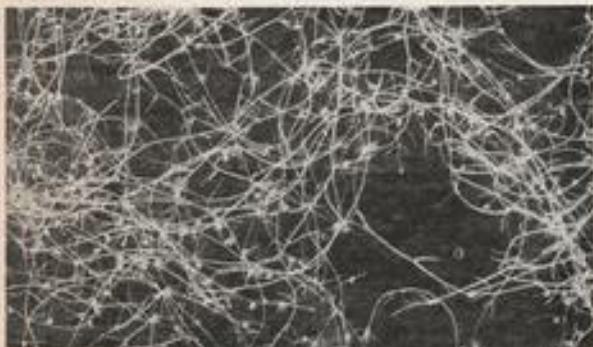


Photo:

Dwarf bladderwort (*Utricularia*)

G. Timmerman

SOME floating plants are very beautiful, and during the summer months they can be useful as well as decorative. For instance, the labyrinth fishes or anabantids love to build their bubble nests beneath the large rosettes of deep green foliage produced by the floating fern (*Ceratopteris pteridoides*) from South America. The feathery roots of this aquatic also help to keep the water crystal clear by starving free-swimming algae of light and nourishment and trapping stirred-up sediment.

Then there is dwarf bladderwort (*Utricularia prebensilis*), a species which looks like a tangled skein of pea green sewing thread floating in the water. This interesting plant from the shallow streams and lake sides of Africa and Australia has tiny bladders, which though adapted to the capture of living organisms found in old aquarium water, are much too small to endanger the lives of baby fish. Dwarf bladderwort is unrivalled as a shelter plant for newly-born live-bearer fry; it can also be anchored to the floor of the aquarium with a few heavy stones and used as a spawning mat for oviparous fish such as barbs and the like.

The water lettuce (*Pistia stratiotes*) from the sunny West Indies, and the water hyacinth (*Eichhornia speciosa*) from the warmer parts of North America, are two aristocrats of the

heated aquarium. Of the two species, the water hyacinth is the easier to grow, for it can stand quite a lot of knocking about by the fish and will thrive at ordinary room temperature; that is, 60° and above. This is not the case with *Pistia*, which must have plenty of bright, but not scorching, light, a moist tropical atmosphere above water, and no pulling about by the fish. Given these conditions it will grow large and satiny and produce masses of roots among which baby fishes love to hide.

The humble duckweed (*Lemma*) collected from a drainage ditch or field pond, will quickly adapt itself to a warm water existence and smother the surface of the aquarium with a pretty carpet of fresh green fronds. Apart from its use in providing shade, it is a favourite green food for many vegetable-eating fishes such as mollies, gouramies, the larger barbs and scats.

Lemma trisulca, the ivy-leaved duckweed, is a rarer and more decorative form which always stays just submerged. Its common name is completely descriptive of it, for it looks just like a miniature ivy growing underwater.

A Cichlid for the Community Aquarium

(Continued from page 89)

youngsters will take newly-hatched brine shrimp and from then on their growth is rapid.

During the incubation period the female refuses all food and is consequently very emaciated at the end of this time, but soon fills out again when she starts feeding. The species will breed several times a year if allowed to, but the female will not have a fair chance to pull up between broods, and I suggest three broods a year fairly evenly spaced out, to be the best policy.

Quite an interesting fish, I think you will agree, both for experienced aquarists and the beginner, and one which could well enable a fascinating family of fishes to be better represented in our aquaria.



*A page for
the beginner
contributed
by*

A. BOARDER

THESE are some directions for those aquarists and pondkeepers who are going away on holiday. First of all, if the pond is not over-stocked with fishes it can be left quite safely for three or four weeks without you having to do anything to feed the fishes at all whilst you are away. The larger the pond and the longer it has been established the less likely to go wrong and the less attention will it require. If the pond is very small, see that there are not too many fish therein. In a well planted pond there is always something for the fish and they will spend most of their time browsing about around the sides finding food. However you do, see that no extra food is given before you go away. Don't think that the fish will starve, and throw enough food "to last them" for a fortnight. Most of this will be eaten and can soon cause trouble by polluting the water. The warm weather will cause the water to foul more quickly than during cold weather.

If you have spawning size fish in the pond and have reserved a shallow part of the pond for them to spawn, it is a good plan to place some form of cover over this portion to prevent cats from catching the fish as they use the shallow. I have made a framework of wood with some netting stretched across, which I always place over the shallow end of my pond each night when a spawning is expected, and this is left on when I go away on holiday. If you have a good aquarist friend it may be helpful to ask him what to do now and again, not to feed but just to see that all is going well.

The indoor tank may appear to present a problem to the aquarist but there is no need to have any fear that your fish will starve whilst you are on holiday. In an ordinary indoor tank there will be some food available for the fish in the form of algae and small particles of water plants. A hungry fish can be seen mouthing over the plants for hours on end and it will be obtaining quite a quantity of food whilst doing so. As with the outdoor pond I say that there is no need to get anyone to come in each day to feed the fish. They may be left alone quite safely. If the tank is in a light position near a window I advise that it be moved if possible to a darker and cooler position in the room. Remember that a tank is likely to keep in far better condition if it does not get too warm. In very warm weather, especially in thundery times, the water can become lacking in oxygen and the fish may be in trouble. Before you go away give the tank its usual weekly servicing and remove any dead water plants. On no account must you give the slightest bit of food extra before you go away, and when you return you will find that the fish are in better condition.

Some ago I kept tropical fish and before going away I borrowed a lad who was very interested in fish how to look after them whilst I was away. On my return I was confronted with a number of jam jars filled with dead fish. All the adults were dead and only a few fry remained alive. It was over-heat and there had been a hot spell which had

soon turned the water so foul that hardly anything could live in it. I learned my lesson from that time and have never again left an interested person in charge. Whether I have old fish or fry to leave they all get the same treatment. Absolutely no extra food before I go and I have never yet found any fish on my return dead from starvation.

If your indoor tank is lighted from above make quite sure that the lamps are not left on whilst you are away from home. They would only tend to increase the temperature of the water and this is just the thing you must avoid. Another important point is to check up on the number of fish in the tank together with their sizes. Many aquarists set up their tanks in the first place with the appropriate sizes of fish for the tank but forget that with good treatment and feeding the fish will grow and so may become overcrowded. If you find that you are near the maximum of one inch of fish to 24 square inches of water surface you must remove a fish or two so that there is no possibility of there being too many fish in the tank during the warm weather. It is far easier to keep a tank and the fish in a healthy condition if you have reduced the number of the fish.

It may be thought that the above remarks about feeding apply only to dried or packet foods, but this advice can apply to live foods as well. If a large number of water fleas are placed in a tank before the aquarist goes on holiday they will take a good deal of the oxygen from the water and the fish will gorge themselves too much at first, probably to their detriment later on. The same thing can apply to *Tubifex*. If too many of these are placed in a tank they will burrow into the sand at the base of the tank and may live on for some time, to be eaten later. This may be all right, but what often happens is that the fish eat far too many in a short time and I have often noticed that some fish appear unable to digest *Tubifex* properly and they are often voided in a half digested condition; pollution of the water is then almost certain.

Early hatched fry should be making good headway and by now the second brood will be coming along well. They should now be able to take most kinds of foods but so much will depend on how much room they have. Where the fry have been crowded they will not have grown at anything like the same rate as if they had plenty of room. Always be guided by the weather when judging how often to feed fry. The warmer the water the more often must the fry be fed. Sort out the young fish as soon as you can because the more room you can give the better fish, the faster will they grow. Grade the fry as early as you can and although you may not be able to pick out the winners it will be possible to throw out all those which are not likely to make good specimens.

The outdoor pond will require attention during August. Where there are a number of water lilies in the pond it may be found that some may become so overcrowded that some pruning is necessary. The water lily leaves may have grown to such an extent that the whole surface of the pond

(Continued overpage)

"Slippery Sammy" Again

by H. ROUGHTON-SKELTON

IT is now more than a year since I wrote about "Slippery Sammy," my pet eel (*The Aquarist*, March, 1951). In February Sammy was placed indoors in a small aquarium because, while on my daily outside inspection, I found his small tub nearly frozen solid; so once more Sammy was thawed out and fed. He refused all food until the temperature of his water reached 50° F., but because he had ignored food for three months before this I thought it expedient to try to force him to eat. No doubt in natural surroundings, eels would seek deeper and warmer water and keep feeding until later in the year.

I mentioned last year that in two years of captivity, Sammy had increased in length from 11-11½ inches to 14½-15 inches. In the past year he has grown another 1½ inches, and to my delight (or perhaps to our mutual delight) he has won a first in the A.O.V. coldwater class in a table show. The judge, who is very well known in fishkeeping circles, explained afterwards that although competing against a pike, carp, tench, perch and golden orfe, the condition of the eel (one of the primary considerations in judging "unstandardised" fish) won the day. Much may be said for a diet of garden worms!

Greater fame was thought to be in store for Sammy, as

"Sammy" the eel receives an arithmetic lesson to test his skill



the N.A.S. show was considered to be a "walkover" (slideover!) for him in the A.O.V. class, such was our inflated esteem of Sammy. But this triumph did not materialise, because the N.A.S. show rules stipulated a maximum body length which immediately excluded Sammy. No doubt the "brass hats" who decide the rules had heard of Sammy and had hurriedly taken defensive action!

Since last year many strangers have written, and more disbelieving friends have called, all to cast doubts on the wonders of Sammy. One obnoxious person even remarked that it was a wonder that Sammy could not read or write. Such a doubt could not be left in people's minds, so the enclosed photograph was immediately taken of Sammy having his weekly arithmetic lesson!

Stepping Stones (continued)

is covered. In such a case the fishes can seldom be seen. Some of the older outside leaves can be cut off, and it will be found that if the lily has become too crowded many leaves will stand up out of the water instead of lying on the surface. This trouble is often brought about by the pondkeeper planting too many or too large-growing types in the first instance. It is perhaps difficult to visualise the pond four or five years ahead, but it is often found that once water lilies

become established they grow too fast, especially if they have been planted in a small pond with a lot of loam in the bottom. I do not recommend that soil should be placed in the pond at all. It is much better if all plants are set in separate containers, as they can be controlled better and can also be removed for the purpose of cleansing the pond annually. Plants other than water lilies may require some attention and in warm weather there is nothing to prevent lush growth.

Next month I hope to be able to deal with some unusual types of cold water fish for those with a pond and a liking for something more interesting than the common goldfish.



Pond in the Picture—11

Where the formal pond finds its place is in a regularly arranged garden, and this circular pond with its central statuary forms the mid-point of an orderly layout. Its three-part surround is unobtrusive, flags, cobbles and bricks in concentric strips.

Photo:

H. S. F. 301

Lysenko Theory of Heredity

by MARGERY G. ELWIN, B.Sc.

IN the last article in this series I gave a brief account of the principles of the Mendelian theory of inheritance. In America and Western Europe this is the orthodox theory and is accepted by the majority of scientists, though some have expressed criticism and others are becoming increasingly worried by "awkward" facts which will not seem to fit in.

Research in the West is mainly carried out on laboratory animals kept as far as possible under uniform conditions. Relatively simple characters, such as eye colour, coat colour and hair or bristle formation are studied and the results of these experiments usually seem to "fit in" with the Mendelian theory very well. But when we come to practical breeding under natural conditions the picture changes. For instance, Professor John Hammond, the foremost authority in this country on the scientific improvement of farm animals, has this to say in his book *Farm Animals*:

"A large number of mutations have occurred, and are occurring, in our domestic animals; but practically all of them give rise to defective characters or fancy points. In domestic animals there are only two which have any semblance of real economic value, the Ancon sheep with shortened legs, which prevent it from jumping fences, and the Dopplender calf, which has the valuable muscles of the back and loin doubled. Even these are of doubtful value, for in the latter, at any rate, the animals are sterile. For the most part these mutations are the bane of the livestock breeder's life, for they give rise to degenerate and abnormal forms which detract from the efficiency of the animals in producing milk, meat, wool, etc." And again, "Having seen the sort of characters which arise from mutations, we cannot visualise these as forming the basis of the improvement of economic characters in our livestock. Now let us consider how the dominant, the normal and economic characters are formed. The development of all these economic characters is dependent on the environment in which the animal is reared and kept." (my italics).

Environmental Factors

It is precisely these characters of which Professor Hammond has such a poor opinion, i.e. mutations, that are studied in the laboratory animals. It will be noticed that Professor Hammond does not reject the Mendelian theory but simply indicates that it gives him little help, since all the characters in which he is interested depend very largely on the environment. Geneticists consider that changes in the environment merely complicate the issue by affecting the degree of development of a character in the individual, while they deny that they have any effect whatsoever on that which is passed on, i.e. the inheritance.

While Hammond's remarks merely imply that the Mendelian theory is limited in application, other observations, such as the cases of purely matroclinal inheritance (inheritance of characters solely from the mother) mentioned in my last article throw doubt on the whole theory. It has also been found by some scientists, working under natural as opposed to laboratory, conditions, that when characters segregate, the proportions in which they are obtained in the

offspring may depend not only on the inheritance of the organism but also on the environment. This, of course, is very disconcerting.

The Mendelists believe that the heredity of an organism is determined solely by its ancestry and is not affected by changes in the environment. Apart from the introduction of new characters by cross-breeding they state that changes only occur by "mutation", a process they consider to be entirely a matter of chance and to have no relation to external conditions.

The Michurinists (or Lysenkoists) believe that, although the nature of an organism is largely determined by its ancestry, it is also very much affected by the environment. They believe the environment actually modifies the inheritance, that characters which it brings out tend to be inherited more strongly in the next generation, while those which it inhibits tend to become weaker. They agree that the inheritance of an organism is usually very conservative and hard to change, especially where vital characters are concerned. This must be so in order to maintain the stability of the organism. But they believe also that, under certain conditions it can be radically changed and, moreover, that the direction of the change can be controlled. This is not just "wishful thinking" but is based on the results of a number of experiments. Details of these cannot be given here owing to lack of space. Here I can only deal with general principles but further particulars are now available for anyone who is interested.

Lysenko Genetics

Theoretically the Lysenkoists argue that it is quite impossible for any particle of living material, such as a chromosome, to be unaffected by its environment. Since it is living, they say, it must necessarily assimilate food substances, etc. from the living tissues around it. If these food substances are altered this must in some way affect it. The idea of genes, which are said to be particles of living matter, being responsible for the development of all the characters of the organism but being themselves quite unaffected by changes in the organism, seems to them quite illogical. Following from this they argue that if changes in the environment do in fact affect the nature of the organism, i.e. its heredity, then it should be quite possible, if we had sufficient knowledge, to alter the environment in such a way as to make the organism change in the direction we require. Most of the work is now concerned with working out ways in which this can be done.

Any given organism, by its very nature, requires definite conditions for its existence and development. If certain of these conditions are not available it must adapt itself and in so doing change its nature or die. The Lysenkoists believe, on the basis of many experiments, that those organisms which have been forced to change in this way, will produce offspring which are also changed and are better adapted to the new conditions. They say that if the process is continued for several generations the nature of the animal or plant concerned will often change so much that it will now actually require the new conditions and will not be comfortable in its old environment. It will, in fact, have changed its "heredity."

On the basis of their experiments they also find that attempts to change the nature of an organism are only likely

to be successful under certain conditions. A full, mature organism, for instance, is usually very conservative in its nature and strongly resists change, whereas a very young individual is much more malleable. One might parallel this with the case with which one can influence a child. But often it is not quite as simple as this; the influence has to be brought to bear not just during youth but at a certain particular stage of development, neither before nor after.

It has also been found that an old-established variety which has become thoroughly settled down and established is usually very unadaptable, whereas a cross between two varieties has a much less conservative nature and is therefore much more able to adapt itself to new conditions. Michurinists call such crosses "shaken" organisms. The more distant the relationship of the parents, the more will the heredity be "shaken." Michurin also found, in plants, that he got the most malleable forms by crossing species from distant places with different environments. He found that if he used a native species for one parent the heredity of this plant, which was already well adapted to the local conditions, would tend to swamp the characters from the other, but that where neither were native the offspring would not only have a mixed inheritance but also, since they were growing under conditions strange to both heredities, would tend to be very receptive to outside influences.

Future in Fish Breeding

This all seems a far cry from fish breeding, but it gives rise to some interesting speculations and might suggest possibilities for experimentation. In breeding for colour, for instance, according to the Mendelian theory, once we have built up the best combination of genes there is no hope of making further progress apart from waiting for a mutation to "turn up." But according to the Lysenko school of thought we might well improve the strain by outside influences, such as light, food, etc., and the effect might not only be obvious on the original fish, it might be passed on to the offspring. There is also the question whether the

effect might not be more marked if we were dealing with young fish or with hybrids. Again it may be that telegony (the influence of a former mating on a later brood) may not be quite such an old wives' tale as scientists believe. It is hardly feasible that it would affect egg-layers but it is not inconceivable that the presence of developing embryos in a livebearer might have some permanent effect on the mother and this in turn might be reflected in subsequent offspring by a different father.

"Rank Heresy"

As one who for many years was an absolutely implicit believer in the Mendelian theory, I realise these suggestions are rank heresy, but apparently well established theories have proved incorrect in the past and others will in the future. It should, of course, be made quite clear that it is not the results obtained by the geneticists which are in doubt but their interpretation. The main points of the controversy are the fact that the Mendelists hold that the Mendelian laws and proportions apply under all circumstances and that they absolutely deny that changes in the environment have any direct influence on heredity. All they concede is that the organism which happens to fit in best in the new environment is most likely to survive and leave offspring. The Lysenkoists, while accepting in general the ideas of segregation, independent assortment, recessive characters, etc., say that the whole process is much modified by the environment, that in the more complicated characters the Mendelian laws may not apply at all, that the heredity of an organism can be altered by changes in the environment and that when we know enough about the life processes of an organism we can direct the change.

As I said earlier, I have been unable to give in this article any details of the experiments on which this new theory is based, and in any case none of the work as far as I know has been done on fish. But those who are interested may like to read further or even "have a go" at trying some experiments for themselves.

FRIENDS & FOES No. 5

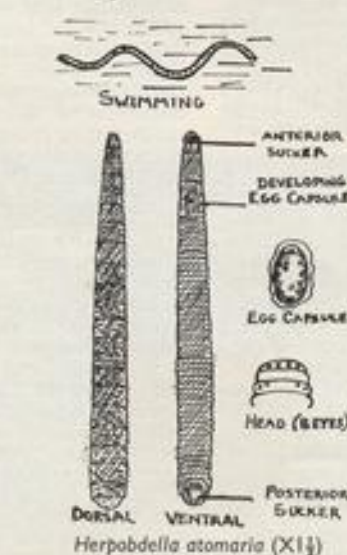
LEECHES—1

PHYLUM—Annelida, from Latin *annulus*—ring, and Greek *eidos*—like.

CLASS—Hirudinea, from Latin *hirudo*—leech.

THERE are 11 known species of British leeches, not all of which are likely to be encountered by aquarists in the normal pursuit of their hobby. In this and next month's notes I will deal with those species that are almost certain to be seen from time to time.

The two commonest, or at least the two most noticeable, both belong to the order Arhyncobdellidae (from Greek *a*—without, *rhynchos*—snout or beak, and *bdella*—leech). One of these two is sketched here, and is called *Herpobdella atomaria* (creeping leech covered with spots). The other is similar in every way except that it has no spots, and is known as *Herpobdella octoculata* (creeping leech with eight eyes). Creeping is effected by alternate expansion and contraction of the numerous small segments of which their bodies are



Herpobdella atomaria (X1½) comprised. Both species are also capable of swimming gracefully and com-

British Leeches

paratively rapidly from place to place. When so doing they closely resemble pieces of brown ribbon about one-fifth of an inch in breadth and from 1½ to 2 ins. in length.

Their food consists entirely of *Tubifex* worms and "bloodworms," which they swallow whole. They could, of course, swallow small fish fry, but to date I have no record of them adopting this practice, and think it unlikely that they are a danger to fishes. They can exist for some months without food of any sort.

Like all leeches they are hermaphrodite, possessing both male and female sex organs. Cross fertilisation is usual, but not essential. Eggs are laid in a capsule, which is then sloughed in the same manner as that of the garden worm, and fastened to a stone or the stem or leaves of aquatic plants. The capsules are oval, brownish and somewhat hard, and may often be found in great numbers attached to the undersides of lily pads.

C. E. C. Cole

THE AQUARIST

AQUARIST'S Notebook



by John Gunn

IT was reported in my paper that Mr. Winston Churchill, on his visit to the National Aquarist Society's show in London, "raised smiles by imitating the mouth movements of cichlids." I wonder if these were the same fishes that earned deepest gratitude during the visit of a much less important person—yours sincerely?

I had with me as companion a young lady of 12. She was I thought, treating all the information I could muster for her about the exhibits a little disinterestedly, and I began to be less and less sure of myself—until we visited the cichlids. My remarks about the pugnacity of these fishes were accepted with the same "they look ordinary enough to me" air until I longed for a savage fight to break out.

Then, at the tank of a firemouth cichlid, I stopped and ran a finger along the glass. The male firemouth was transformed; his colours flushed deepest red, his gills and throat expanded like a crimson hood and he sailed in with all guns bearing on my finger, from all directions. My young friend looked on with excited interest, and I could see that my stock was considerably higher. For that display of glorious activity which saved my reputation, many thanks Mr. Firemouth!

At the National Show there were many fine furnished aquaria to be seen and I would be very disappointed if the beholders of these did not all go away full of intentions and ideas to increase the attraction of their own home aquaria. The winning furnished aquarium in the societies' entries class, for example, showed just what can be done by using rocks to bank sand. The plants massed at varying heights above the general base level in the banks of sand completely masked the limited confines of the aquarium—it seemed as if through this small window a part of a much larger pond was being viewed.

The care with which rocks, pebbles, chips and sand had been matched in many of the aquaria was most marked. I know that the argument can be put forward that matching strata is not always a truly natural picture, but for me the most pleasing tanks were those in which matching had been studied.

I heard a lot of favourable comment on the display of



Photo:

Valerie Lilly

A furnished tropical aquarium in which rocks have been used skilfully to bank the sand at different levels. Plants include Ludwigia, Indian fern, Cryptocoryne, hairgrass, Sagittaria, Ambulia and Bacopa. This aquarium, entered by The Lotus Aquatic Society, was the winner among furnished aquaria from societies at the N.A.S. Show this June

water plants at this show, too. They were indeed very fine specimens, demonstrating that aquatic botany could itself be a rewarding study. Perhaps water gardening for its own sake is too much neglected these days?

If I needed to be reminded about the necessity for aquarium glazing compounds to remain reasonably soft and resilient and not set hard then the remainder was most strenuously brought home to me last month. An old three-foot angle iron aquarium of mine had several cracked panels, and was becoming rather rusty, so I decided to take it down and completely re-glaze and re-paint.

This was a very old tank, in continuous use for over 25 years, and it was made in the days when less attention was given to aquarium cements. Exactly what the cement used was I cannot say, but it was as hard as the iron frame itself and took me many hours of patient chipping to remove it. With all my care the intact glass panels became damaged at the edges by the efforts needed to displace the cement.

Although the tank had given good service over all these years I think that its life would have been much longer uninterrupted but for this rock-like cement, for its non-yielding setting for the glass was undoubtedly responsible for the cracks which appeared in the course of time. However, the aquarium is going back into commission, this time with a modern glazing compound and a frame adequately treated with aluminium paint beneath its exterior finish to prevent rusting.

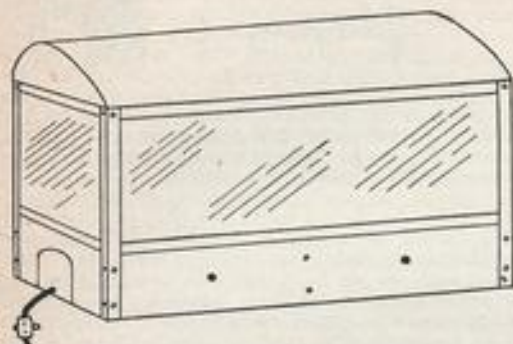
Do not hesitate to shade aquaria which are exposed to full natural lighting at this time of year. Fishes will appreciate a little reduction in light, your plants will not mind it for a few weeks and you will save yourself the worry of excessive algae development.

Both the thread types of algae and the motile, suspended types grow rapidly in bright light, and now is the time that they give most trouble. Screens of paper around the tank, and over the top as well in very sunny periods, will stop these pests turning the water to pea soup. Garden ponds in positions where little shade is given and without lily pads can with advantage be screened with sacking—chiefly for the benefit of the fishes—during bright spells in August.

Credit where credit is deserved. The printed page is often used, and rightly so, to condemn and expose malpractices and false dealings, but perhaps cases deserving commendation are sometimes overlooked because of this. So after reading of so many cases of deplorable treatment of my long-suffering friend the tortoise let me congratulate Mr. Charles Wright, an aquatic trader of Kingston, Surrey, on his excellent provisions for these reptiles.

His tortoises, when not being exhibited for sale, are allowed first-rate sun-bathing facilities on the flat roof of his premises. Up in the light and air yet with shelter for bad weather, newly arrived specimens in particular are given the kindest introduction to our variable climate. Such care must do the maximum to impress customers with the necessity of proper treatment for the animals they buy.

Design for a Home-made Base-



MY brother-in-law is a tropical fish enthusiast, therefore, when one day last year we were seated quietly in the garden, it was not unnatural that the conversation should turn to that subject. According to him, there were positively no snags. Indeed, all that was necessary was a tank—the bigger the better, a heater, a thermostat, plus a few odd etceteras such as a thermometer, and I should be all set to go. I must admit that when he casually informed me that this would cost five to six pounds plus, of course, the cost of plants and fishes, my enthusiasm cooled.

This must have been most marked, because he hastened to say that it could be done cheaper if I would be contented with a small tank. Apparently there existed tanks about 14 ins. by 10 ins. by 10 ins. that were heated from beneath by electric light bulbs. Obviously this was likely to be much cheaper, but was much smaller than the tank I had in mind. However, I reasoned that if a small tank could be heated by electric light bulbs, why couldn't a large one? He agreed, but had never heard of one, and furthermore did not know where one could be purchased. My one course would be to make one. With the wonders of exotic fishes firmly planted in my mind, and with the enthusiasm of the beginner, I resolved to do this.

Tailoring to the Site

I had in mind a tank about 24 ins. by 12 ins. by 12 ins., but a calculation told me that a tank of these dimensions would, with water and gravel, weigh about 1½ cwts., and would therefore need a substantial piece of furniture to hold it. The only suitable place was on a flat-topped bureau which was very solid and substantial, but the size of the tank would have to be 28 ins. by 10 ins. by 8 ins. This would be a rather narrow tank, but fitted the top of the bureau exactly, and as this was the only place available, the size and shape would have to do.

The making of the tank was a fairly simple matter, and for the benefit of those who may be interested in the method of heating and would like to make their own tank, the following are the details of construction. The tank consists of a wooden base in which are housed the heating bulbs, and is in effect a shallow box, the top of which is the glass bottom of the tank. At each end of the box is a small door, on the inside of which is screwed an ordinary electric lamp holder. The doors are not hinged, but held in position by small clips on the outside. In the front of the box, two holes are drilled opposite the bulbs. At the back of these holes, pieces of red glass or celluloid are fixed to act as visible warning should the bulb burn out. The tank is made from 1 in. aluminium angle, and is screwed to the base. The

by W. NEWMAN

bottom of the tank is $\frac{1}{4}$ in. rough cast plate glass, whilst the sides are 32 oz. sheet glass.

Now for the details. It is essential that the sides of the base should be at least $\frac{1}{4}$ in. thick and 2½ ins. deep; also the edges must be quite straight, otherwise there will be a tendency for it to warp. When cutting the doors, it is as well to use a fret saw if possible, and cut them so that they have a dovetail effect. They are therefore wedges and will not fall into the box when placed in position. The bottom consists of a piece of three-ply. The asbestos mats laid in the bottom are asbestos cooking mats and prevent the heat of the lamps from penetrating the bottom. The tank frame does not present much trouble. Aluminium being soft, is easily cut, drilled and bent, but expands considerably even with a small amount of heat. Therefore it should not be used for large tanks.

Metal Frame

The uprights should equal the depth of the tank plus the depth of the base. These are screwed to the base at the corners. The bottom front and back members should be equal to the length of the base. The face of the angle at the ends should be cut away for one inch, to allow them to butt on the uprights, but leave a tongue to lay flat along the top of the base behind the upright. These members should be



Wooden base of the aquarium housing the lamps, which are mounted on the end "doors." A view of the finished aquarium is shown at the top of the page

screwed to but overlapping the base by the thickness of the angle (about $\frac{1}{4}$ in.). The bottom side members should be the width of the base less 2 ins. These are also screwed to the base and overlapping by about $\frac{1}{4}$ in., and should butt flush with the uprights. The top members should be cut equal to the length and width of the base respectively.

The ends of all these members should be cut for an inch down the bend of the angle. The faces of the angle at the ends should then be bent so that they will pass behind the upright. The top members are then rivetted to the uprights. A point to remember is that the rivets must be flush at the back of the frame. The holes for the rivets should therefore be countersunk at the back.

When glazing the tank use only a first-class glazing compound, and one that is made specially for the purpose. The glass should have no more than $\frac{1}{16}$ in. between the edges and the frame. There should be about $\frac{1}{4}$ in. of glazing compound between the glass and the frame. The bottom should be glazed first, and great care should be taken to make sure that the glass is firmly embedded. Next the front and back should be inserted; lastly the ends. These should

ated Aquarium

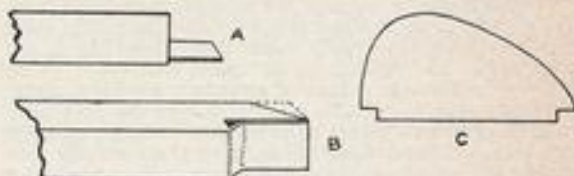
be a tight fit between the back and front glasses. The front, back and side glasses should fit tightly down on the bottom glass. The tank should now be left to set. The back can be painted on the outside—I painted mine a light blue. A loose piece of 32 oz. glass forms the top of the tank.

The top cover containing the illuminating lamps can be made as follows. Cut two wooden ends $\frac{1}{2}$ in. thick, the width of the tank, and about $3\frac{1}{2}$ ins. deep. These are joined together by strips of wood let into the front and back edges. Over the whole is tacked a sheet tin cover the length of the tank. Two holes are cut in the back to take two lamp holders. The wiring is also simple. The illuminating lamps are wired together with a switch to control them. The heating lamps are wired separately with a switch to each.

Heating Details

The wattage of all lamps is the same—15 watts. This seems to be very low, but it works: in fact, during the period I have had the tank in use it has proved more than enough. During the day, both illuminating lamps have been in operation and one heating lamp. At night, both top lamps are out, whilst both heating lamps are on. Therefore, so far 45 watts have been sufficient for illumination and heating during the day, and 30 watts for heating at night. In September, the back and one end was lagged. A layer of cotton wool was stuck to the glass with glue. Over this was placed a sheet of brown paper which was stuck to the frame. This helps to conserve the heat during the cold weather.

A close watch has been kept on the temperature in the tank. During the summer months, this ranged from 75° in the morning to 80° at night. During the autumn the temperature has been 72° in the morning and 76° at night. The tank is housed in a room heated during the day.



A: ends of the lower angle members are cut as shown. B: ends of the top members are angled (45°) cut, and bent. C: wooden end piece of cover

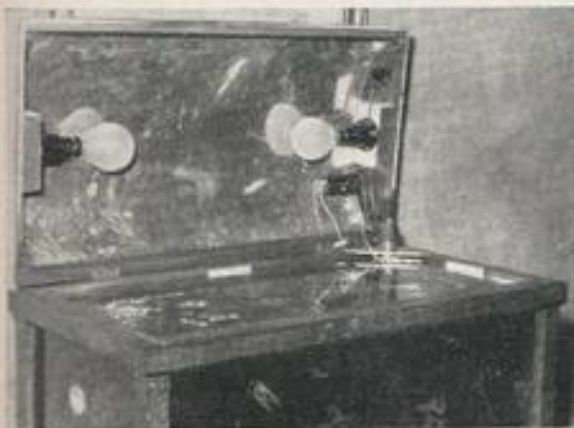
During the winter it is necessary to keep both heating lamps going during the days, and perhaps increase the wattage to 45. The fishes are quite happy and healthy, and breed well, in spite of, or because of the daily rise and fall of temperature. An interesting fact is that the plants grow at least twice as fast in this tank and look just as strong as they do in a thermostat-controlled immersion-heated one.

So far as I can see, there is no reason why larger tanks cannot be heated by this method, but it is necessary to give an occasional eye to the thermometer, especially during a heat wave when the atmospheric temperature is in the eighties. There is, of course, no reason why the heating lamps cannot be coupled to a thermostat. The cost of all this?—35s., including a thermometer.

An Aquarium of Wood *designed by* STANLEY TURTON

THE tank illustrated in the photographs is 24 ins. by 12 ins. by 15 ins. deep, and the framework is constructed in black walnut and glazed with 32 oz. glass. No water is in contact with wood and in some cases the bed in the rebates is as little as $\frac{1}{4}$ in. wide without any sign of a leak. (I have heard of numerous angle iron framed tanks with as much as $\frac{1}{2}$ in. width of bed, giving trouble in this respect, not to mention trouble with rust and corrosion.)

The glass cover is supported by small aluminium brackets inside the top frame so that any condensation forming on the glass drips back into the tank, and does not run down the outside, as is common when a sheet of glass is laid on the



August, 1952



Black walnut wooden aquarium, shown with the cover raised on the left

top of the frame. The whole is covered by a wooden hood, hinged to the top frame, housing a reflector, two lighting bulbs, lighting switch etc.

I am a beginner at keeping an aquarium and this is my first attempt at tank construction, which has cost approximately £4, including thermostat and heater, etc. I have not adopted aeration and am content to keep the tank well planted and limit the number of fish to 20 or so; these conditions are proving extremely satisfactory.

IN THE Water Garden—by Dr. W. E. SHEWELL-COOPER

I WANT during the next few months to discuss a large number of water plants which I have admired for years and which have really made their mark. It is not necessarily the "difficult to do" plant that ought to be admired. There is a kind of aquarist's snobbery which expects a man to specially admire or love the poor little "miffy" plant which takes an awful lot of coddling before it gets going and then, when it does succeed, is not really very wonderful to look at. Fortunately you only meet this in some quarters.

Purple and Blue Flowers

There are a large number of plants which grow quite easily. They seem happy in the pool or in the surround. They give you the idea that they are really growing to please you. Why on earth they should be looked upon as common because they do this, I do not know. Take for instance, the water willow or swamp loose strife (*Najas verticillata*). This is the most beautiful shrubby perennial. It produces those long graceful wands which bend over and, incidentally, easily take root from the tip. The leaves are of a beautiful dark green colour, lanceolate in shape and two to five inches long. Whorls of purple flowers are found in the axils. But what I like about it is that in the autumn the foliage turns to a brilliant crimson colour and so it is aflame at that time as well as being really pretty in the summer.

Now it is not by any means difficult to grow. Neither is the pickerel plant, which I always think is very decorative. Its Latin name is *Potamogeton nodosus*. Personally I think it is the best blue flowered aquatic I know. With me it will grow 24 inches tall. It has lovely arum-like smooth leaves, olive green in colour and they seem to glisten and shine in the sun. I always plant it just at the edge of the pond in three to five inches of water. It loves to grow in the mud there, but it never becomes untidy nor does it grow rampant. It is a happy plant and needs no looking after at all. Isn't that what you want?

Another blue plant which grows in shallow water is *Lobelia dortmanna*. It only grows two inches in height but has nice upright foliage. It is really one of the submerged oxygenating aquatics and so is very useful for the pool for this reason. If you need an oxygenator in your balancing up, then here is one that is worth while including. The flowers are a pale blue in colour and the stems are thin and wiry. As a contrast grow a water evening primrose. Now many of the members of this family are not really hardy but there is one species I have found that is—it is *Jussiaea repens*. It will grow in from three to five inches of water, as does the pickerel plant, but it produces its flowers and foliage well above the surface. If you prefer, it will grow in a bog. The plants are freely studded with golden yellow flowers, but if it has a fault, it is that it is a spreader, so be prepared to keep it cut back.

Rampant Growers

I would rather have these rampant growers that need controlling, than the plants that seem to take years before they grow at all. I am not thinking of encouraging you to have one of the duckweeds, for instance, because they do multiply so rapidly that they become a regular pest. But take the member of the gentian family, *Limnanthemon nymphoides*. This grows in from six to 18 inches of water and has floating leaves in a profusion of small golden yellow flowers which stand two or three inches above the surface. The leaves are heart shaped, mottled, and are about two inches across. Now here you have got to cut back the



Photo:

L. E. Perkins

A mass of blue-flowered pickerel plants growing in shallow water

plants occasionally or try in some way to confine the roots.

What a pretty plant is the water violet, which is used as an oxygenator both for indoor aquaria and outside pools. I am referring, of course, to *Hottonia palustris*. The rosettes of pea-green, fern-like foliage to me are most attractive. They are submerged on the whole but they produce a mass of white and lavender flowers from six to 12 inches above the water. I have had them growing in water no deeper than four inches but they seem equally happy with an 18 inch depth, and maybe more for all I know. From the water violet we come to the American cowslip, really a member of the primula family, which likes to grow in the boggy situations around the pool. All these American cowslips are spring flowering. The narrow leaves are born in rosettes and the flowers are cyclamen-like. The species most folk start with is *Dodecatheon frigidum*, which has violet-coloured flowers, but I am much fonder of *D. meadia*, because its clusters of drooping magenta flowers with reflexed petals are so pretty. The long green leaves incidentally, are freely spotted with purple.

Huntsman's Horn

If you have got a wet boggy position with full sun, why not try a very striking plant—the huntsman's horn (*Sarracenia purpurea*)? This is quite hardy but it must grow in a mixture of sedge peat and soil on a 50-50 basis. After the planting is done, the surface should be covered with live sphagnum moss. (I emphasise this word "live.") It produces in time inflated pitcher-like leaves which start life pale green and turn to bright crimson. Then purple flowers arise from the base, looking like inverted umbrellas. The only snag about huntsman's horn is the sphagnum moss, but if you can give it this, you will be delighted with the new friend and so will those who come to visit your garden.

Post-Mortem Examination of Fishes:

W. Harold Cotton, F.Z.S., 39, Brook Lane,
King's Heath, Birmingham, 14.

Specimens should be sent direct to Mr. Cotton, with full particulars of circumstances, and a fee of 2/6.

It is important that the following method of packing fish be adopted:—Wrap fish, very wet, and loosely in grease proof paper and then in wet cloth. Re-wrap in greaseproof or wax paper and pack around with cotton wool in tin box. Despatch as soon as possible after death, with brief history of aquarium or pond conditions.

READERS' QUERIES ON COLDWATER FISHKEEPING

Hatching Eggs from an Aquarium Spawning

I have five goldfish in a 24 ins. tank. Two have developed breeding tubercles, but I don't know if the others are females. I have no other tank, what do you advise me to do?

The fish will probably spawn in the tank, but most of the eggs will be eaten unless you can remove some quickly. You can place some thick bunches of water plants floating on the surface of the water and if the fish spawn on these you will be able to take the plants out with the eggs and hatch them in a separate container. Anything fairly shallow will do; an old fashioned toilet basin is ideal. If you leave all the fish in the tank the fry from any eggs which escape being eaten will be consumed as soon as they hatch.

I have a large tank for cold water fish and I can arrange for a continuous trickle of tap water to flow into it. Do you advise me to do this or would the tap water be harmful?

Tap water should not be harmful to your fish. I use nothing else myself. Where there are a number of fish in a tank I am sure that it is an advantage to have a trickle of fresh water most of the time, but there is no need to run in a lot. A drop each second or so works wonders in a tank. The cooler fresh water will sink to the bottom and help to displace some of the fouler water there. A continuous circulation can be achieved in this way and the fish will benefit. I have never found tap water injurious to any type of fancy goldfish.

answered by A. BOARDER

Please could you tell me where I could get some minnows? I have been miles around the Newport district and cannot find one.

I do not know anywhere in your district but I have had some experience in catching minnows and find that many a stream which at first sight contains nothing, is alive with them on further searching. I once went to a very clear stream in search of minnows; I could not see one anywhere but placed a minnow trap in the water baited with bread. Within minutes many minnows appeared as if by magic and all swam upstream as if they had "smelt" the bread as its flavour washed down to them. It is quite possible that if you had placed a trap in some of the waters you visited you might have had the same results. You mention you have looked in ponds and canals. I do not think that you will be very successful in such places. In my own experience I have found that it is only in fairly fast flowing, clear streams that minnows are found. The type of water favoured by trout is usually the best place for minnows.

I intend keeping some goldfish in an outdoor pond. I have just collected a gallon of pond mud, black and evil smelling, but it contains thousands of tiny creatures, from water fleas to flattish light brown things

Many queries from readers of "The Aquarist" are answered by post each month, all aspects of fish-keeping being covered. Not all queries and answers can be published, and a stamped self-addressed envelope should be sent so that a direct reply can be given.

contracting and stretching when moving about. Will all this be good food for the fishes?

Some of the contents of the pond are no doubt of good use as food but others can be harmful. The creatures which contract sound to me to be leeches and these can do considerable harm to the fish. If they can get in contact with fish they will attach themselves and suck the blood from them. The water fleas are good food, so are such things as mosquito larvae and *Tubifex*. When collecting from a pond it is essential to place the catch in some water, wash away the mud and examine the contents well before using as food. Besides the leeches mentioned it is possible that there may be some larvae of water beetles and dragonflies. These can be very harmful to small fish and so I advise you to look back over some issues of *The Aquarist*, and get acquainted with these creatures before using the whole of the catch as food for your fishes.

I am finding great trouble with root rotting. I have spent pounds on plants but they are soon floating at the surface with no roots and the bottoms blackened. What can I do to prevent this?

The trouble with your plants may be lack of light or wrong rooting medium. Water plants need a fair amount of light for successful growth and if your tank does not get plenty of this it may be the reason for the plants not growing. Sometimes if a plant is put into the sand too deeply the lower part of the stem just rots away. I find that it is better to let the stem rest on the sand, when roots will form and get established. It is often possible to root the plants in small pots first and then lower them into the tank. You did not say if there were fish in the tank. The droppings from the fish will act as a manure for the plants and will help their growth.

I propose to use old pieces of broken concrete as ornament for the base of my tank. Is there anything harmful in the stones or concrete?

The concrete, if weathered, may be quite harmless to the fish, but surely you can find something better than that as a decoration for the tank. Why not get some small pieces of weathered rockery stone? A few pieces would cost very little and would be safer. New concrete will give off lime which could harm the fish and any sharp edges to the concrete can damage them.

I have two goldfish and I have noticed occasionally that their dorsal fins move up and down rapidly and then remain down for a time. The fish appear in good health, can you say what is the matter with them?

I have sometimes seen fish behave as you describe. The trouble may be that some form of parasite is worrying the fish. At least that is the impression that I get when watching such a fish. The parasites may not be large enough for you to see easily but if a Dettol bath is given this may remove them. If a fish louse is attached to the fin of a fish the flicking movement can often be seen; it is just the reaction of the fish to the irritation and it is its

effort to rid itself of the pest. Fish lice are as a rule quite large enough to see and they generally cause a red patch on the fish.

I have recently made and stocked a rather large pool in the garden. I have planted it and introduced some tench, catfish, rudd, shubunkins and golden orfe. I cannot now see a sign of a fish. The water has gone green but surely I should be able to see one fish? Is it possible for them to have died without coming up to the top after?

It is quite natural for a newly set up pond to turn green. The fish may be there quite all right and there is no reason to suppose that they are all dead. There is probably plenty of food in the water for them and perhaps you will see them all very soon. Try going to the pond quietly at night with a strong torch. Shine the light down into the water and keep quiet and you may be able to see the fish. If you sprinkle a little food, such as a small piece of dry brown bread crust, on the surface and keep well away from the pond you may see some of the fish come to feed. Also, if you can go to an upstairs window of the house and look down at the pond you may be able to see deeper into the water. As a last resource you could try fishing for them. Rig up a fishing line without a hook. Tie a fair sized worm on the line and throw out. Keep quiet and if there are any live fish in the pond it should not be long before you get a bite. You may be able gently to draw a fish up to the surface but that will be about as far. They either get the worm or leave go when they reach the top of the water.

We have just received two tanks at our school and wish to set them up correctly. What plants should we buy and how should the task be started?

I advise you to get in touch with the secretary of your local aquarist society. If you are unable to get anyone from such a society to help you, you can proceed on the following lines. Wash out the tank with a disinfectant. Place some aquarium compost or washed fairly coarse sand at the base. See that it is about three or four inches deep at the back and slope it down to the height of the frame in the front. Place one or two pieces of weathered rockery stone on the sand in a natural formation. Do not use sharp stones or any type of marble. You can choose any of the following plants for coldwater tanks:—*Elodea canadensis*, *Egeria densa*, *Myriophyllum*, hornwort, *Vallisneria spiralis*, *Sagittaria*, willow moss and hair grass. The plants will look best in small clumps. Try to hid the back corners as much as possible and always try to keep the front of the tank open and free from large plants. Before planting run some water in the tank by pouring it on to a piece of thin board. This will prevent the sand from washing about. Do not fill up more than half way until the plants are added. Rooted plants are the best but if not rooted they may be weighted down with small strips of lead or laid on the bottom with a small stone on them to anchor them until they root. Tap water can be used and the tank should stand in such a position that it gets light but not direct sunlight on the front of the tank. If too much sunlight reaches the water it will become green in a short time. Do not over stock with fish. A good rule is to use one inch of fish to each 24 square inches of surface.

I have just made a garden pond 5½ feet by 2 feet and 20 inches deep. I placed in the pond some soil which I got from a nurseryman, and some plants. I put some goldfish and golden orfe in the pond and the orfe immediately died. I removed the other fish and they are still all right. I tested the water and it showed very strong alkali content. What can I do to reduce this?

The test of the water shows that there is too much lime present. Golden orfe are soon in trouble if there is anything wrong with the water. Your pond is not very large and as it does not hold a large volume of water the effect of the lime from the cement is bound to be much worse than if you had a larger and deeper pond. The soil may also have affected the water as there may have been a large quantity of lime in that. It is absolutely unnecessary to put any soil in the bottom of a pond the size of yours. The plants are much better planted in small containers with a very little soil; then, as they grow the roots come from the container and make good use of the waste matter from the fish—serving their main purpose. I think that you will be wise to empty the pond, do away with the soil, scrub well out and refill. When the water has stood for a day or two try some *Daphnia* in the pond. If they live the water should be safe for fish. The adding of acids to the water to correct the balance is not an easy matter and you may do more harm than good. In the case of my own pond, which is much larger than yours, the water was put in after a good scrub round, and fantail goldfish were put in straight away. They showed no ill effects, which proves that there was sufficient water to accommodate the lime from the cement.

I have a 22 ins. by 10 ins. by 9 ins. tank in which I have a 5 inch comet and two 2 inch shubunkins. The shubunkins have developed gasping symptoms and no matter what I have tried in the way of remedies they do not improve. Can you explain why this is?

Your tank is none too large for the fish but that may not be the trouble. The easiest way to find out if there is anything the matter with the tank is to remove the shubunkins to another container for a time; if they then stop gasping at the surface, the water in the first tank must be to blame. If they still act the same there may be something the matter with them, such as an infection of the gills. If the gills are not working properly the fish are unable to extract the oxygen from the water and so gasp at the top; by blowing out the water from their mouths they go backwards, as you describe, through a form of jet propulsion. There may be gill flukes present, or if none now, the gills may have been damaged by their presence previously. You say that you have tried the Dettol bath, but it is of little value if the fish are replaced in a tank where the pest is still present. Sterilise the lot and start afresh.

I had seven goldfish which I won on a fair ground recently. Three have died and the others do not look too well: they spent most of the time on the bottom of the tank with their gills working very fast. Their tails were bent and they turned on their sides. What was the cause of death?

The death of the fish may not have been your fault. The fish were probably recently imported under conditions which do not assist health. They are often overcrowded in transit and any weak fish soon succumb to such treatment. Do not over-feed the fish with packet foods. Some of these, especially those prepared by well established dealers, are very well balanced and nourishing, but if too much is placed in a small tank at a time, that which is not eaten soon turns the water bad and the fish may die. Do not overcrowd the fish: one inch of fish to 24 square inches of water surface is a fairly safe rule. Do not overdo this. The tap water you used may have been all right but it is always advisable either to use that which has run through a hot water system or to let it stand for a day in the open. This will have the effect of removing any chlorine in the water.

AQUARIST AT HOME :

Mr. E. Ryan and Mr. F. Womersley

(HALIFAX)

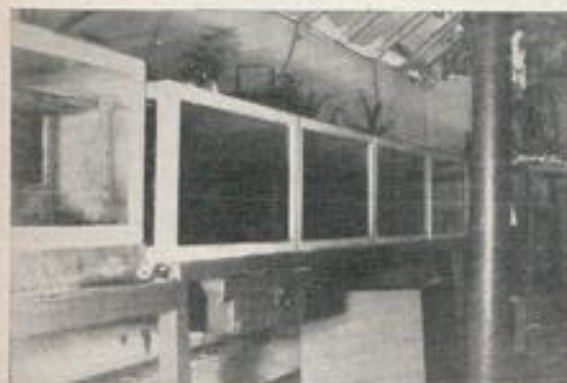
Interviewed and photographed by JAS. STOTT

THIS month I would like to introduce readers to a partnership well known to a lot of West Riding aquarists. Its members are Mr. E. Ryan and his son-in-law Mr. F. Womersley of Ovenden, near Halifax, both members of the Halifax & District Society. Whenever an opinion is asked of these two Yorkshire aquarists invariably the answer is "Ah, we know nowt about fish," but despite this statement it is remarkable how consistently the Ryan and Womersley partnership features "in the cards" wherever they exhibit in the West Riding.

They have been in the fishkeeping hobby for just over three years and I suggest that they have gone a long way to knowing quite a lot of answers in that comparatively short time, if exhibiting successes are anything to go by. They constructed their own fish house and made quite a good job of it. The length is 18 feet and it is 6 feet 6 inches wide. A glass-paned roof of medium pitch gives a ridge height of 7 feet, falling to a wall height of 4 feet 8 inches. The walls are fitted with an inner lining of asbestos sheeting. There are two adjustable roof ventilators and another situated in one of the end walls which permit a very free circulation of air through the building when required.

Light Screening

During the summer, light through the south slope of the roof is cut out by fitting, on the inside, three asbestos panels. A hot water system is installed consisting of four-inch pipes fixed under the staging and operated by a boiler which is situated in a compartment at one end of the building. The floor is concrete and the staging made up with angle-iron sections on which are 14 tanks ranging in size from 18 ins. by 18 ins. by 12 ins. up to 42 ins. by 12 ins. by 12 ins. Most of these tanks are tropical, but a small coldwater section is maintained for common sunfish and some carp.



Large aquaria forming the coldwater fish section of the fish-house described



Mr. E. Ryan (left) and Mr. F. Womersley in their fish-house. Part of the vine in the house is seen in the background

In the tropical section is to be seen quite an assortment of fishes; green swordtails, perma black mollies, angels, tiger and schuberti barbs, bumble-bee fish, American scarftail guppies, catfish, *Nannostomus anomalus*, beacons and serpaetras. The partners have done very well with exhibiting their perma black mollies. These are kept in green water and, although natural light is preferred by the partners, artificial light is used through the winter months over the mollie tanks in the attempt to retain green water conditions. They are now the owners of the sunfish which took first prize in its class at last year's B.A.F., since when it has taken several more firsts under their exhibiting. If all goes well with this fish they are hoping to exhibit it again at this year's B.A.F.

These partners are also interested in cacti and succulents and have an attractive display on an angle-iron staging at one end of the fish house. They also have a black Hamburg grape vine in the fish house which not only provides shade for the tanks during the summer but also provides a good crop of fruit. Last year they obtained 20 bunches of good quality grapes. There were two or three very promising green swordtails to be seen in this establishment, which reminded me of the fact that the greens of this species are undoubtedly attractive fish when of good quality and in condition, but it appears to be a neglected variety these days.



Another view of the house interior. The small doorway leads into the heating boiler annex

News and Reviews

HOLLAND

ONE of the most outstanding tropical fishes to be found in aquaria since 1906 is the bloodfin (*Aphyocharax rubripinnis*) says the author of an article in the February issue of *Het Aquarium*. These lively fishes look best kept in small shoals of six to eight in spacious aquaria kept in a sunny position at a temperature about 70° F. (they will stand much lower temperatures). They eat all kinds of foods and breed readily, although bloodfins are voracious eaters of their own eggs, so that parents must be removed when spawning is over. Bloodfin fry hatch after 24 to 30 hours, and after a fortnight, in which they require the finest possible live foods, they are easily reared on sieved *Daphnia* and brine shrimps.

In an interesting article on animal behaviour Dr. G. Baerends describes the close similarities between the spawning and breeding habits of sticklebacks and cichlids in choosing their breeding territory, in their conduct towards their neighbours and intruders and the behaviour of the females entering the spawning area. Perch instinctively hunt their prey in shoals and gain great advantages in this way; a single perch placed in an aquarium with guppies has much more difficulty in catching one of them than it has when it is a member of a hunting shoal. Cichlids such as *Astronotus ocellatus* also hunt in shoals with similar advantages.

For many years it has been a handicap to the development of the hobby that facilities for contact between aquarists of different countries all over the world have been inadequate and plans have been laid for a meeting of aquarists to found a World Federation of Aquarists. The Nederlands Bond Aqua Terra is to act as host for the meeting at Amsterdam this month.

Aquarium lighting for plant growth is discussed by two workers from the laboratory of the Philips works at Eindhoven in the March issue of *Het Aquarium*. It has been found that the different colours of the spectrum affect plants in various ways: in yellow and red light (chief constituents of the light from ordinary electric lamps) plant growth is intensified, and red light particularly has a

"drawing" influence which makes the plants grow long and spindly. In blue light plants remain low and grow compactly. Fluorescent tubes, and especially the "daylight" variety, yield more blue light than do ordinary lamps and have other advantages; they give approximately three times as much light, give more even illumination, and produce less heat. This last factor makes the fluorescent tube specially useful for coldwater and marine aquaria. Although the initial expenditure involved in fitting these lamps is higher this is compensated for by their longer life and their lower electricity consumption.

W. J. VAN DER KOLK

LONDON

MORE than 50 guests were present at a cocktail party given by Mr. Philip Castang at his private residence on the 29th June, many members of the aquatic trade being present.

The occasion was the celebration of the 250th anniversary of the firm of Castang, an event without precedent in the annals of the aquatic trade.

The firm's records over such a long history of trading are extremely interesting, and many names of royalty and titled people can be found among the large number of clients listed in them. Also of interest are two posters Mr. Castang has in his possession. These were once displayed in the firm's shop to advertise the London Zoo, then situated in the grounds of the Tower of London. The ravens in the Tower were supplied by the firm for many years.

In its early years the business was in the New Road, Tottenham Court (now Tottenham Court Road) on a site where Maples stands to-day. Leadenhall Market then saw the Castangs for 85 years, and the present address in Hampstead has been used for 28 years.

No mention of the Castang business would be complete without introducing Mrs. Castang, mother of the present owner. During the difficult days of the war period, amidst shortage of materials and supplies, Mrs. Castang kept the business going daily during the absence of her son on national service.

Altogether, a quarter of a century's service to the public and the trade of which the Castangs can be justly proud, and we are sure that our readers will join with us in our expression of congratulations and good wishes for the continued prosperity of this fine old firm.

International Federation—by A. FRASER-BRUNNER

LAST year I sent a circular to each country in which a national federation of aquarium societies was known to have been formed, with the suggestion that these organisations should get together to found a World Union of Aquarists. My letter was accompanied by a statement embodying some of my own ideas as to the tasks which such an international body could undertake, and some suggestions as to how these could be carried out.

The letter and the suggestions were sent, not only to the federations in the countries concerned, but also to the principal journals, since these also can be considered as national rallying points for the hobby. By this latter device it was possible for me to extend my suggestion to America, which otherwise would have been excluded from the scheme since no national body has been formed there.

Before going further I want to make it quite clear that I never claimed that the idea of an international body was original. What was new, however, was the proposed method of setting about it. Previous suggestions and actions with this basic idea in mind had been made only

between individuals; no one had thought about approaching the organisations already in existence. Such individualistic approach cannot very well succeed if its real aim is to found a broad representative body.

Any individual or group of individuals who tries to take a short cut into a leading position in the hobby will at once be suspected of power-politics or some financial objective. An international federation must arise logically out of the growth of national federations in the same way that the latter have arisen out of the rapid growth and multiplication of aquarium societies.

All I did in my letter was to point out that the time for the new step forward was ripe. This I knew to be a fact because I had already had the benefit of discussions with leaders of organisations in several European countries as well as in Britain, and had ascertained the strong feeling in favour of international co-operation that existed. The suggestions that accompanied my letter were my own; they

(Please turn to page 106)

OUR READERS

Write—

Readers are invited to express their views and opinions on subjects of interest to aquarists. A selection from queries received will also be answered here. The Editor reserves the right to shorten letters when considered necessary and is not responsible for the opinions expressed by correspondents.



New Ideas on Oxygenation

I WAS interested in the article in your March issue of *The Aquarist* by James W. Atz about "balanced" aquaria, showing that it was not the content of oxygen in the water which was so important for the health of the fish, but the absence of carbon dioxide. Therefore, now that we are not trying to get oxygen into the water, but on the contrary trying to get the carbon dioxide out, surely the whole technique of "oxygenation" can be looked at from a different viewpoint?

Now I know very little about chemistry, which is why I am writing to you, but I visualise the possibility of having a strip of some porous substance which has been soaked in some cheap chemical (could charcoal somehow be used, and would it work?), which can then be placed into an aquarium along the back. The chemical would absorb the carbon dioxide in the water, but would remain in the porous substance and not dissolve into the water. Every few days, when the chemical had become saturated, one would lift the strip out, wash it thoroughly (possibly in some other chemical), soak it in the original chemical, and then replace into the aquarium.

If such a scheme were possible, would it not greatly assist the aquarist who could not afford to have large numbers of tanks, but who wanted to keep large numbers of fish? And at the same time it would eliminate the necessity of the air pump with its tiresome "hum".

An alternative suggestion is to have a series of metal strips fixed one above the other, each one being constructed so that when it was lowered into the tank at the back in an upright position thin strips of air would be trapped. This would provide an extra "surface" of air to the aquarium to facilitate the evaporation of the carbon dioxide. The gadget could easily be lifted out each day and then replaced, thereby changing the trapped air.

I do not know if this idea would really help, or if the circulation of the water would be insufficient for it to be of much use, but I am not clever enough to make such a contraption myself, nor could I easily tell if the carbon dioxide content of the water was greatly helped. What do your readers think?

A. B. DE T. ANDREWS,
London, W.1.

River Pollution

IN your Editorial in the May issue of *The Aquarist*, you mention the campaign conducted by the Anglers' Co-operative Association against the pollution of streams and rivers, which I agree deserves every possible support. I am interested in learning the details of this campaign and I would appreciate it if you would furnish me with the

address of the Association or wherever I may obtain information.

I. PINCHUCK,
London, N.8.

The address required is the Angler's Co-operative Association, 30, Netgate Street, London, E.C.1.

Aquarists' Badge?

AS a very "new" subscriber, I felt I would like to query whether in the past anyone else has suggested the issue of a badge to all fishkeeping readers of your monthly?

I know that the money question these days is very acute, from my own experience in business, but how nice it would be to have a very neat little badge, by which we enthusiastic people could readily recognise one another. It would no doubt lead to many lasting friendships between people who have never for one moment even dreamed that the other one was the slightest bit interested in their hobby.

To test the reaction of this idea, could you not put it to your subscribers in one of your future issues, asking those in favour to write in, and from the response, big or small, you could judge whether it was practical to issue such a badge? I realise that the cost of same would be entirely governed by the number willing to support the idea.

MRS. V. WATKINS,
Chepstow, Mon.

Letters are invited on this subject.—Editor.

Aquarium Philately

READERS of *The Aquarist* may be interested to learn that at least one country has issued a set of postage stamps of tropical fish. This is Mozambique, South-East Africa. The issue consists of 24 large stamps, values ranging from 5 cents to 50 escudos. Each stamp portrays a different tropical fish native to the area. It only remains to add, regretfully, that the price asked by dealers for this set in mint condition is £5.

RAYMOND YATES,
Manchester 19.

Tubing Tip

WHEN it is required to keep the levels of water the same in several tanks I find the best method is to use "air-line tubing." As the rubber tubing is springy, so that it retains its shape when bent over the aquarium edges, I insert a length of "resin-cored solder" into the tubing. It is then easily bent to any shape and the solder does not harm the fishes or interfere with the normal siphon action.

J. C. ALLEN,
Lincoln.

International Federation (from page 104)

have no legal force, and may be rejected or adopted by the World Union when it comes into being. These ideas were put forward simply as a stimulant to thought and discussion among those invited to consider the formation of the new body. *The Aquarist* and other journals were, therefore, right in publishing only my letter and excluding the personal ideas which accompanied it.

Mr. Innes, in *The Aquarium* (U.S.A.), however, has done less than justice to my suggestion. He did not publish my letter, but presented a condensed and garbled version of my suggestions in order to pour scorn upon the whole scheme. In particular he seized upon an idea that the World Union might organise an exchange of stock in order to improve breeding strains and to overcome difficulties of international exchange. He saw this as a suggestion that the international body should set up in competition with the trade.

Those who know me better will not need to be told that I would never make such an impracticable suggestion. The scheme would be limited in scope and would be operated with the collaboration of the trade in the countries concerned. The important thing would be that there would be control at both ends, and the right fishes, in the right condition, would come into the right hands, at the right time. Unlike what, according to Mr. Innes, happens in the American trade, both parties would be satisfied.

Well, I knew that, compared with the European countries, U.S. aquarium-keeping was in a state of anarchy, and Mr. Innes' Editorial merely underlines the fact; so has a brief letter more recently received from the editor of *The Aquarium Journal* (U.S.A.). I had hoped that these journals would be prepared to speak for their country in the conclaves of the World Union, but as they are not prepared to do so we must for the time being "include America out" and leave the door open for the time when progress shall have done its work.

In the meantime there is no reason why the formation of the international body should not proceed. There is great enthusiasm for the idea in European countries, and there has been some competition among them as to where the first meeting shall be held. The plan which I think will meet with ultimate approval is for the initial conference, at which the body will be formed and its constitution laid down, to be held in Holland. The highly organised and very efficient Dutch Federation has offered to arrange this meeting, and also to stage an exhibition at the same time, and I feel sure this would result in a highly satisfactory inauguration. The national bodies of Denmark, Sweden, Belgium, Germany, Switzerland, Italy and our own country have endorsed my suggestion and agreed to send delegates.

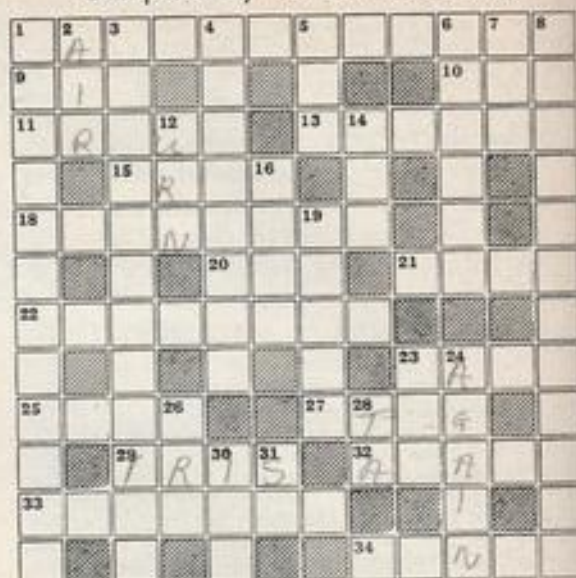
In France there was no national federation, but my letter has drawn attention to this deficiency, and I am pleased to say that efforts are being made to unite the aquarium societies in that country so that the French aquarists will be eligible for representation. The Aquarium Society of India, able to speak for the majority of aquarists in that country, has also expressed interest in the plan from the beginning, and desires to be represented at the meeting. This is a fine start and will form a strong core for further growth.

It is unfortunate for me that I should have to be away in remote parts of Africa at this critical formative period, but this does not affect the outcome of the scheme in any way. As I said at the beginning, this is a task for the combined efforts of the aquarists in the participating countries, and the fortunes of one individual must make no difference at all.

(We learn as this issue goes to press that the first meeting of the international body is to take place this month, 23rd and 24th August, at Amsterdam Zoo.)

The AQUARIST Crossword

Compiled by J. LAUGHLAND



CLUES ACROSS

- Aquatic plant. Royal Marine? (5, 7)
- Lightest part of fairy shrimp
- Bream loses its head and turns for the girl (3)
- Defeat to a T for this fish (5)
- Elizabeth starts this reptile (6)
- Smug fellow mixes grip (4)
- All far in (anagram) (8)
- That which is conscious and thinks in the goby (3)
- Solo for the capital city (4)
- Having the lustre of a gold-fish, for instance (8)
- This should be coarse when used as a planting medium for tanks (4)
- To play on the fife (4)
- Term sometimes used for male fish. Monarch of the glen (4)
- Girls name or bog plant (4)
- Acquiesce (5)
- Arthropods, usually winged (7)
- A hundred and anal for one kind of fishing water (5)

CLUES DOWN

- Aquatic plant, *Myriophyllum* (5, 7)
- Air (3)
- Fail rich stop (anagram) (8-4)
- Fires rot (anagram) (8)
- May be of mineral, fish or vegetable origin (3)
- 33 across in their perfect final state (6)
- Organ for balancing fish (3)
- Bloody weapon and the inevitable ending? (3, 9)
- Drag from the gurnard (3)
- All is not well with a change of head (3)
- Crazy American slang starts with a mouth plug (4)
- Egyptian water lily (5)
- In biology, a bag (3)
- Once more (5)
- Before the mere loses a thousand (3)
- Thanks in a vulgar way for half a tank (2)
- Hard water? (3)
- A short street (2)

PICK YOUR ANSWER

- Rasbora trilineata* (the scissors tail) attains a length of about: (a) 4 ins. (b) 5 ins. (c) 6 ins. (d) 7 ins.
- Cyprinopoma goodii* is native to: (a) Arkansas. (b) California. (c) Florida. (d) Texas.
- Lemna* (duckweed) is represented by: (a) 3 species. (b) 6 species. (c) 9 species. (d) 12 species.
- If the trivial name of a species is *oligolepis*, as in *Barbus oligolepis*, it may be expected to have: (a) Few scales. (b) Large scales. (c) Many scales. (d) Small scales.
- The popular name of paradise fish was given to *Macropodus opercularis* by: (a) Carbonnier. (b) Cuvier. (c) Lacepede. (d) Rafinesque.
- The scientific name of mermaid weed is: (a) *Bacopa*. (b) *Ottelia*. (c) *Pilularia*. (d) *Proteroponca*.

G. F. H.

(Solutions on page ix)

PERFECT summer evening conditions aided the enjoyment of members and guests of the **Croydon Aquarists' Society** visiting the fine water garden of Mr. L. H. Housfield, a founder member of the society, at Croydon late in June. Visitors inspected Mr. Housfield's unique ponds and were given the opportunity of seeing some of the interesting processes carried out in his adjoining factory. After refreshments a number of microscopes allowed Mr. Bean to demonstrate many aquatic specimens, and Mr. Housfield gave a practical talk on his experiences in making and maintaining his ponds.

OVER 13,000 visitors attended the four-day show of the **Edinburgh and East of Scotland Aquarium Society**, including 2,000 Edinburgh school children in conducted parties. Among the many interesting exhibits was a collection of animals loaned by the Royal Scottish Zoological Society. Winners of special awards were: Mr. J. D. Young's angel fish (best fish in show—East Scotland Trophy), Glasgow Northern Aquarium Society (inter-club furnished tropical aquarium—Waverley Trophy) and Mr. J. Scott's veiltails (best breeder's entry—Kean Cup).

AT the annual general meeting of the **Ilford and District Aquarists' and Pondkeepers' Society** a successful year's activities were reviewed and officers elected. The secretary, Mrs. J. Wilson, 27, Elgin Road, Seven Kings, Essex, will send an application form to anyone interested in membership.

LECTURES by Messrs. Bushby and Creed, table shows of characins, egg-laying tooth carps, cichlids and livebearers and discussions have formed the programme enjoyed by members of the **North London Aquarist Society** in recent months. There are vacancies for some new members—applications to Mr. C. W. Hughes, 61, St. John's Villas, London, N.19.

ACTIVITIES planned for the remainder of this year by the **Southall Aquarist Society** include lectures, a film show and an evening outing to a London retailer's premises to inspect his stocks and hear a talk on his fish-keeping experiences. Table shows are very popular with members and in addition to the preparations for a display of tanks to be made at the Borough of Southall Show this month plans are being made for a home aquarium contest. Many new members have been secured through the interest in a furnished aquarium shown in the local Odeon cinema. Meetings are held on the second and fourth Wednesday of each month at the Beaconfield Arms, West End Road, Southall at 7.30 p.m.

THE June meeting of the **Southport Aquarist Society** opened with a talk by Mr. A. Lindford on pond life, illustrated by living specimens of water fleas, water louse, glass worms, water snails, leeches and *Dytiscus* larvae. This was followed by an auction of members' surplus stocks and a demonstration of pH determination by Mr. L. Taylor, who used comparative tests of various types to estimate pH of samples of aquarium water brought along by members.

WHEN members of the **Swansea and District Aquarists' Society** saw the colour film loaned by the Harrow Aquarists' Club the facilities of this club were greatly admired. At the same meeting an auction of fishes, plants and equipment was held with a raffle to help the society's funds.

NEW name of the Wandale Club is the **Wallington and Carshalton Aquarist Society**. Talks on planarians, tank setting-up and fish-breeding have been heard at recent fortnightly meetings, and details of forthcoming events can

Officials of the Mitcham and District A.C. and the Wilson Hospital, Mitcham, on the occasion of the presentation of an aquarium to the children's ward

News

from AQUARISTS' SOCIETIES

Monthly reports from Secretaries of aquarists' societies for inclusion on this page should reach the Editor by the 5th of the month preceding the month of publication.

A copy of *The Aquarist's Directory of Aquarium Societies* will be sent free to any reader on receipt of a stamped, self-addressed envelope.

be obtained from the secretary, Mr. E. E. Orchard, 12, Hilliers Lane, Beddington, Croydon, Surrey.

SECOND annual open show of the **Wembley and District Aquarium and Pool Association** was held in June, and 320 entries for the 23 classes were received. Many new aquarists were enrolled at the Association's information stand, manned by members answering questions about the hobby. Awards were presented by radio-personality Mr. Steve Race and judging was carried out by Messrs. Boarder and Phillips, and Mrs. Robertson and Mrs. Meadows.

FOLLOWING a meeting at which a show of films was given by Mr. A. Batchelor, members of the **West Middlesex Aquarists' Society** heard a talk on breeding angel fishes and white cloud mountain minnows given by Mr. G. Saunders. A table show of fancy goldfish at the first meeting was won by Mr. W. T. Harding's fantail, and at the second meeting Mr. T. N. Wood's black widow took first place in a show of characins.

THE eighth annual show of the **West Surrey Pondkeepers' and Aquarists' Club** was held in June at Guildford, Surrey. There were 210 tanks on display, with many fine specimens and exhibits covering tropical, coldwater, marine and vivarium interests. Prizes and awards were presented by Mr. K. Cook. Members of the club have recently enjoyed a day's coach outing to Southsea, and among recent talks given at the bi-monthly meetings was one on water plants by Mr. F. C. Kazitzky. Secretary of the club is Mr. A. J. Maynard, 4, Sandfield Terrace, Guildford, Surrey.

AT the May meeting of the **Weston-super-Mare and District Aquarists' Society** Mr. B. W. Moore spoke on the breeding habits of the bitterling. The following month's meeting

took the form of a ramble in the Rhyme area where members collected various specimens.

MEMBERS of the **Sirocco Aquarists' Society** (Belfast) have a full programme for their monthly meetings, at which experienced aquarists give advice and guidance before a "question and answer" period in which individual problems are dealt with. At the last two meetings Messrs. G. Crisp and W. Ryan have given talks on livebearers and feeding aquarium fishes.

LAST month Mr. J. MacGregor talked on cold-water fish-keeping to members of the **South Glasgow Aquarium Society** and a coldwater fish table show was also held. The society is now issuing a quarterly bulletin called *The Harlequin*, and the first number contains an article on the guppy, a "Questions and Answers" section, summaries of *Rasthena heteromorphus* habits and fish ailments and treatments, and notes on white worm culture.

Aquatic Traders' Assn.

AT the first Council meeting after the A.G.M. of the **Aquatic Traders' Association** this year all members were placed in one of three groups and have since been notified of their classification. The Council also agreed to investigate a number of complaints received with regard to some members who do not come within the category of a bona-fide trader. If the Association is effectively to serve the purpose for which it was originally created, the process of removing those who have in the past been granted membership without being fully investigated, must be carried out with the utmost dispatch.

The Sub-Committee of Manufacturers, comprising three factors of heaters, met and agreed on a policy with regard to prices and discounts. The Council approved the proposals submitted by the Sub-Committee of the





Best fish in the show was this flag cichlid (*Cichlasoma festivum*) entered in the class for cichlids by Mr. M. A. Green of Luton, Bedfordshire.

Photographs by VALERIE LILLEY STUDIOS

Photographs on this page were taken at the fifth annual exhibition of the National Aquarists Society staged in London this June. As usual the event received wide publicity and attracted many visitors, among whom was Mr. Winston Churchill. Centrally disposed in the large hall occupied by the exhibition was the N.A.S. stand (pictured above with the show trophies on display).



In the picture on the right Mr. R. Skipper of Hendon A.S. is seen holding the Club Points Shield awarded to Hendon. With him are the N.A.S. President, Mr. L. Katerns (left) and Treasurer, Mr. F. G. Odams.

A caricature of the N.A.S. President Mr. L. Katerns (left) drawn by Mr. A. Davies during the exhibition.



Section of the show generally voted the most interesting were the entries of individual furnished tropical aquaria (Class 43, above), in which Mr. D. Pullon's (Nottingham) set-up gained first place.



A general view of the crowded exhibition hall is shown above, and the N.A.S. stand can be seen to the left of the picture, facing the entrance. A picture of the dealer's display which won this year's award for the best stand is on the right.

