

The AQUARIST AND PONDKEEPER

Founded in 1924 as "The Amateur Aquarist"



THE BUTTS, HALF ACRE, BRENTFORD,
MIDDLESEX

Telephone: EALing 4703

PUBLISHED MONTHLY
SUBSCRIPTION RATES

The *Aquarist* will be sent post free for one year to any address for £1 0s. 0d. Half-yearly 10s. 0d. Canada, U.S.A. \$3.00 yearly; \$1.75 half-yearly.

QUERIES

Postal replies are made to all specialised queries accompanied by a stamped, addressed envelope. This privilege is afforded only to registered readers and direct subscribers. Subscription forms can be obtained on application. In all cases letters should be addressed to the Editor.

Correspondence with intending contributors is welcomed.

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

The Editor accepts no responsibility for views expressed by contributors.

Contents

	Page
Editorial	143
Breeding the Earth-Eating Fish ..	144
What's New on the Market?	147
Aquarium Water Plants	148
Aquarist's Notebook	150
In the Water Garden in October ..	152
Fancy Goldfish Breeding—9	153
New York's New Aquarium	154
Microscopy for the Aquarist—35 ..	157
Readers' Queries Answered	158
Making a Garden Pond	160
News from Aquarist's Societies ..	163

VOL. XXII No. 7

1957

Editorial

AUTUMN can be one of the most pleasant seasons of the year in which to be working in the open. This is one good reason for using this time to make a pond in the garden, and it is fortunate that this season is also the most favourable one for this particular out-door activity from all other points of view. The labour involved is lessened by the workable state of the soil, removal of most plants and shrubs, necessitated by the pond-building, can be undertaken with minimum risk and weather conditions are usually most suitable for laying concrete. Above all, the completed job has the opportunity to mature through the winter, so that when spring comes around again the pond will have begun to "fit in" with the older parts of the garden and will be ready for plants to be set in and around it. For those who are looking forward to the delights of extending their fish-keeping activities into their gardens next year, a detailed discussion of the preliminary steps to pond-building is given in the article on page 160 of this issue.

WE think that readers, after they have seen the description of New York's new Aquarium by Mr. James W. Atz, will feel like congratulating all those responsible for the venture upon the outcome of their skilful planning and on the successful accomplishment of their purpose in the face of delays which must have demanded the greatest patience and perseverance. What is now open to the public is only the first stage of what is planned for the future, and aquarists will hope that its completion will not be further hindered. We have no knowledge of the existence of any plans to build even a small really modern aquarium anywhere in Britain, so our admiration for the New York Aquarium is not untempered with envy. However, perhaps by the time regular services to the moon are in operation it will be easy for Londoners to make a day's outing to the Aquarium—in New York.

Breeding the Earth-Eating Fish

by MELVIN J. REID
(New York)

(Photographs by New York
Zoological Society)



The pair of *Geophagus jurupari* successfully bred by the author. The male is to the right. The photograph was taken 3½ months after the last events described in the article

THIS is an account of a successful spawning of one of the "earth-eaters," *Geophagus jurupari*. It is the most detailed record of which I know, and I was encouraged to make it by conflicting reports on the breeding habits of this species. Some aquarists have described it as an oral incubator, while others have failed to mention this feature in their accounts of its reproductive behaviour.

My pair had been purchased in February 1954, at which time they were not quite 4 in. in total length and indistinguishable as to sex. In November, the first signs of mutual sexual interest were noticed about a month after the male and female started to differ in shape of fins and in body length, the male now being 5½ in. long, the female somewhat less. They spawned for the first time on 5th March, 1955, and for 17 days they managed to keep their brood together although they finally lost all their young in one way or another.* This spawning had taken place in a community tank. Subsequently the two fish were kept more or less alone. On 20th April, the female, who was alone at the time, laid eggs and carried them about for 4 days, even though they were unfertilised. The pair appeared to have spawned on 3rd May, but I could not be sure; at any rate, nothing came of it. On 10th May, however, I witnessed the spawning act itself.

Both fishes were highly excited that morning and were circling each other with fins spread, gill-covers extended and jaws puffed up. The male dragged a small stone to the front of the tank and began driving the female. She now seemed ready to spawn and did not run from him. Her ovipositor, which was fairly stout with a blunt end, was

extended about a quarter of an inch. The two fish began to clean the stone, which was a piece of red shale, about 2½ in. by 1½ in., and was one of the smallest in the tank.

First they cleaned it with their mouths, as cichlids typically do, then they covered it with gravel, removed the gravel and cleaned it with their mouths again. They repeated this unusual procedure over and over, apparently as a means of being certain that the entire stone was thoroughly cleaned. The female now made several "dry runs" over the stone. After each one, during which she scraped her ovipositor along the stone, she would drive the male toward the stone, but apparently because there were no eggs, the male refused to go near it. Finally, at 9.15 a.m., the female began depositing rows of closely packed eggs, and the male followed, fertilising each row. The genital tube of the male was very small and narrow and barely extended from his body. The eggs were about one-sixteenth of an inch in size and now appeared to be almost transparent grey in colour. Spawning ended about an hour and a half later, at which time the entire surface of the stone was covered with closely packed eggs.

That evening I found a little gravel lightly sprinkled over the eggs. I do not believe this had been put there intentionally by the fish, but rather that in their digging and foraging through the gravel, they merely left behind their usual trail of gravel which drops from their gill-covers as they swim about. The female was guarding the eggs and fanning them. The fanning was vigorous and effective; I could see gravel being blown off the eggs, and even the gravel beside the stone was moving under the force of her pectoral fins. Occasionally the female would stop fanning to sift through the gravel, probably for food. She kept the male away from the spawn. The pH of the water was 6.8, hardness 96 parts per million (p.p.m.) and temperature 82° F. When I put in some methylene blue, the male came out of his corner and the female let him take a position at the opposite end of the stone. Both then guarded the eggs.

*An account of this series of events, including details of feeding and other care, may be found in an article that appeared in March and April, 1957, issues of *The Aquarist Journal*. In that article, the fish were provisionally identified as *Geophagus acanthurus*, but it seems more likely that they are correctly designated as *G. jurupari*. A more detailed analysis of the breeding habits of these fish will appear in a future issue of *Zoologica*, the scientific journal of the New York Zoological Society.

Later, perhaps when she was sure it was safe, the female again chased the male away. Sometime during the following day, the female must have picked up the eggs, for all but two with fungus had disappeared by nightfall and her mouth was obviously full. On 13th May she swallowed them.

Courtship commenced anew on 16th May, and after two unsuccessful attempts to induce spawning (the result of which was that the female had to be separated from the male to save her from too much abuse), about 200 eggs were laid on 24th May. When first seen that evening, the eggs covered the major portion of a piece of red shale, 2½ in. by 2½ in. There was a little gravel on them, and the female was again keeping the male away. The temperature was 84° F., hardness 117 p.p.m. and pH neutral. Both fish ate *Tubifex*. Gradually the male regained his aggressiveness, while the female lost some of hers. As the male came near the spawn she would try to block his approach with her body, but as he got more aggressive, he would squeeze past her and settle down at the opposite side of the stone. Each time this happened she chased him away, and he would swim about the tank, foraging through the gravel and sometimes returning to the spawn. After a while the female began to tolerate the male's presence, and they were soon in a head-to-head position, lips almost touching while they both fanned the eggs.

The following morning they were still fanning in the same position, apparently resigned to each other's presence, but later on they began to chase each other, circling about and nipping each other's tail, etc. By noon, my wife had noticed that the female was picking up some of the eggs off the stone and that the male was persistently taking nips at her. That evening, both fish were quiet. There were still 40 eggs with fungus and five eggs without fungus remaining on the stone. (The area from which the other eggs had been removed showed a mark from each egg, which at a glance made it appear as if all the eggs were still on the stone.) Both fish now ignored food.

The female was carrying a mouthful of eggs, but it was difficult to tell whether the male had any. He was not annoying the female and they stayed close together. Occasionally she gave him light nudges with her head. On the 26th, both fish still refused food. The skin across the female's lower jaw was stretched and puffed out, and she constantly rolled the eggs. Since the pouch of the male

was less obvious and he was rolling his eggs only from time to time, it became apparent that he was not carrying as many as the female. (All the eggs remaining on the stone became affected by fungus.) By the 28th, the male's pouch had stretched and darkened and he began to chew the eggs more regularly. Two days later the female began to annoy the male, and they began inhaling strands of *Tubifex*.

I have never seen these *Geophagus* spit out unhatched eggs, but on their first spawning, when they spat out the newly hatched fry for the first time I did mistake these fry for eggs. Their tails were transparent and almost invisible, and since they were still apparently unable to move I thought at first that they had not yet hatched. I believe that although other authors have mentioned eggs being spat out, they may have mistaken newly hatched fry for eggs. Based on incubation periods of my pair, it seems that enough time had elapsed for the eggs to have hatched. On 31st May, both fishes spat out mouthfuls of fry. These were a little further developed than those spat out for the first time in previous broods, and although not free swimming, they were able to move about fairly well. The female picked up most of the fry, and the male picked up a few. Both parents then began nudging each other. I offered them blood worms, which they both took gingerly while still holding the fry in their mouths. Both fish spat their young into separate depressions, and the female, who had most of the young, tried to keep the male away from her young, but he managed to pick up a few strays. I put a *Corydoras* into the tank. Then, by using a rubber syringe, I managed to pick up four strays that had been missed by the parents. I put these four babies into a 7½ gallons tank. I soon removed the catfish, as the parents were having difficulty keeping track of all the young. That night I gave Liquifry to the four young, and the next day I started them on brine shrimp and micro worms.

On the morning of 1st June, the parents began expelling and picking up a few young at a time. I then saw the female begin to "drink" air bubbles at the aerator. When I disconnected the air stone, both parents began the process of expelling and tending the large flock of young. They refused *Tubifex*. In the evening, the female was tending all young, while the male was feeding. She soon picked up all the fry and chased the male. When I hooked up the air stone, she resumed the chewing of air bubbles, and the male then began to chase her a little. On 2nd June, when I turned off the reflector, they felt more at ease and they expelled the fry. They then began to tend the young together. The depression in which they released the young was 5 to 6 in. across, almost circular in shape and about an inch and a half deep at the centre. While tending the young the parents got along well, but usually when the female had fry in her mouth, she would nudge the male.

On 6th June, the young appeared to feed on the cloud of sediment that came from the parents' gills while they were digging through the gravel. The parents still seemed to fan the swarm of young with their pectoral fins. By this time, the four fry in the 7½ gallons tank had become tame and were not afraid of bright light. They even came to my hand. During the night I found another stray, which I also put into the smaller tank. By 11th June, the five in the 7½ gallons tank had grown definitely larger than those with their parents. There were still about 140 fry on 11th June, and the parents seemed to be showing them about the tank. The young were split into two groups, one group with each parent, and they were exploring the entire tank. The parents' tank is kept on a dresser in my children's room. The parents let the young out while we opened and closed the dresser drawers under them, and even during the wildest playing of my two children; but when the tank light was turned on, they seemed apprehensive, no matter how quiet the room was.

By the 14th, the fry began picking out bits of food from



The male *Geophagus jurupari* of the pair bred by the author. This photograph clearly shows the extensions of its pelvic fins which at first led Mr. Reid to call it *Geophagus acuticeps*.

the gravel. They were still not large enough to pick up pieces of gravel itself, but they would dig down between crevices in the gravel for food. Although I have found these fish generally to be bottom feeders, the young would rise toward the surface when I fed micro worms. In the evening, the male picked up all the fry and began driving and nudging the female. He seemed to be courting, but she paid no attention to him as she went about the bottom inhaling *Daphnia*. On the 16th, when I put a so-called *Corydoras punctatus* into the tank, the young were busy eating chopped *Tubifex* and the parents did not pick them up. I then placed an *Octocinclus affinis* in the 7½ gallons tank, and replaced evaporation losses in both tanks. The fry had not been feeding on sediment for the past few days, possibly because they were getting enough live food. The parents had now begun eating from the worm-feeder again.

On 17th June, I took one of the smaller young from the 7½ gallons tank and replaced it with the family group. It was considerably larger than those being raised by the parents. The baby was frightened, and stayed motionless, hiding near a rock. When the female finally saw it, she went after it. I could not tell whether she was chasing it to eat it or to pick it up, but since I have found that these fish, as a rule, do not eat small fishes I believe she was trying to pick it up. The youngster ran to a corner and hid, but I chased it out toward the flock of young being tended by the parents. The parents, excited by my commotion, picked up all the fry, and the male, who now saw this lone youngster, went after it with his mouth full of fry. Obviously he wanted to pick it up. By evening the newcomer was still hiding, so I returned it to the 7½ gallons tank. The catfish, who was usually kept in a corner all day, was allowed the freedom of the tank at night, and was permitted to roam about the bottom whenever the parents were carrying the fry. The young in the 7½ gallons tank were now about four times the size of those being raised by their parents.

On 21st June, both parents were in a highly excitable state and they were still holding the fry fairly late in the morning. When I fed with *Tubifex*, the female finally released her fry, but the babies seemed as excitable as their mother had been. The young kept trying to get back into her mouth, but she refused to take them in and went on eating. After a few minutes, the male slowly expelled his fry back through his gills. This was the first time I had seen the male do this; as a rule he spat the young out. (When fry are picked up, they go into the parents' mouths head first. When coming out of the gill-covers, some come out head first and some tail first.) During the night, I took some 6-days-old black mollies and placed two with the parents and six with the fry in the smaller tank. The next morning I noticed the two mollies were swimming about the upper ledges of the tank, away from parents and fry. The mollies in the smaller aquarium were schooling together, and their presence seemed to make the five *Geophagus* more active, but neither species paid any attention to the other. After a few days, I removed the two baby mollies from the parents' tank.

On the 23rd, after an especially quiet day during which no one was at home, I found the fry unusually adventurous. They were swimming about the tank and through the tunnel well away from the parents. When I fed with *Daphnia*, the fry rose to take it, and one baby swam right into the *Daphnia* net. I placed it in the 7½ gallons tank, and after a few moments of fright, it began to feed on *Daphnia*. I then tried a larger net, hoping to let other fry swim into it, but as soon as the female saw the net, she excitedly picked up a lot of fry and began darting about the tank. The male did the same as soon as he saw the net, but in his anxiety to run from the net, he left behind about a dozen young. In order to avoid further excitement, I left the room. Within a few minutes the parents came out and picked up the



Two of the *Geophagus* young raised by the author from the spawning described in the article. At the time the photograph was taken, the fish were 3½ months old.

remaining fry. During the next 20 minutes or so, they retained the fry, even refusing food, but a half hour later the young were out again. On 24th June, one month after spawning, the parents seemed unable to completely close their mouths while carrying the fry. They would swim about, carrying the young with their mouths partly open, and open them wider in rhythm to the pumping of their gill-covers.

On the 25th, before going away for the week-end, I fed the parents with some *Tubifex*, and then put extra worms in the floating worm-feeder. I also put quite a bit of *Daphnia* into both tanks. When I returned home on the evening of the 27th, all the fry were out. They took *Daphnia* hungrily, but the parents didn't seem too hungry when I offered them blood worms. In fact, there were still quite a few *Tubifex* in the worm-feeder. At darkness, the female picked quite a few young and retired to a corner, as usual. The male refused to pick up the remaining ones, which were swarming about his head, trying to get into his mouth and even through his gill-covers. When a few got into his mouth, he immediately expelled them through his gills. After a while they ceased being so persistent and nestled in a tight swarm about his body. I then took a clear plastic dip-tube and using it as a fry-catching bell, I was able quietly to pick up ten young without creating much disturbance. The male was a little nervous about it and he hugged the bottom, drawing the fry in close to his body. A few times it appeared as if he was about to pick them up, but each time he seemed to change his mind and just moved away from the dip-tube, changing his direction. (I noticed, however, that when the catfish approached the male and his swarm of young, he would chase the catfish away.) I placed the ten newly caught fry in the 7½ gallons tank. The five young separated earlier were now about an inch long, while those that had been raised by the pair were only about a half-inch. This difference in growth can probably be attributed to the fact that the young in the smaller tank were able to eat almost continuously, night and day, while the others spent a good portion of their time in the mouths of the parents. When I darkened the house for the night, the male finally picked up most of the young about him, but in the darkness he missed about six of them, and these spent the night on the bottom of the tank.

On the evening of the 29th, I arrived home to find the

female carrying fry, while the male nestled on the bottom with the balance of the young clustered about him. I turned on the room lights and fed with *Daphnia*, and 10 minutes later the female expelled her fry. On the night of the 30th, I found both parents acting in an excited state. The female had fry in her mouth, while the male was near the centre of the tank with many young swimming about. When I walked near the tank, he picked up many of them, but he could not hold them all. The babies he could not hold kept trying to get in, but he shook them off and soon released those in his mouth. At midnight I noticed both parents seemed in high spirits and were carrying as many young as they could, but there were quite a few remaining out in clusters throughout the tank. (Now that my family was away for the summer and the house so quiet all day as well as many nights, the fish were more excitable than usual when I approached the tank.)

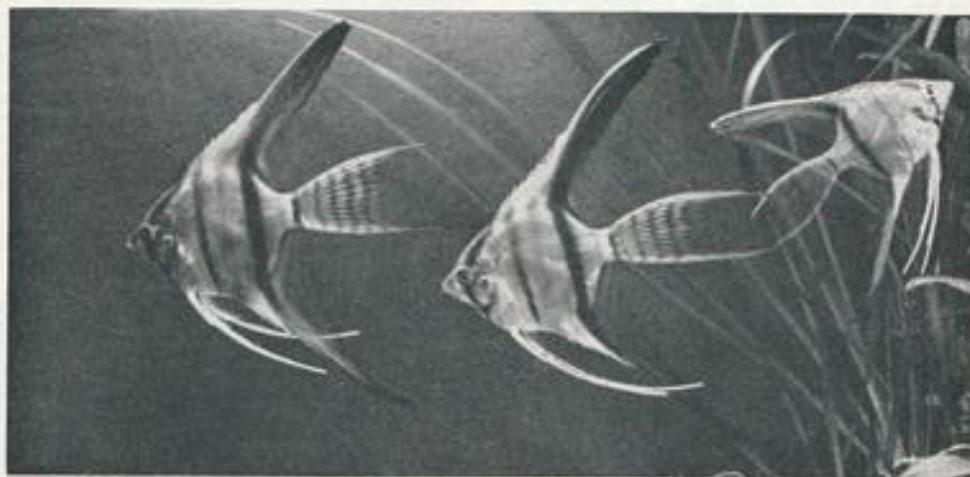
On 4th July, I returned from a week-end away from home after dark and saw that neither parent was carrying any young and that the young were scattered about the tank. When I fed with *Daphnia*, the young began to move about the tank eating, and the female began inhaling the food. When she approached one of the young, she quickly went after it, looking as if she intended to eat it, rather than to pick it up. The young apparently had the same impression, because they fled from her. The male did not seem to pay any attention to the young, and they in turn did not seem as afraid of him. The male then began to drive the female

a bit. Then I fed with *Tubifex* and I noticed for the first time that some of the young were eating whole worms. The ovipositor of the female was now showing, and she seemed pretty frisky with the male. Courtship had begun.

I placed a *Corydoras arcuatus* in the 7½ gallons tank and then, using two nets, I caught 26 fry and placed them in the 7½ gallons tank. During the netting of these young, the female went into a tunnel, made of shale, and the male rested quietly but tensely on the bottom nearby. Neither parent made any attempt to pick up young. The babies had no fear of the net and were easy to catch. The following day, since the parents were paying no attention to the young, and *vice versa*, and since the male was beginning to drive the female, I siphoned out 51 young *Geophagus*, making a total of 93 in the 7½ gallons tank. None of the young appeared to be injured by the siphoning, but this is a rough procedure that I cannot recommend as a general practice. There were still about a dozen young left with the parents, and all were now taking *Tubifex* from the worm-feeders. Almost as soon as I turned off the lights, my work done, courtship was resumed.

On 8th July, courtship having progressed pretty far, I removed the last 12 young from the parents' tank, giving me a total of 105 healthy young *Geophagus*. Toward the last few days the young had generally stayed away from the parents, even running from them occasionally, but at times they swam right in front of their noses, and even under their bellies without being molested.

What's New on the Market?



"Veiltail scalares"

A NEW strain of the angel fish (*Pterophyllum scalare*) with greatly developed tail finnage has been developed in Eastern Europe. Some specimens have been brought to Britain by Mr. Colin Roe (Shirley Aquatics, Ltd.), from his buying tour on the Continent, and he hopes to make arrangements for their distribution here. The angels are known as "veiltail scalares." Other species of fishes known to aquarists but seldom imported were also brought back by Mr. Roe, together with new species and varieties including a Siamese *Badis*, a black guppy, an African *Barbus* and some new water plants.

THE difference between just keeping fishes in an aquarium and having alert, healthy specimens that are fit and ready for breeding may be a matter of diet. Too little attention is paid to the nutritional requirements of fishes, and a new "AQUARIST Booklet" by Dr. Feroze N. Ghadially, entitled *Fish Foods and Feeding*, provides in practical detail what the aquarist needs to know about this. Live and dried foods are described with special attention to foods for rearing young fishes. The book's 88 pages are profusely illustrated, and it is obtainable for 4s. 11d. post free from *The Aquarist*, Brentford, Middlesex.

Aquarium Water Plants

by E. E. TOLEMAN

(continued from last month's issue)

ONE of the most popular genera of decorative aquarium plants is *Cryptocoryne*, of which about a dozen species are cultivated by aquarists. They are all attractive, but are not as fast in growth as many other aquatics, a point possibly in their favour in decorative aquaria. They prefer matured water and not too much illumination, and all species require warm water. Reproduction is by means of underground runners, and young plants should be allowed to grow to a fair size before being removed from the parent plant. Although they flower only rarely when grown under water they will do so freely when grown as bog plants. To do this one plant should be planted in a 3 in. flower pot and stood in a saucer of water, with, of course, a moist atmosphere and a temperature of not less than 65° F. and no direct sunlight. When established under these conditions they will send up their typically aroid flowers and set seed. Runners will also be much more freely produced under such conditions than when they are grown wholly submerged.

As popular as *Cryptocoryne* and rather easier to grow are the *Echinodorus* species, of which *E. intermedium* is better known as the Amazon sword plant. Given plenty of room, warm water and a rich compost this will grow to a considerable size, and will produce runners bearing a new plant at each joint, which should be allowed to attain a fair size before being removed. *E. radicans* is equally attractive for tropical tanks, but does not seem to be grown so frequently as the former, which is a pity as it can make a really good specimen plant. *E. ranunculoides*, a native species with narrow leaves, is useful in coldwater tanks.

Ceratopteris thalictroides, commonly known as the Indian fern, makes a delightful under-water plant, its foliage being different both in form and colour from most other submerged aquatics. It must not be planted too deeply or the crown will quickly break up, and it must have warm water. It is a most prolific viviparous plant, the baby plants being carried in large numbers at the edges of the mature fronds. *C. pteridoides*, the floating fern, is best grown as a floating plant, when it will soon make a layer several inches deep and quickly cover the water surface.

The spatterdock as usually grown in aquaria is the young plant of either *Nuphar advena* or *N. luteum*, plants common in this country. So long as it produces its beautiful under-water foliage it is suitable for tanks, but too soon it grows its large floating leaves and rapidly becomes too large for the average-sized tank. A rather more suitable species is *N. kalbiamon*, a North American plant which is much smaller in habit than our native species, but unfortunately it is not very easy to obtain. The propagation of *Nuphar* is by seed or by division of the rootstock.

A plant seldom seen outside botanic gardens but which is ideal for tropical tanks is *Amblia lanceolata*. It has large leaves, about 6 in. long and up to 2 in. broad, which live a long time and help to make it a most arresting plant for the

larger decorative aquarium. Propagation is either by seed when obtainable, or by division of the rootstock when this is sufficiently large, but unfortunately it is not a very quick-growing plant.

The *Aponogeton* are represented in aquaria by several species, of which *A. crispus*, *A. undulatus* and *A. ulvaceus* are probably the most grown. All three are very attractive and in warm water are easy to grow, but they must have sufficient light and a good compost. A plant often spoken of by aquarists but seldom seen is the Madagascar lace plant, usually *A. fenestralis*, but also sometimes applied to other species such as *A. henckeliana* and *A. bernieriana*. They are not easy to grow in small tanks, and their requirements are subdued light, clean warm water and a good rooting medium; it is probable that aeration would help as they grow naturally in running water. When they do establish themselves properly growth is quite rapid, and flowers will be produced which set seed readily, but in most tanks where conditions are not perfect growth is slow and flowers are seldom produced. Propagation then consists of dividing the rootstock, but unless it is urgently desired to increase the stock it is better to leave the plant undisturbed, as they generally resent interference with their roots.

A further type of *Aponogeton* is that in which floating leaves are produced from a rootstock rooted in the compost; a typical example of this is *A. distachyus*, the water hawthorn, a plant hardy in this country and very useful for cold water. Several species of this type are available for warm-water tanks, and these include *A. leptostachyus*, *A. dinteri* and *A. heudelotii*. *A. brassicaeus* will grow in either cold or warm water, and is almost hardy outdoors. They all flower freely, having sweetly scented flowers, but as their flowers are raised above the water they can be really appreciated only where the tank can be viewed from above.

Another plant with its foliage on the surface and having very pretty poppy-like flowers of a soft-yellow colour is *Hydrocleis comersonii*, an easily grown aquatic that will grow in water of 50° F. and above, and flower most profusely throughout the summer months.

An even prettier plant of the same habits is the water snowflake, *Limnanthemum indicum*, requiring warm water and plenty of sunlight in order to produce numerous dainty yellow-centred white flowers. *L. nymphaeoides*, also known as *Villarsia nymphaeoides*, is much hardier and has golden flowers raised above the water surface, with leaves that look like miniature water-lilies. When planted in a good compost it can become rampant in growth, and needs to be kept in check; for this reason it should not be introduced into outdoor pools, where it could become a nuisance.

Some of the water-lilies are useful for larger tanks, and of those most readily obtainable for warm water are *Nymphaea capensis*, *N. stellata* and *N. vivipara*. For cold water *N. candida*, *N. pygmaea* varieties and *N. tetragona* are all small in size, and whilst not having the same range of colour in their flowers as the larger growing types are nevertheless quite attractive. All *Nymphaea* require a good compost and plenty of sunlight, the conditions in a glass-roofed fish house are excellent for them, and they will enhance its appearance.

Of the purely floating plants there is not a very great selection available to aquarists, but those that are obtainable are mostly well suited to tank culture. *Riccia fluitans* is well known and makes a dense mat of tiny plants immediately below the water surface. *Ricciocarpus natans*, also known as *Riccia natans*, is equally useful, and both will thrive in cold or warm water, but stock should come from water of the same temperature as that in which they are to be grown, as losses can easily occur during acclimatisation.

Azolla, well described by the popular name of fairy moss, is usually available in two species, *A. caroliniana* and *A. filiculoides*. They have a wide temperature range and have, in fact, become naturalised in parts of the British Isles; they



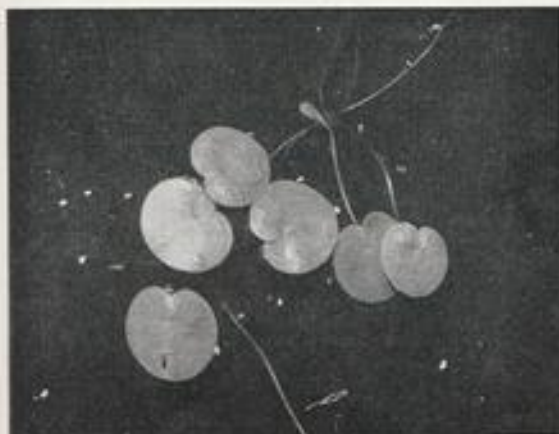
Surface view of *Salvinia*

prefer natural to artificial light, and when happy will spread amazingly quickly.

Salvinia natans is probably the commonest of the *Salvinia* species used by aquarists, although several other species are sometimes available. It is an excellent means of providing cover for young surface-swimming fishes, besides being useful for creating shade.

Utricularia is a genus of most interesting insectivorous plants, and possesses bladders for the capturing of small insects, hence the common name of bladderwort. Some of the species are aquatic and of these *U. prehensis* is the one usually found in warm-water aquaria. It grows immediately below the water surface and there forms a tangled mass of long stems with the tiny bladders attached. It flowers only rarely, with pale-yellow flowers that are raised above the surface. For cold water a native species, *U. vulgaris*, is available, being a fairly common plant of ponds and ditches. It has been suggested that bladderworts may be dangerous to fry, and in one case the author has observed a newly hatched Siamese fighter caught in a bladder, but it does seem to be a rare occurrence and should not therefore stop us growing this plant.

The plant sometimes referred to as American frogbit,



Photos:

Surface view of frogbit

Laurence E. Perkins

October, 1957

Limnobium laevis, is not unlike our native frogbit, *Hydrocharis morsus-ranae*, but it does need rather warmer water. A truly tropical species, *L. stoloniferum*, requires natural light to thrive really well, when it will cover the water surface very rapidly.

Pistia stratiotes, the water lettuce, is, when well grown, a very beautiful tropical plant with large rosettes of pale-green foliage held above the water, and long white trailing roots below. Unfortunately it is not too easy to grow in tanks unless natural light and a warm, moist atmosphere are available, but where conditions are favourable, such as in a fish house, then it is a plant to be recommended.

Probably the most attractive of this group of floating aquatics is the water hyacinth, *Eichornia speciosa*, but like the preceding plant the conditions for growth must be right for it to succeed. The leaves have a unique shape, the leaf stalks being much swollen so as to make them buoyant, thus keeping the plant floating on the water. Long masses of fine roots trail down into the water and make an excellent spawning medium, besides providing cover for baby fishes. The flowers are of a pale-blue colour, and under good conditions are produced frequently during the



Left, *Vallisneria* planted too deeply in the compost; the crown will rot and die. Right, the plant is correctly set and young plants are seen being produced on runners



Left, the lower leaves of a piece of a typical water plant prepared as a cutting are removed and, right, the cut stem is inserted into the compost, where young roots soon form

summer months. Propagation is rapid, by means of runners, and because of this plenty of surface space must be available.

This list is by no means all the plants that could be used in aquaria, but it does aim to include most of those easily available to aquarists, although some may be obtainable only during the warmer months, as growth of many of them is very much slower during the winter.

To the author it seems a pity that there are so few classes for individual plants in our shows, for more of these would surely help to raise the standard of aquatic-plant culture by aquarists. Continental aquarists seem to pay more attention to plants than we do, and by this they certainly attain a very high degree of attractiveness in their exhibition tanks. If as much emphasis were placed on plants as on fishes it would probably mean that the scope of our hobby would be extended and more people attracted to the fascinating pastime of keeping fishes—and plants!

AQUARIST'S Notebook



by

RAYMOND YATES

HOBBYISTS usually begin with very small fishes (a matter of price or what friends give away) but secretly desire to have much larger specimens. Tiny specimens are all very well but they do not arouse the admiration of non-aquarists in quite the same way as much larger fishes. Unfortunately, large and small fishes do not go together, so the hobbyist has to decide whether to keep to small, abandon them for big, or buy more and larger tanks. Generally more tanks are obtained and more fishes follow. In due course it is realised that big fishes eat more, cause more disturbance, need more frequent cleaning, stand less crowding and prove more quarrelsome than their smaller counterparts.

Big fishes often prove less colourful as they grow and the larger they are, the more defects show up. The market for big fishes is restricted (according to variety) and you can't give them away to friends who have little tank space or who keep small fishes. Gradually the realisation dawns that big fishes are something of a liability, even if not quite a dead loss. When a large fish dies it is often impossible to replace it, and when it is one of a pair this leaves you with the survivor whose hopes of another mate are small. Losses with smaller fishes are less worrying, for most of them can be replaced fairly soon.

Many beautiful small fishes grow up into large, ugly, unwanted adults, and newcomers should always ascertain from friends in advance, before buying, just what the ultimate size might be. Good examples of these are some of the barbs (clowns, *Barbus filamentosa*, spanner, etc.) and the tetras (*Moenkhausia* and the Congo characin). With the exception of a few obvious troublemakers, small fishes make the best tank inmates. They are much less demanding and almost always on the move. A small shoal of one or two related varieties or colour-contrasting types makes the underwater picture complete.

Personally I like large fishes, but only in their place, and this is what newcomers to the hobby cannot provide: separate accommodation. Large tanks with a mixed collection of such large fishes as angels, keyhole cichlids, leeri, blue gularis, pompadours, etc., look very well but large barbs and tetras lack colour and disturb the set-up. They are best avoided. Most cichlids are best away from other tropicals, but very small cichlids are decidedly handsome for the short time that they remain small. Young Jack Dempseys, festives, blue acaras and many others are charming for a few weeks and get on well with similar-sized fishes until increasing size makes their attitude more aggressive. Be careful when buying small cichlids. I came across a case recently where some small cichlids were offered as dwarfs, but alas, they trebled their size in the short space of 3 weeks and turned out to be the rather rough-tempered Senegal cichlid.

If you are buying some large-growing fishes it is best to buy them at least half-grown, apart from cichlids. Many of these large fishes are not at all robust when small and all too often sicken and die on their owner. Examples at random are archers, scats, leeri, gularis, angels. Readers will no doubt think of many others which are a very doubtful buy when small. A few large fishes do not seem to lose their colours when full size, as clown loach, male gularis, selimang and some scats. Never buy jewel cichlids at any size, unless you intend to give them a tank to themselves, however small they are and however cheap. It is possible to keep these fish with other large cichlids but they are not fish for the inexperienced.

Some large specimens can be very annoying in their way. *Astronotus* dashing about at speed, disturbing mulm and

biting "feelers" of fishes like gouramies and angels; black sharks and pal fish as chasers, *Meryomia* as eaters of all the tank vegetation and larger barbs and tetras as queue-jumpers at feeding time. Large fishes are excellent for public aquaria, and this is an easy way to observe them and enjoy their good points without being oneself put to the trouble and inconvenience they can so often cause.

Dealers sell plants and hobbyists buy them, which is all to the good of the hobby. Enthusiasts with fish houses with plenty of daylight from above have no difficulty in growing plants and are sometimes amazed at the rate of growth. Some plants grow much quicker than others, of course, and the well-known "parrot's-feather" must surely be the runner-up to Jack's famous beanstalk, so quickly does it reach the surface from the gravel. Old rootings and cut-off parts will often produce good shoots if just left to themselves, floating in a tank, in particular *Cubomba* and *Hygrophila*. The latter can be propagated merely from odd leaves left to float in the tank. However, this is a slow business and it is quicker if the leaf is stuck upright in the gravel, about a quarter of it being actually buried in the compost. Of course, where this is done no fishes should be present. A spare tank given over to plant propagation will quickly repay itself, but keep snails out.

Not all potted plants will do well in a fish house. There are many reasons for this. Sometimes the fish house is too dark, lit only from above (glass roof), faces north, the heating fuel causes fumes detrimental to plant life, high humidity may be unsuitable. However, many find it very much to their liking and it is rather surprising how few aquarists with really excellent facilities bother to consider the botanical aspect of adding to the pleasures of their main hobby. Apart from the crowded "no room to swing a cat" type of fish house, there is usually shelf room to house many plants. All the well-known "tropical" house plants do well such as *Monstera*, *Philodendron*, hops, *Ficus elastica*, palms, etc., as well as *Tradescantia*, Japanese honeysuckle, *Campylobasis*, begonias, pot-grown *Clarkia*, cyclamen, ferns, *Lobelia cardinalis*, fuschias and many others. House plants which have "died" off can often be brought through the winter to use again the following spring by storing in a fish house in a dark corner on the floor.

I always enjoy a visit to any public aquarium, quite irrespective of whether the set-up is good or bad. One always sees something new and there is almost always something which one can learn from other people's methods. If something is seen which is really unusual and the reason is inquired one often gets some really interesting sidelights on the hobby. Curators and their assistants, of course, are not often seen by visitors to public aquaria and when they are, few people care to ask direct questions, apart from hardened hobbyists who already know (or think they know) all the answers already. I think this is a pity, but is part of our national way of life in not speaking to strangers.

For myself I have often given short explanations to groups of people looking at tanks on display and in almost every instance they proved very interested and keen. The bare name of a fish or fishes on a tank gives no information

to the uninitiated and people are grateful where a knowledgeable bystander volunteers detailed, interesting and humorous information in a friendly way. In this way I have actually made several friends from people who had dabbled in the hobby, but one rarely sees aquarists wearing aquarists' badges. Only once have I run up against a fellow aquarist (actually advertising his club in his button-hole) whilst visiting aquaria, this being Mr. Scott of the Bradford club.

Standing by tanks one gets more than used to the many different approaches of the public to aquarium fishes on display. Many say nothing but pass slowly by. Others race past as if they were in a hurry to get back home to their T.V. Women seem thrilled but perhaps a bit bewildered by what they see in the respective tanks. Men rarely adopt this attitude; many men know exactly what every fish is (having read the label) and then proceed to point out to their wives and children the various varieties, hopelessly inaccurately. One has to keep a straight face when somebody points to some choice pompadour fish with "Look, our Ted's got some of those in a tank in the back-yard," or "Quick, here are some baby haddock" or "Ugh, what a horrid fish, doesn't it look like your uncle Bill?"

Public taste seems to prefer bright colours first, followed by bright colours allied with rapid movement. Fishes which are rare and which most aquarists would love to own are often ignored by the general public. Few people linger any real length of time at any tank (if they do they are aquarists). From experience I have found the one fish which almost everyone knows on sight is the angel, and those which attract most favourable comment are marine fishes, tiger barbs, livebearers in good colour and neons and scarlet characins. Don't speak to just anybody looking in a tank and don't make the first move. Wait until some remark has been passed which shows real interest before making any comment on your own part.

Many books stress that crowded fishes will remain stunted. This is true of fry and small livebearers in certain circumstances but is not a general precept. I have written on this before. Recently I saw some Congo characins which had grown to 4 in. from 2 in. in under a year in crowded quarters with other fishes. You can't stop large tetras from growing.

When he gets up in the morning and comes home from work in the evening the experienced aquarist casts a quick glance at his tanks. If there is anything amiss he knows in a moment, where a beginner would not realise anything was wrong. The hobbyist gets to know exactly what his fishes will be doing at any given time and if they are not following their usual ways he knows something is wrong. All too frequently this can mean something wrong with the heating supply. Drooping fishes, motionless on the bottom, means chill. Sometimes the heater fails but the electric top light(s) remain on and the fishes can be seen drooping at the surface immediately under the light as this is the warmest portion of the tank. Rapid breathing at the surface may mean over-heating, particularly if accompanied by bright colours in all the fishes. It may also mean overcrowding or betray the presence of a large colony of *Tubifex* worms in the tank gravel.

Fishes which dash about and scrape themselves on the plants, gravel and rockery may have white spot, but more probably the tank is overloaded with mulm, droppings, decayed food (or fish), black sand and micro-organisms arising therefrom. A listless fish may be suffering from fungus attack, internal troubles, including constipation, or the repeated attacks of a bully in the tank. Bitten tails or fins indicate a fin-nipper in the tank; more will occur unless the troublemaker is removed. Catfish which refuse to lie on the bottom do so because the bottom is foul (even if it

doesn't look it) or because of vast masses of *Tubifex* in the gravel. Bent bodies indicate age. The most important thing for the hobbyist is to be able to recognise instantly from several yards' distance that the tank is too cold, too hot or too foul. These variations need immediate attention.

Club magazines in England are very few and far between, considering how many clubs there are in the country. The United States has us well beaten in this respect and some of their club efforts are very good indeed. A new arrival on the scene is the 28-pages *Tropicals in Chicago*, of which about 12 pages are advertising matter. This magazine is printed on good paper, and contains many photographs, several instructive articles and other interesting features. To celebrate its inauguration this magazine held a draw at the Chicago International Pet Fair, the names of its subscribers being put into a container, the winner receiving a fully equipped aquarium and six tank-bred pompadours.

The Convair Association of Pomona, California, issue a mimeographed monthly called *Aqua-Montaly-News* which runs to five pages and covers. The winner of a recent membership contest was given an aquarium as the prize. The Lockheed works at Burbank, California, issue *Fin Fun* with 18 pages and no advertisements. This is very good and includes club advertisements by members free. A hidden name in the magazine wins a dollar for the finder, a door prize at the monthly meeting was two lyretails and another meeting night saw 30 jars of neons passed on to lucky winners. One number was given over entirely to the sea horse, and includes this "Ode to a Daddy who was a Mummy."

The equine aquatic, the sea horse,
Has very small need for a she horse,
For when they beget, in the sea horse set,
The whole thing is done by the he horse.

Aqua Notes of the Gulf Coast Society, Florida, runs to six pages of foolscap size. Still smaller is the four-page newsletter issued by the Cincinnati Society with cartoons by Albert J. Klee. One member is reported to have put a heavy female guppy in with two small Dempseys so that the young would provide them with food. Result, one heavy guppy without eyes. However, the babies were delivered, the female living 3 days.

The National Aquarium Society of Washington issue a monthly news running to 10 pages. At a recent meeting some 150 fishes which had not been sold in the auction were put in the "Grab Bag" (grab-tank) and were dipped out by purchasers at their own price. Two members (M. and I. Sochard) use a form of fish food said to be perfect in conjunction with a good dry food. Little trouble to prepare or keep, it lacks odour: Slice several pieces of calf's liver. Take a pan of water and bring to boil, adding no salt. Drop pieces of liver in and boil for 5 minutes. (When liver is first put in the water it will foam up so turn the flame low.) Pour off the water and cool to room temperature. When cool keep it in a plastic bag and store in cool place, preferably in the refrigerator. To feed, cut into small chunks and hang from wire, or crush with the fingers. Fed this way it will not foul the tank water and gives the fish something to pick at during the day.

Nebraska Tropical Topics refers to a member who used one of the new pink light globes thinking it would be just the thing to bring out the colours in his fishes. It did nothing startling in this respect and he forgot all about it. Some time later he realised the plants in this tank were going off and, subsequently, all but one of the plants died. The *Oregon Aquatic News* ran a competition for an article entitled "Why I Keep Tropical Fish." Winner was a Canadian lady hobbyist who received a set of guest towels with an underwater scene thereon.

In the Water Garden in October

by ASTILBES

MANY water plants will die down during this month but do not be tempted to make the annual clean up of the pond until November. All fairly small ponds benefit from this annual emptying and cleaning but it is better to wait until November before cleaning out the pond so that most of the leaves will have fallen from trees and shrubs which may be near the pond. Then the water plants will have finished growing for the season. However, it is possible to assist the general clean up by taking out as much as possible of the waste matter in the pond during this month. All water lily leaves which are dying should be removed. This can best be done by tying a knife on a long stick and cutting through the stem as low as possible. The floating leaves can then be raked out.

Many pond-keepers are of the opinion that as many leaves as possible should be allowed to remain in the pond to form manure for the plants in the following season. This is a dangerous practice. In the first place the plants will not be growing during the winter and so cannot use up the waste matter. Also this matter will decay and give off foul gases which can kill the fishes. This state of affairs is especially dangerous when the water freezes over and traps the gases.

As many fallen leaves as can be reached should be removed from the pond to save more work later on. There is sure to be enough nourishment in the pond for the water plants the following year without leaving a lot of leaves in the pond. These all tend to create foul conditions and if one expects the fishes to go through the winter safely it is imperative that the water should be in a very pure condition. For the same reason it is essential that the fishes be fed with care from now on. If the pond is of a fair size and is not overcrowded with fishes there will always be enough food for them. It is a fact that well-fed fishes can go through the winter more safely than half-starved ones, but any uneaten food would soon upset the balance of the water.

It may be necessary to check up on the number of snails and mussels in the pond. A few may be all right in an established pond, but if any of these die and remain in the water they soon smell very badly and nothing will foul a pond more quickly. Mussels will rarely live for long in a concrete pond unless there is plenty of mulm at the bottom in which they can work.

Any blanket weed should be removed when seen, as this can remain dormant in the water until the spring when it can flourish once again. Some types of fishes can get badly entangled in blanket weed, especially those goldfish varieties with double tails. In the winter many fishes become more sluggish and are then more prone to get caught in the weed.

Some pond-keepers ask about keeping frogs in their ponds. It must be realised that our native frogs do not live in the water. They are mainly land creatures although they do like damp positions for most of the time. They will come to ponds in the spring, sometimes as early in the year as February, to spawn. Most of them then leave the water for the rest of the year. Some, however, remain in or near the pond all the summer and some may hibernate at the bottom of the pond for the winter. If frogs are introduced into a pond in the spring they may spawn there but if the pond does not suit them they will crawl out and go off to a more suitable one.

It will be found, though, that if frogs develop from tadpoles in a certain pond it is probable that later on when they are mature they will return to that pond if possible in order to breed. Most frogs are mature in 4 years, although their rate of growth is controlled often by the season; a dry one means slower growth. This is because many of the live foods for the frogs only appear during wet weather. When



Photo:

Laurence E. Perkins

Hi-goi carp, a good subject for the pond

ponds are constructed it is a good plan to see that it will be possible for frogs and toads to get out of the pond once they have spawned. The type of pond with overhanging slabs of concrete can prevent these amphibians from being able to leave a pond. If they cannot do this they may be in danger of dying from starvation.

A grand fish for the larger pond is the hi-goi carp. It is a large-growing species and one which will become very tame in a short space of time. The hi-goi can grow to 18 in. or more in length and reach a weight of several pounds. Their action in the water is very slow and deliberate and they swim about often just under the surface like miniature submarines. They seem quite harmless to other fishes and will thrive on the usual types of food given to goldfish.

It is a good plan to watch for pests in the water even as late in the year as this as if many are left they can start off in the spring and soon become a nuisance. The different species of leeches are often seen more easily during the autumn, when some of the plants have died down. They should be removed and killed when seen, and they can be trapped by tying a piece of meat on a string and leaving it in the pond each night. It should be surrounded by a piece of small-mesh wire netting to prevent the fishes from eating it. If pulled out every morning many leeches will be found sticking to it.

The larvae of water beetles and dragon flies may still be active in the pond and should be killed if seen. These are caught best during the hours of darkness. All pond-keepers should possess a strong electric torch and visit their pond every night. It is surprising how easy it is to catch a fish, if necessary, at night-time. Also most of the pests can be seen and caught far more easily than in the day-time. The fishes are quieter then and many pests come up to the surface of the water during the dark hours.

If any shrubs or trees near the pond are getting too rampant they can be cut back as soon as most of the leaves have fallen. It is not a good policy to have trees too near a pond but sometimes this cannot be avoided.

Aquarists' Film Shows

SOCIETIES wishing to include a film show in their programme of meetings should write to Mr. Mason Smith (42a, Ruston Road, Cambridge), who will travel to any district for this purpose. Titles of Mr. Smith's own films are: "Tropical Aquarium Plants" (colour); "The Fighting Fishes of Siam" (colour); "Blue Gouramis from Sumatra" (black and white); "Tropical Aquarium Fishes" (colour); "The Cambridge University Botanical Gardens" (colour); "Zoo Life" (colour); "The South African Clawed Toad" (black and white).

Fancy Goldfish Breeding—9 *by* A. BOARDER

FANCY goldfish which have been bred this season should be sorted for quality as soon as possible, so that only the most promising fish are kept by themselves to receive the maximum attention. Space must not be forgotten as no fish can be expected to develop quickly and correctly unless it has sufficient room. Feeding also plays a very important part from now on. This year's fry should by now be able to take any forms of food, and to get the best from the brood it is necessary to feed fairly frequently on the best types of food. I do not believe in giving the same foods every day. I am certain that a varied diet will give hardier fish and ones which can be reared and then kept healthy on almost any type of diet. If only live foods are used when rearing the fry, they are less likely to be able to take dried foods if the occasion arises.

Some forms of starchy foods are a great benefit, especially when the short-bodied fish are being reared. The warmth of the water is still very important but during the warmer part of the year it is possible that if the fish are kept under cover, either in a living room or fish house, the temperature of the water will generally be in the neighbourhood of 70° F. It is amazing how well the fish will feed as long as the water is in the lower seventies. They can be fed at least three times a day as long as the water does not drop below 65° F. for most of the time. Do not forget that a partial change of water will encourage them to feed well.

The water is sure to get foul in a short space of time, from the droppings of the fish. With most of the fancy goldfish there is no need to be too fussy when running in fresh water. Once the fry are a month old, and provided that they have made good progress, it is surprising how little they are upset by the introduction of much colder water to their tanks. I have had tanks of young fantails with a water temperature of 75° F., and have run in fresh water direct from the tap through a hose. This is played on the

9. Sorting Moors

side of the tank to save too much disturbance. Some of the old water can be allowed to run over the top of the tanks, as long as care is taken to ensure that no fish are washed over the top. Once this fresh water has been introduced the fish will feed immediately and show no signs of having been upset in any way by this change, although it may be as much as ten or more degrees cooler.

If it is not possible to run in fresh water and allow some to run over it is a good plan to remove some so that fresh can be added, as nothing will restrict the growth of the fish more quickly than if the water becomes impure. When in this condition it loses a great deal of the necessary oxygen and then the fish are unable to digest their food properly. Should the water start to smell or look unhealthy do not delay for a single day, but empty the tank and thoroughly clean it out. The fry may be sorted when all is ready for placing the fish in the cleansed tank.

The sorting of shubunkins, fantails and veiltails has been dealt with in previous articles in this series and it is now the turn of the moors. It is quite unnecessary to refer to these fish as "black moors." Unless the fish is black it is not a moor, and so the adjective is superfluous. There are two distinct types of moors: the veiltail moor and the fantail moor. Although the two types have been recognised for many years the Federation of British Aquatic Societies omitted the fantail moor from their standards for the current period. However, I understand that a movement is on foot to recognise the fantail moor again. It is no easy

matter for breeders to alter the particular types of fancy goldfish. Several years might elapse before a particular feature can be bred out of a strain. As an instance, the tail of the fantail used to be joined for a quarter of its length and the later standards call for the complete division of the tails.

As a matter of fact the fantail moor is a much more active fish than the veiltail moor, which when in a show tank can spend almost all the time folded up at the tank bottom. In such a position it is quite impossible to tell if the fish has a divided tail let alone paired anal fins! I have had to judge some such fish on more than one occasion, and as some tanks have another one placed on top it has been impossible to get the fish to move with a planting stick, and so it has been impossible to judge the fish correctly. On the other hand most fantail moors are fairly active and gain many more points than would a veiltail moor which was continually lying on the bottom.

The veiltail moor should have a deep, round body approaching a sphere in shape. The head should be short and broad and there should be an even contour of the body above and below. The back should not be flat nor should it have a bad hump. The tail should be completely divided, broad and at least as long as the rest of the fish. It should fall in graceful folds and not show any sign of forking at the bottom. The dorsal should be large and full, equal to the depth of the body. The eyes should be telescopic, protruding well from the head. The cornea should be clear. Nasal flaps should be enlarged and can be fringed as in the pom-poms. The anal fins should be completely divided and well developed, and the pelvic and pectoral fins should be well formed and of a length corresponding to the other finnage.

The colour must be a uniform sooty black, and the fish should show no signs of bronze. Any metallic sheen will go against a fish, as will any red markings. Young moors are similarly coloured to scaled or metallic goldfish and get the dull black only as they develop. As is well known, sunshine will greatly hasten the colour change of ordinary metallic goldfish but it is not required for moors. The effect of too much sunshine on young moors is to make them tend to a bronze colour instead of the sooty black which is needed. Warmth also appears to have an effect on this colour change, and so once the fish are about a month old it is important to ensure that the temperature of the water does not keep much above 65° F. if it can be so arranged.

It has often been noted that when moors are subjected to warm-water treatment they have lost some of the soft blackness and turned bronze. It is therefore a good plan to see that the tanks containing young moors are shaded from direct sunshine, and a good covering with a surface plant such as duck weed will be an advantage. No rocks should be in the tank on which the eyes could be damaged, and the gravel for the base should be chosen with care. That which is composed of small round stones will be much safer than sharp-edged gritty sand.

Sort the fry for their tail development first, as it is no use concentrating on a number of fish which have either a single tail, a webbed one or a tri-tail. Examination in a white bowl will enable you to throw out many which will be a waste of space and food. The next sorting is done in a glass tank and then the shape of the body and other fins can be examined. Although the body and finnage will alter quite a lot as the fish grows, a badly shaped body or fin will never get right again. For instance, a thin, pointed dorsal fin will never grow into the full broad fin which is

(Please turn to page 156)



The First Stage of the new New York Aquarium, located on the ocean front at Coney Island in Brooklyn, New York, as seen from the boardwalk which passes directly in front of it

NEW YORK'S NEW AQUARIUM

by JAMES W. ATZ (Associate Curator, New York Aquarium)

Photographs by New York Zoological Society

THE New York Aquarium once more has a home of its own. On 5th June, 1957, the first stage of what is planned to be the largest and most diversified aquarium in the world was dedicated, and on the following day the citizenry of New York were able to do something they hadn't done for nearly 16 years: *Go to the Aquarium.*

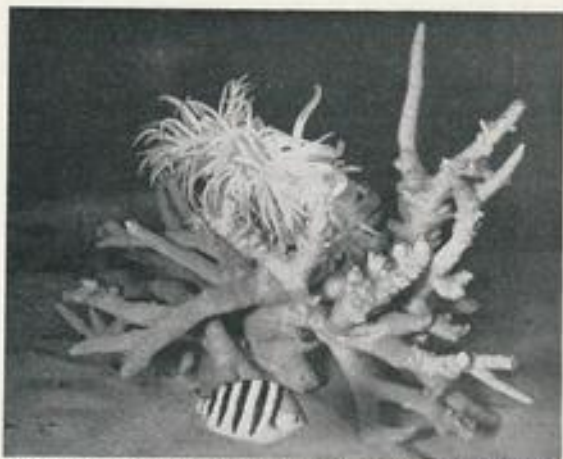
Of course, it was not exactly like the old days. True, the institution was the same and some of the old crew were still on duty at the place, but the locale, type of building, method of financing and exhibits—except two old-time turtles—were entirely different. Coney Island on the ocean front, not the Battery at the southern tip of Manhattan Island, was now the location. Instead of a made-over fort, the building was an up-to-date affair, specially designed for the purpose. No longer was there free admission; only school children and certain other organized groups were allowed entrance without charge. Unlike the old Aquarium, the new one is to be self-sufficient, and a considerable part of its revenues are to be derived from admissions.

Of the old exhibits, those few that were still in captivity and alive had previous commitments, so to speak, and were therefore unavailable, with the exception of two Ridley turtles that had been given to the Bermuda Aquarium when the old place closed down and which that institution generously offered to return to us. They, and a scattering of personnel, represented the only living bond between the old Battery Aquarium and the new Coney Island one.

To be sure, there was a firm and clear-cut organisational connection between the old and the new; in fact, the new institution was actually the same one that had opened in Battery Park in 1896 and had existed there until the fall of 1941, when it was closed down to make way for the Brooklyn-Battery tunnel. For the very reason of maintaining continuity and keeping together key personnel, the New York Zoological Society, which is responsible for the operation of both the New York Aquarium and the New York Zoological Park (Bronx Zoo), made half of the Lion House available, and there a temporary installation of tanks, pipes and pumps, as well as a couple of filters and reservoirs, was

erected. At the time, no one dreamed that it would take more than 15 years for the Aquarium to find a permanent home. But no one anticipated the prolonged after-effects of World War II or the Korean War, which were two of the prime factors delaying the construction of the new building.

The present structure is only the first stage of a much larger establishment. A good idea of their relative sizes can be obtained by comparing their over-all dimensions. The first stage is roughly 200 ft. by 150 ft., whereas the completed building will be 1,268 ft. long and 280 ft. wide. Nevertheless, the smaller one had to include all the kinds of essential equipment and mechanical features that would



In one of the tanks of the New York Aquarium, a sergeant-major swims by pink-tipped anemones perched on some staghorn coral. All hail from Florida



Main hall of exhibits at the new New York Aquarium. Here are exhibited creatures of the coral reefs, larger ones to the left, smaller to the right

eventually comprise the larger whole, and this helps account for its cost of approximately one and one-half million dollars. These funds were provided equally by the City of New York and the New York Zoological Society, which obtained its share from private sources. The rapidity with which the remainder of the Aquarium will be erected

depends to a great extent on the acquisition of more money by the Society.

Because of the limited space at our disposal, we knew that we could exhibit but a small fraction of the aquatic life available to us. It seemed most appropriate to concentrate on marine life, both because of our proximity to the sea and



One of the larger indoor tanks, housing fishes from Floridian reefs, including file fishes, angel fishes, grunts and wrasses. The tank is decorated with artificial-coral formations made of glass cloth and plastic



The renowned moorish idol is one of the spectacular reef fishes that have been exhibited at the new New York Aquarium. Emphasis has been placed on these flamboyant inhabitants of tropical seas

because salt-water creatures are much less frequently seen in captivity, if they are seen at all, outside of public aquariums. Of the many, many animals inhabiting the sea, those associated with coral reefs present a greater array of beauty and oddity than those of any other single habitat. We have therefore emphasised the exhibition of these remarkable and colourful fishes and invertebrates. The reefs of Florida, the West Indies, Bermuda, Hawaii and the Philippines have all yielded specimens for our tanks. In obtaining these exhibits, we have had the co-operation of several persons and institutions, especially the Bermuda Aquarium, the Steinhart Aquarium, the Key West Aquarium and the



One of the finest freshwater exhibits at the new New York Aquarium is this mottled snakehead from the Belgian Congo. An active, aggressive fish when it wants to be, this specimen will nip a tankman's hand if it gets the chance

American Museum of Natural History. Our two outstanding freshwater fishes are a large mottled snakehead and an albino Congolese lungfish.

Our most popular exhibit is not a fish, however, but Olaf, a baby male Atlantic walrus whose personality is so droll and affectionate that he has captivated everyone. Sharing Olaf's large oceanarium-like tank, in which sea mammals can be viewed both above and below the water surface, are several California sealions and an Atlantic harbour seal. Other non-fishy exhibits include four species of sea turtles, some pelicans and a colony of penguins.

Director Christopher W. Coates has been studying the physiology and behaviour of electric eels for years, and this long-term interest has paid off exhibition-wise with a spectacular show in which our eels are regularly made to demonstrate their electrical powers to visitors. Another unusual feature is our Talking Labels. Visitors rent a small head-set with jack plug attached for a nominal fee, and when they plug into a strip fastened beneath the railing in front of a tank, they hear a tape recording of one of our staff discussing that particular exhibit. We have tried to make all our labels as informative and useful as possible. Identification labels are short and simple and are accompanied by a coloured drawing of the animal. There is also a series of larger labels that provide general information about the exhibits and building. Attendance has exceeded all expectations. Between June and 15th July, visitors totalled 135,000, in round numbers.

Fancy Goldfish Breeding

(continued from page 153)

required. A snouty shape to the body will probably never improve. As for colour, the breeder will have to have plenty of patience as the soft black colour may not show to advantage for some months. Faults found in show veiltail moors are, lack of sooty blackness with its corresponding bronze colouring, flat backs, poor dorsal carriage and undeveloped double tail.

The fantail moor should conform in body shape and finnage to the ordinary fantail. All moors must be metallic or visibly scaled. It has been said that to get a good black in a moor it is necessary to cross a moor with a scaled red fantail. This is most unwise, as any cross, once in the strain, may persist for many generations. Where all varieties of fancy goldfish are concerned it has been proved that once a cross is introduced into a strain it is almost impossible to keep that strain from producing "throwbacks" for ever afterwards. Even after ten generations it is possible for a few bad fish to crop up in a strain once a fresh type has been crossed into it.

Moors should be fed as for other short-bodied types, and it will be found that these fish do better in a fair-sized tank and not in a pond. If they are placed in a pond there should be no sharp-edged rocks in the water on which the eyes could be damaged. Because of the dull colouring the moor cannot be considered a good fish for the garden pond and the eyes and flowing finnage could be damaged during a bad winter. The eyes as well as the tails are liable to contract fungus troubles.

Change of Address

FROM this month the West Bergholt address of Whitwell and Smykala will be used only for breeding and storage; the London branch at 61, Grafton Road, London, N.W.5, will be the sole distributing address for all supplies to the trade.

Microscopy for the Aquarist—35 by C. E. C. COLE

THIS month we are going to set up and try out our microscopes for dark-ground illumination. Remember that we need a more than usually powerful light, so change the bulb in your lamphouse for one of at least 100w, and get out your condenser so as to be able to concentrate the light emerging from the lamphouse opening.

If you have one of the special "intense" lights, complete with aplanatic condenser, iris diaphragm, filter holders, etc., now is the time to start using it. So far we have not considered such an expensive light source, which is normally far too intense for visual work, but as we intend to cut out the majority of the rays anyhow it is eminently suitable for our present project. I am not recommending you to buy one of these lamps; use one if you can borrow it or already have one.

The same applies to the dark-ground condenser or illuminator. Try one before you buy it; it is nice to have one, but not if we don't make full use of it. For powers up to 1/6 in. a set of wheel stops will be good enough.

Set up your microscope for ordinary visual work with transmitted light. The light is likely to be too intense for eye comfort. To enable you to work with preliminaries close down the lamp iris, which can be accurately centred in the field of view, and then opened just sufficiently to enable you to focus it accurately.

The condenser iris should be open as wide as it will go. For dark-ground work the aperture *must* exceed that of the objective. It is the rays from the excess upon which we depend for success. Use a cavity slide upon the stage, bearing a drop of, say, an infusorian culture, covered with a glass slip.

The large infusorians—*Paramecium*, rotifers, etc., will be visible to the naked eye, but hundreds of smaller ones will not, and no detail of shape or internal structure can be made out at all.

Select a stop and place in the filter carrier of the substage condenser. Look down the body tube, open the lamp iris to the fullest extent. If you cannot see any glimmer of light the stop is too large. Try a smaller one.

If the field is dimly lighted replace the eyepiece and look again. If the condenser setting is too low you will see a dark centre to the field surrounded by a lighter ring, and within this lighter ring small particles or living creatures shining brilliantly.

With eye close to the eyepiece, rack up the condenser very slowly, and watch the light ring fill out the dark centre. The creatures will now look like living jewels. The background when the stops are used will never be velvet black, because the stops are some distance below the illuminator.

Daphnia, *Cyclops* and *Bryozoa* are particularly beautiful when examined by this method, and these are creatures where the appearance under dark-ground illumination can be compared with that under normal transmitted-light conditions, so that a true idea of the usefulness of the method, as far as such animals are concerned, can be formed.

For the highest powers some authorities say that dark-field illumination is the only satisfactory method. Cedarwood oil is used for an immersion fluid. A drop is placed upon the upper surface of the condenser, and another upon the under surface of the slip being used. Very, very slowly, the condenser is racked upwards until the two drops meet. Nothing will be seen until they do. The objects must be exactly at the apex of the hollow cone of light being used. Corrections for cover-glass thickness must be accurate; in

fact the whole business requires great care and patience. If you can cultivate these virtues the reward is great, however, well worth the striving for.

And now for those who followed my suggestion last month, and placed some creatures in turpentine for observation every other day. Did your experiences coincide with mine?

Possibly some of you had no results at all. The reason, if such proved to be your unfortunate experience, was because you put too much water into the turpentine with your experimental specimens.

Take any small transparent container and place a little turpentine in it. Then take a small quantity of water and dribble it in. As the water reaches the turpentine it forms into large globules, reminiscent of fat globules in water, and sinks through the turpentine to reunite beneath it, forming a layer of water at the bottom of the container. Shake the two liquids together and leave, watching the mixture through a lens. Minute droplets of water will again sink to the bottom and unite one with the other until the original depth of water is again present.

Any aquatic creatures dropped into the turpentine in water will sink to the bottom and die of suffocation as soon as the oxygen supply is exhausted, and then putrefy in a normal manner. To give the turpentine a chance to act it is essential therefore that the creatures introduced are surrounded by as little water as possible. Most of it can be removed by careful application of blotting paper or filter paper. Specimens preserved in formalin will need the same treatment for, after all, most of the preservative solution is water.

Coloured specimens, such as bloodworms, will change in a matter of hours to a dull, creamy opacity, rather discouraging to the tyro who will wonder what good can result from a change that enables him or her to see less than they did before!

This, however, is but the beginning. Gradually, as day follows day, the specimens will become more and more transparent, and striated bands will become apparent which criss-cross the creatures: to the tops of the legs, if any, the jaws, and all movable segments or parts of the body. These bands and ribbons are the muscles of the creatures. As the turpentine penetrates deeper into the tissues, the internal organs become plainer, and much detail which has hitherto been invisible is revealed.

Clove oil has a similar effect upon animal tissue. Both are what is known as "clearing agents," of which more later.

They are not preservatives, and therefore are unsuitable to keep specimens in indefinitely. "Clearing" is only one of the processes employed in the making of slides, all of which will be discussed later on.

Cacti in the Fish House

ALTHOUGH some water may still be necessary for some of the cactus seedlings raised this year, the mature plants will start to go into their winter's rest. During this period they should receive little or no water. The amount of water depends on where the plants are kept. A good rule is to water occasionally, say once a fortnight, if the plants are in a room or fish house where the temperature does not drop below 60° F. In colder positions very little water may be needed from the end of October to the end of February. Generally speaking the colder the position the drier must the roots be kept.

COLDWATER FISH-KEEPING QUERIES answered by A. BOARDER

I have just set up a coldwater tank 24 in. by 12 in. by 12 in. and spent £4 on three small lionheads, one oranda, two small calico veiltails, two telescopic-eyed moors and two red snails. Within less than a month all were dead. Where have I gone wrong?

I cannot say why the fish died but I think that you went wrong in the first place by buying fancy goldfish instead of gaining some experience with some ordinary common goldfish. It may be that the fish you bought were infected in some way when you bought them. Had you been more experienced in the art of fish-keeping you might have been able to recognise any signs of ill health when you bought the fish. Although perhaps not as hardy as common goldfish there is no reason why fancy goldfish should not be kept quite healthy in a tank the size of yours. It will hold 12 in. of fish but it is safer to have less than this for a start.

You may have introduced the fish to the tank before the water plants had started growing. Also you may have fed the fish with too much dried food which would soon pollute the water. When buying fish see that they have the dorsal fin held quite erect. Check that they are bright of eye and are very active. Signs of ill-health are whitish coating of the body, lowered dorsal, red streaks on the fins and hollow bellies. If the fish are swimming at or near the bottom of the tank searching for food they are the ones to buy.

There is another point to watch when buying fish and that is whether artificial aeration has been used in the dealer's tanks. If such is the case it is possible for fish to be in trouble even before you can get them home. They are used to water heavily charged with oxygen and then when placed in a fairly small can the oxygen is soon used up and the fish may die.

Could you advise me on my fish? I have about 50 in the pond and several have gone blind, at first in one eye and then the other.

You do not say how big the pond is. It may be overcrowded with fish and then at least some of them will not thrive. When fish are kept in an overcrowded condition they soon feel off colour. One of the first things which happens to a fish off colour is that the protective mucous covering gets weakened and can at times almost disappear. It is then that the spores of fungus can gain an entry to the vital parts of a fish. The fungus (and eye blindness is probably most often caused by this) is always in ponds. The fish are able to resist its attacks because of the protective coating of mucus. If your fish are not overcrowded you may have been over-feeding them or feeding with something which they do not eat. The uneaten food will soon create foul conditions and the fish will then be ready for attacks by diseases. Some salt in the pond water might help but not if the conditions causing the trouble still exist. You can cure fish affected with fungus with a salt bath or with one of the advertised cures. Dabbing the affected eyes with castor oil on cotton wool helps a lot.

Are tiger barbs trustworthy occupants for a community tank?

We would not advise the inclusion of tiger barbs in a community tank of smaller fishes. When tiger barbs settle down and reach a fair size, they often develop the annoying habit of nipping the fins of other fishes and driving them away from food.

Which are the easier to breed—glow-light tetras or neon tetras?

Neither of these species is easy to breed. The sort of conditions that might induce them to spawn are clear, acid water, partial shade and a good growth of fine-leaved plant life such as *Fontinalis gracilis*, *Myriophyllum* or hair grass. The aquarium should be kept clear of all decaying matter (no uneaten food left on the bottom), though a thin covering of rich brown sediment often makes these fish feel more at home.

I know where I can collect willow moss in abundance. Would this plant be suitable for covering the floor of my tropical aquarium?

The fine-leaved willow moss (*Fontinalis gracilis*) settles down very well in the tropical aquarium, but the common sort called *F. antipyretica* soon dies in warm water. If you do collect *Fontinalis* from the wild, make sure that it is entirely free of snails' eggs, water beetles and the like before you introduce it into the aquarium. Lots of pests and disease can be introduced into the aquarium with plants taken from the wild.

I am about to start an aquarium for the first time, with a tank 28 in. by 24 in. by 12 in. I shall be grateful if you can answer the following queries: If I limit myself to keeping six fish can I maintain a balance so that the water will not need changing? Would a suitable combination be two golden orfe, two moors and two bitterling? I would like to have freshwater mussels in addition, is this advisable?

Your tank can hold up to 36 in. of fish, but if you are keeping fish for the first time I do not advise you to have as many fish as this. The fish you suggest will be all right as long as the golden orfe are not too large. I think that it is a better plan to make a start with some hardy types of goldfish and then other varieties can be added when all is going well. The water will not need changing as long as you have enough growing water plants to assist in oxygenating the water, but if you over-feed then the water will soon become fouled. I do not recommend putting mussels in a tank, especially in one newly set up. Mussels can thrive only when there is plenty of mulm in the bottom of the tank; they cannot move about in sand very well. They would probably soon die and then pollute the water.

I am about to glaze a 30 in. by 12 in. by 15 in. tank frame and I am uneasy about using the new cement which never sets hard. I shall be glad of your advice as to which kind to use.

Whether you use the old type of cement which dries hard or the new type which remains slightly pliable is up to you. It is a matter of individual choice. Good results can be had with either method. If the semi-plastic type is used the tank must be left for a few days before the water is added or else most of it would be squeezed out. The old type of compound is more like ordinary putty and once glazed the tank can be filled with water right away. The weight of water then firmly imbeds the glass into position.

I siphon the mulm from the bottom of my tank every week as advised but does this not rob the plants of a good deal of nourishment? Do uneaten *Tubifex* and *Daphnia* skins foul the water?

When you service your tank you should try not to remove most of the mulm. Just clear up the front half of the base and leave some of the mulm at the back. This will give the plants some food. If *Tubifex* are not eaten they will probably burrow into the compost and remain there for some time. If fish are fed correctly there should be no remaining skin of *Daphnia* left in the tank. You have probably been giving too many at a feed. Goldfish types can take only a small meal at a time and are unable to consume large quantities. If you put too many water fleas in the tank the fish soon become satiated with them and then instead of eating them completely they suck them into their mouths, crush the moisture out of them and then spit the skins out. They may eat these later on but not if too much food is given at a time.

Last year one of the carp in my pond developed a lump on the head which later became raw and the fish died. Now another fish has a raw wound on its head. What is the cause of the trouble?

The lump on the head may have been a cyst or a form of tumour. It is not possible to say for sure on the evidence available. These cysts and tumours sometimes form

through a blow but they usually clear up and the fish is then none the worse. Once a wound becomes open and raw it can be dabbed with iodine. Small raw spots can be caused by fish lice, known as *Argulus*. These attach themselves to a fish and suck its juices, causing a wound. They can swim freely to another host and resemble a tiny (one-eighth inch or more in diameter) plaice but are almost transparent. If a fish is infested with lice it should be immersed in a solution of a teaspoonful of Dettol to a gallon of water. The lice soon leave the fish and die. Watch the fish closely whilst it is in the solution and remove it if it turns over.

If I put some old concrete paving stones in my aquarium will it harm the fish?

The old concrete is not likely to harm the fish in any way. How the tank will look is another matter. Why not use a piece or two of weathered Westmoreland rockery stone? This will look much better and be safer.

I have recently purchased two sunfish. Will you kindly advise me as to whether they will disturb the fish already in the pond? goldfish, comets, shubunkins and tench?

You do not say which species of sunfish you have. There are many species and some grow much larger than others. The main point to remember, however, is that all the species of American sunfish are rather similar in habits to our native British perch. They are carnivorous and will eat any other fish small enough for them to get in their mouths. As long as your fish are about the same size as the sunfish I do not think that you will have anything to worry over. Whether the sunfish will be safe all the winter in an out-door pool is another matter. If we get a very severe winter it is possible that the fish may be in trouble, especially if your pond is not very large and well established.

Please can you tell me at what age fantails colour?

If the fish are calico or nacreous, that is without visible scales, they should colour very soon after hatching. If they are the scaled type the time taken to change will depend on: the strain from which they came; the rate of growth and the amount of sunshine and warmth available. Some fantails can change from bronze to red in 3 months whilst others may take 2 or 3 years. My own strain will change colour in 3 months provided that they get enough warmth and sun. I had a late hatching of fantails in July last year, and the fry were left cold out of doors all the winter. They did not start to change until the warm weather started this year, but during the hot spell in June they all started changing like magic! There is no doubt that the sun and warmth play a very large part in this colour change. Feeding may have something to do with it but some of the smaller fishes change colour before the larger ones and so this does not seem to be all-important.

I have a pond in the garden of a house I have recently occupied. I propose to place some goldfish therein but my family are afraid that the pond will become a breeding ground for mosquitos and other insects. Are their fears real, please?

You and your family need have no fear that mosquitos will breed in your pond once you put goldfish in it. If no fish was put in, it is probable that you would have plenty of cause for complaint. Unless you overfeed the fish then they will eat all the insect larvae which are likely to hatch out in your pond.

After I had glazed my tank and filled it, a film of oil formed on the top. Will this recur?

A film of oil does sometimes form on the surface of the water in a new tank. You can remove it by drawing a sheet of paper quickly along it from end to end. This film may not be caused solely by the glazing compound you used, as you suggest, as it can be encouraged to form if too much

uneaten food remains in the tank. Once the water gets a bit foul a film often forms.

I have a pond with about 250 small goldfish in it and many are developing fungus. How can I cure them?

It may be that your pond is overcrowded with fish. Once a pond gets to saturation point for the fish you must expect trouble. Fish just will not thrive if they are crowded. The fish may be overcrowded or the water may be impure. The latter state could have been occasioned by too much decaying vegetation in the pond, but more likely from excess of food decaying there. It is not always that you have given the fish too much food but you may have been giving them something which they do not like. Clean the pond out, refill and then go easy with the food. Fish in an open pond should not be fed every day; they can always find something to eat among the water plants.

I have a small pond in the garden which I recently emptied to stop the leaks and then refilled. I replaced the fish but not the plants. Now the water has turned almost red through a form of reddish dust over everything. Is this due to stagnation or lack of plants?

The red in the water is probably a form of freshwater red alga known as *Baccharosporium*; this would certainly thrive where there were no water plants. You did wrongly when you placed the fish back in the pond before the water plants. The plants would have prevented the formation of so much of the red alga. There is no need to worry, however, as once the plants are replaced and they start to grow the red alga will disappear. This form of alga will often occur in water exposed to strong sunlight. Even a bird bath filled with ordinary tap water will probably go quite red through the formation of the alga. When a pond or a tank is set up it is always advisable to make sure that the plants are growing well before the fish are introduced. It is not only that the plants give off some oxygen for the fish, but their presence in the pond ensures that excess of algae is unlikely to form. The fish are able to eat some of the finer leaves from the plants when they are placed in the pond and can also get a certain amount of shade from them.

I have an aquarium which develops a lot of slimy algae on the leaves of the plants. I try to slide some off with my fingers but the plants do not seem to be growing healthily; what is the cause?

It sounds as if the general conditions of your tank are wrong. When a tank is correctly run the plants remain healthy and the water clear. Trouble arises when something either was done wrongly when the tank was first set up or has gone wrong with the management later on. I am positive that the majority of tanks go wrong because of over-feeding. I know I often state the same thing but it is so important that it bears repetition. If many of the algae- and slime-infested tanks could be left alone without artificial food for a fortnight they would clear up by themselves, and the fishes would help in the process. If you are able to obtain any tadpoles they would soon clear up all the slimy algae from the plants; that is, of course, as long as you did not feed them artificially.

I have noticed quite a few small transparent worms on the glass of one of my aquaria. They are about 1/2 in. long and have a tapered body. They slide about the glass. The fishes pick off some of them but then appear to let them fall. Are they harmful?

The creatures are planarians and are not likely to do any harm to adult fishes. I think that if you reduce the feeding of your fishes they may eat many of them. Planarians are often encouraged by the fact that there is a lot of decaying uneaten food at the bottom of the tank. They could eat small fry, but I do not suppose that many are likely to appear in your community tank. If you remove your fishes and plants you could kill the planarians by adding a tablespoonful of household ammonia to each 5 gallons of water in the tank. Wash it out well before refilling with fresh water.

Making a Garden Pond

by AQUARIUS

It would be safe to say that no garden of any size at all is complete without a pond. A well-kept and sited pond can be the making of a garden and not only look attractive but give the owner the added pleasure of being able to keep and breed fishes which make interesting pets for all of the family. The making of a garden pond should never be undertaken lightly, as so much depends on the right start as to whether the pond is going to be a lasting pleasure or just a nuisance.

Many people make a pond incorrectly and then grumble about it afterwards when it has been their own fault through not going about the task in the right manner at the beginning. The unfortunate thing about it is that so many people make a pond and do not have the slightest idea of what is required to ensure that it is a success. It is only after something has gone wrong that the owner will seek advice. The advice cannot always then be made use of as it might mean the moving of the pond to another position in the garden, which is an impossibility.

Do not, then, commence to make your pond until all points have been examined thoroughly. Remember that once the pond has been made it will not be possible to move it. Any faults in its construction may not be put right later on. On the other hand, if all the features are understood at the beginning there is no reason whatever why the pond should not be a joy for ever. I suppose there are very few pond owners who would not like to have had their present knowledge when they first made the pond; however, this knowledge would be of great value if another pond was to be built.

The siting of the pond in the garden can be very important. There are several factors to recognise. It is probable that for most gardens in suburban areas the pond should be situated not too far from the house. If fairly near it can be viewed from a living room, perhaps, and even on a wet day, much interest can be had by watching the movements of the fishes. Watching the fishes is not the only benefit to be obtained from having the pond in such a position. Sometimes herons, sea-gulls and kingfishers may find a pond and take the fishes. This is far less likely to happen if the pond is fairly near the house. If the pond is fairly secluded the visitation from a predatory bird becomes a possibility. Another point in favour of the pond being sited near the house is the opportunity for filling the pond with water from the domestic supply. A short length of hose is all that may be necessary.

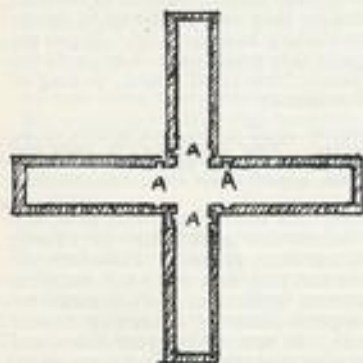
Having fixed on the site as near the house as possible, the



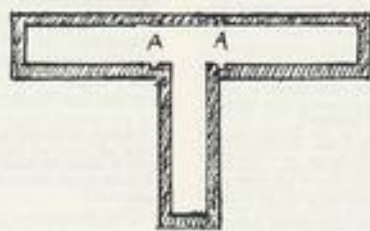
Photo: Laurence E. Perkins

Two small ponds on different levels connected by a waterfall form an attractive feature of this garden

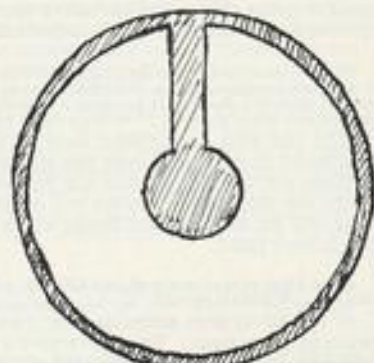
lie of the land should be studied. Many pond-makers might be encouraged in the belief that the best place for the pond would be in the lowest part of the garden, so that rain water might be able to drain into it and so make up any wastage. This is quite a wrong idea. The pond should be placed on a high part of the garden if there is one. Rain water should not be allowed to drain into the pond as it can



Crossed-shaped pond with slots (A) to take slides for partitioning



Plan of T-shaped pond with facilities for making three containers with slides inserted at A



Plan of circular pond with centre-piece to provide easy access to all the water

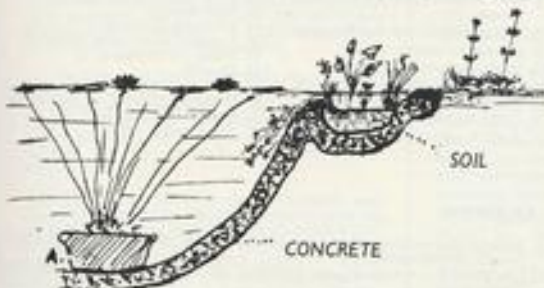
contain many impurities which may be dangerous to fishes. Also, if the pond is sited in a higher part it will make it far more easy to empty it if this is necessary. It may even be possible to site the pond that it can be siphoned empty with the aid of a hose.

Where the higher part of the garden is at the farthest point from the house it may be possible to make the pond in the raised form, that is, built above the ground, to obviate rain draining into it and to facilitate emptying when necessary. Care should be taken to see that the pond is not made too near to trees and large shrubs. There may be danger from pollution caused by leaves falling into the water and a great deal of sunshine may be screened from the pond.

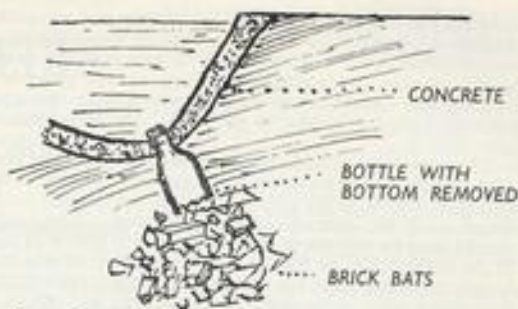
When your mind is settled on the best position for the pond the next question to be decided is its shape. This may possibly be determined by the style of the garden. If the layout of the garden is formal, with straight flagged or concrete paths, formal flower beds or trimmed straight hedges, it is almost certain that your pond will have to follow a similar pattern and be formal too. It must then be round, square, oblong, semi-circular or cross-shaped. If the garden is long and narrow it may be that the pond will have to be long and narrow too. Regular-shaped rose beds with interplaced stone paths will require a formal-shaped pond, itself surrounded by straight stone paths. Where flower beds are made with straight sides the formal pond will be necessary but once the line of the garden has been broken by winding paths and irregularly shaped flower beds the need for an informal pond will arise. If a rockery is anywhere near the proposed pond then the pond will have to be informal in shape to match the style of the rockery. If a rockery exists in a garden and a pond is required near it, the pond should conform in shape to the style of the base of the rockery. After it has been made some more rockery can be added so that the pond becomes an integral part of the actual rockery.

If the garden is rather long and narrow it may be that it will be better to make two or three small ponds connected by a small stream than to try to make one very long, narrow pond. Whilst considering the shape of the pond, the pond-keeper should consider how maintenance can be carried out in after years. Some attention may be necessary for the pond at varying intervals, although a pond should never require as much attention as other parts of a garden. The possibility of being able to reach most of the pond without a lot of trouble should not be missed. If a pond is not much wider than 7 ft. at any point it will make it fairly simple for the owner to reach any plant or fish in the pond. This may appear to cut out the possibility of making a fairly large pond, but if thought is given to its shape there is no reason why a good-sized pond cannot be made yet still be accessible.

Let us consider the circular pond. As a rule this type means that the centre is out of reach except with a lot of trouble, but this can be obviated by giving the pond a



Section of pond, showing a pot (A) containing a water lily, and the surrounding trough for bog plants



Part of a screw-top bottle set in the concrete bottom allows for drainage

narrow neck of land, say at the back, where one could walk and so get near to its centre. If the back part of a round-type pond is brought in towards the middle, making it kidney-shaped, it will be found that much less of the water is out of reach and yet the pond can hold as much water. In the same way, a fairly large pond can have what appears to be an island in the middle, joined at the rear by a narrow neck of land for accessibility. As plants are encouraged to grow on the "island" the neck at the rear may be hidden from front view.

Many pond-makers would like to be able to keep and breed fishes in the pond, and it will be well to consider the advisability of providing means of separating off certain parts of the pond for youngsters, etc. If a pond is made in the form of a cross it can be so constructed that any of the four arms can be partitioned for various fishes. Grooves can be made, when the pond is constructed, which will hold either glass or wooden slides. Such a pond could then have various types of fishes; even carnivorous ones such as pike or perch could have a part to themselves without there being any danger of them eating goldfish or other kinds.

If one has the ingenuity and energy it is possible to construct the pond so that there is an underwater observation compartment where it will be possible to watch the actions of the fishes below water level. Such a pond will need great care in design and construction. The general idea will be to make a kind of dugout adjoining the side of the pond with a section of stout glass in the side of the pond. The dugout is entered by steps and if a door can be fitted to cut out the side light the view of the under-water scene will be greatly enhanced.

After deciding the position and shape of the pond the next thing to be considered is its size. No doubt this will depend on several points. First is the cost of construction, then the size of the garden or the amount of space available. Lastly, one must consider whether one has the energy to undertake the task unaided and what help is available when doing the actual work. The ideal way would be for two or three intending pond-makers to get together and help each other. You will soon find what a help it can be when mixing and laying concrete to have a friend who can assist. When considering the size the following should be borne in mind. The smaller the pond the easier will it be to make and the more trouble is it likely to be for ever after. The larger it is the harder and more costly to make but the more pleasure is it likely to give afterwards besides being far easier to keep in good order.

At this point it may be of some use to state what is likely to be too small for practical purposes. Any pond which has less than 24 sq. ft. surface area is not likely to be of much use. This would make the minimum pond size say, 6 ft. by 4 ft., and the depth should be not less than about 2 ft. Smaller ponds are subject to extremes of weather;

they get too hot in summer in a short time and too cold in winter. A pond with a surface area of about 60 sq. ft. would be far better and would not be half as much trouble as the smaller one mentioned. It is always possible to increase the size of the pond if required once operations have commenced, as long as the actual concreting has not been started.

The next task will be to mark out the outline of the pond. If the shape is to be informal it is quite easy; all that will be necessary will be to lay a clothes line on the site and push it about until the desired shape is obtained. The outline should then be cut out or well marked with plenty of pegs. If the outline is to be formal then a great deal of care must be taken to ensure that the outline is absolutely symmetrical. Any slight fault in the shape of the outline will offend for ever afterwards. If the pond is to be round in shape it will be found that if the centre is pegged a string can be run from it to mark with a knife all round the required position. If the pond is to be oval then two pegs are used and a string run round loosely and its arcs are used for a guide.

The square and oblong ponds must be marked out with great care. See that the corners are quite square. This can be done by measuring from one corner to the opposite one at the other end, and then seeing that this measurement corresponds to the length between the other pair of opposite corners. When the outline is perfect a number of pegs must be driven into the ground so that a perfect level can be obtained. It is of no use trying to guess at the ultimate level of the edge of the pond. If this is not absolutely correct then when the pond is filled with water it will be found that one side is higher than the other and it will spoil the whole look of the finished product. A long straight board can be used, with a spirit level, and all the tops of the pegs should correspond in height. When you are quite satisfied with all your pegs the ordering and obtaining of the materials can be completed.

When marking out the pond remember to allow for the thickness of the concrete. This needs to be 2 in. thick for small ponds and 3 in. for larger ones. If it is intended to make a type of bog garden incorporated with the main pond it will be necessary to mark this out with the main pond although its construction may be left until the main pond is almost finished.

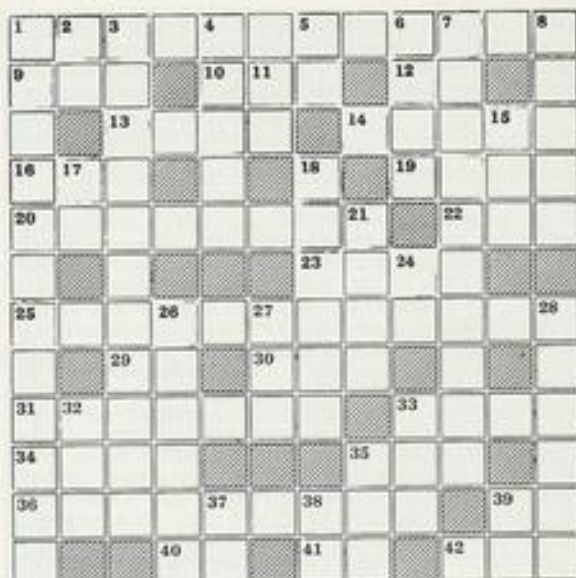
Materials Required

Once the earth has been dug from the site all will be ready for the actual concreting. If the earth at the base is of chalk or fairly solid gravel all will be well, but if it is clay or soft earth then some brick rubble must be rammed in first to make a firm base. It is not easy to estimate exactly how much material will be needed for the concrete, as a lot will depend on the thickness it is to be laid. For an average pond, the total square footage of the concrete area divided by 60 will give the number of cubic yards of concrete required. For each cubic yard of concrete 6 cwt. of cement, half a yard of sand and three-quarters of a yard of coarse aggregate will be needed. The coarse aggregate should be clean and of varying sizes. The ideal type has plenty of fair-sized stones with sufficient smaller stones and sharp sand to fill up all the gaps between them. Having many fairly large stones will mean a saving of cement.

(To be continued)

The AQUARIST Crossword

Compiled by J. LAUGHLAND



CLUES ACROSS

- Trichogaster leeri*, a gem of a fish (5, 6)
- Prefix often encountered in ichthyology, and indicating three (3)
- Belonging to us (3)
- Indefinite article is half anal (2)
- The fish auction would be so called in Scotland (4)
- Species of cichlid. The blue — is *Aequidens latifrons* (5)
- Head viceroy in Abyssinia, head of the *Rasbera* (3)
- Tide returns to prepare *The Aquarist* for you (4)
- An unhealthy condition due to overcrowding (8)
- Fish eggs
- Oils rather mixed in the store-
pit for silage (4)
- Mouthbreeder genus (12)
- Governing body of soccer
(1, 1)
- Proverbially busy creature (3)
- A salmon spear (7)
- Island of West Indies and
incubation (4)
- A strip of fish skin used as bait
on a hook (4)
- International distress signal
(1, 1, 1)
- Out of condition (9)
- Ego (2)
- Religious degree (1, 1)
- Beside (2)
- Where oysters lie. There is
one in every river (3)

CLUES DOWN

- Genus of *scalare* (12)
- Just a hesitancy in a Perch (2)
- Flighty sort of fish from
Malaya (7, 4)
- Blood-sucking parasite. Fishes
have them, and they are seen in
blouses (5)
- Follows 19 Across for the man
the reader writes to (2)
- Breed or family (4)
- Of the kind that ascends rivers
to spawn (10)
- I tear around in anger (5)
- A tetra comes from here (3)
- You will be indirectly con-
cerned with this if you use it
for tank heating or lighting
(1, 1)
- One who catches fishes (6)
- Male parent (4)
- Look from the loach (2)
- Survived (6)
- Imperial distinction (1, 1, 1)
- Covered with bony plates (6)
- Bring forth young (3)
- Shy (3)
- Christian era (1, 1)
- Wasting disease in fishes as
well as in humans (1, 1)
- Yours truly (2)

PICK YOUR ANSWER

- The famous naturalist Agassiz was: (a) Dutch; (b) French; (c) German; (d) Swiss.
- Which is the largest of the following species? (a) *Epiplatys chaperti*; (b) *E. fasciatus*; (c) *E. macrostigma*.
- Limia caudofasciata* (the steel-blue limia) is native to: (a) Cuba; (b) Dominica; (c) Haiti; (d) Jamaica.
- The King Coscorob is the popular name of: (a) *Budorcas*; (b)

- Mesocirrus polyacanthus*; (c) *Polyceropsis abbreviata*; (d) *Polyceropsis schomburgkii*.
- Catula* is a synonym of: (a) *Ambula*; (b) *Bacopa*; (c) *Nymphae*; (d) *Patria*.
- The genus *Dytiscus* (diving beetle) is represented in Britain by: (a) four species; (b) six species; (c) eight species; (d) ten species.

G. F. H.

(Solutions on page 164)

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.

LECTURER at the September meeting of the **Derwent Aquarist Club** was Dr. F. N. Ghadially of Sheffield, who gave a talk on breeding tropical fishes, illustrated with colour and black and white films made by himself. Members of the Burton-on-Trent Aquarist Society were guests of the club.

THE annual meeting of **Kirkcaldy & District Aquarist Society** was held on the 25th September and new officials and committee have been elected. Visitors are always welcome and during the year the club was pleased to receive aquarists from societies in England and Scotland. The meetings are held at Club Rooms, 1, Bethel Place, Kirkcaldy, and the new secretary is Mr. F. Wilkinson, 71, Sutherland Street, Kirkcaldy, Fife.

THE autumn assembly of the **Federation of Guppy Breeders' Societies** is being held on Sunday, 20th October at the Bell Hotel (Ballroom Room), Leicester from 2.30 p.m. to 6 p.m. The receipt of the bulletin for September is also acknowledged.

THE third annual show of the **Corby and District Aquarists' Society** was well patronised by exhibitors and successful. The Inter-Society Challenge Trophy was retained by Corby, Hendon being second and Bedford third. The best fish in the show award was won by Mr. D. Coulter with a paradise, and the best furnished aquarium prize was won by Mr. A. F. Baldoek, of Hendon. The members' trophies were won by Messrs. H. Thompson, A. R. Paley, D. J. Atkins and D. Coulter.

AN exhibition will be held by **Edinburgh Aquarist Society** in the Clubrooms, Infirmary Street, Edinburgh on the 23rd and from 25th until 30th November. Open events are included in the classes on show and particulars can be obtained from Mr. Gunn, 25, Polwarth Crescent, Edinburgh, 11.

AT the last meeting of the **Glenrothes and District Aquarist Society** a table show was held and there was a good number of entries. Future activities include a visit to the Scottish Aquarium Show in Glasgow on the 19th October. More new members have also joined recently.

A NEW society has been formed in Elgin, Morayshire and will be known as the **Morayshire and Banffshire Tropical Fish Society**. New members will be welcome and particulars can be obtained from Mr. C. P. King, 34, South Guldery Street, Elgin, Morayshire.

AT the last meeting of **Inverness and District Aquarist Society** the lecturer was Mr. John E. Edwards of the F.B.A.S., and many helpful hints and suggestions were given to the members during his talk. After the meeting Mr. Edwards became the first honorary member of the society.

AT the annual show of the **Willesden and District Aquarists Club** the entries were up on last year by 120, and in a high class exhibition of fish 15 gold stars were awarded. The main results were as follows: Best coldwater fish—Mr. F. W. Keen; best club furnished aquaria—Hampstead A.S.; F.B.A.S. trophy for plants—Hendon A.S.; Willesden and District Aquarists trophy—Mrs. S. Wingrove; best single fish in show—Mr. and Mrs. R. Skipper; inter-club furnished aquaria, Coldwater—1st, Hendon;

2nd, Willesden; 3rd, West Middlesex; furnished aquaria tropical—1st, Hampstead; 2nd, Willesden; 3rd, High Wycombe. Individual furnished aquaria, Coldwater—1st, Mr. S. Wingrove; 2nd, Master J. R. Chalmers. Furnished aquaria, Tropical—1st, Mr. A. Welsh; 2nd, Mr. F. H. Watts; 3rd, Mr. D. Watson.

FORTHCOMING events of **Nottingham and District Aquarists Society** include a lecture on Genetics and Allied Subjects by Dr. C. J. Cole from Birmingham at the monthly meeting. The Smith Appreciation Cup has this year been awarded to Mr. Arthur Adcock. At the annual show the general layout of the tropical fishes was a geographical one. The aquaria was arranged so that with the aid of maps provided, visitors were taken "round the world in 80 minutes." From the Americas, through Africa, India, Ceylon, South East Asia, the East Indies right to China and Japan. Each country and continent pointed by the 80-odd species on view.

AT the monthly meeting of the **Northampton and District Aquarist Society**, Mr. A. V. Ashford gave a talk on "Collecting and Preserving Daphnia." Questions were answered in a session of "You are the experts." Prize winners in the table show for characins and loaches were Mr. N. E. Lyon and Mr. J. Catterall.

AT the **Dundee Aquarium Society** meeting a play table show was held. This was judged by Mr. H. W. Appleby, who also gave a talk on that fish.

THE quarterly show of the **Cambridge and District Fishkeepers Club** will be held on Saturday, the 26th October at St. Giles Parish School Room, Pound Hill, Cambridge at 6 p.m.

AN interesting lecture was given by Mr. Partington at the monthly meeting of the **Middleton and District Aquarist Society**. The lecture was illustrated by coloured slides on coldwater, tropical and marine fish. There was a good attendance of members and friends.

THE first annual show of the **Poole Aquarist Association** was well attended and the chief prize winners were Messrs. H. J. Pearson and Mr. N. Walker. Endeavours are being made for a quiz to be held with Ringwood Aquarist Club.

IT is hoped by **Dunstable and District Aquarists' Society** to revert to fortnightly meetings with the approach of the long dark evenings. The last meeting included an illustrated talk on plants by Mr. F. C. Karitzky, the well known authority on aquatic plants.

THE aquarium opened at Roath Park by the **Welsh Aquarist Society** has proved a big attraction and has been visited by many people. There are 17 tanks of fish on view.

AT the last meeting of **Hford Aquarists' Society** a discussion on show standards was the chief topic. The table show was molles and was won by Mr. T. H. Thomas, the second being Mr. A. L. Stebbing.

THE many people in Workshop and district interested in the keeping of tropical or coldwater fish will welcome the proposed formation of a local aquarist's society. Those interested should contact Mr. A. M. Deakin, 14, Canal Road, Workshop.

THE annual coldwater show of **Walsall Aquarium and Pool Society** was held recently and attracted many entries of high quality. Under the chairmanship of Mr. W. L. Mandeville, a talk on fresh water biology was given by Mr. R. Marshall. The awards were as follows:—Goldfish (3-inch body limit): 1st, Mr. J. H. Burtle; 2nd, Mr. F. G. Preece; 3rd, Mr. L. Cooper. Goldfish (over 3-inches): 1st, Mr. F. G. Preece; 2nd, Mr. G. M. Davis; Shubunkins: 1st, Mr. G. M. Davis; 2nd, Mr. H. Anslow; 3rd, Mr. H. Anslow. Any other cultivated coldwater fish: 1st, Mr. F. G. Preece (golden orfe). Decorative aquariums: 1st, Mr. F. G. Preece. Mr. Preece received the special award for the highest aggregate of points, and the cup for the best fish in the show was won by Mr. J. H. Burtle with his goldfish.

THE September meeting of **Bradford and District Aquarists' Society** was addressed by Dr. F. Ghadially, his subject being "Water," and his lecture was thorough appreciated by a small but enthusiastic audience.

AT the monthly meeting of **Carassius Club** the recent G.S.G.B. Convention, show and auctions held at Brighton were discussed. Representing the club were Mr. E. Knight (hon. secretary), Mrs. E. R. Knight and Mr. Ryder. It was agreed by club members that the G.S.G.B. have something to work on from "Questions" time at the convention regarding twintails.

THE high standard of the exhibits at the **Accrington and District Society's** show was commented upon by Mr. E. Chapman of Sheffield after judging. The awards were as follows:—Open furnished aquaria: 1st, Mr. A. Wardle, Bury; 2nd, Mrs. A. Wardle; 3rd, Mrs. H. Loder, Burnley. Members: 1st, Mr. A. Isherwood; 2nd, Mr. A. Moss; 3rd, Mr. R. Duckworth. Novices: 1st, Mr. A. Moss; 2nd, Mr. I. Nuttall; 3rd, Mr. H. Pickup. Junior: 1st, Mr. Laura Smith (13); 2nd, Barbara Stephenson (13); 3rd, Stewart Hartley (10). Coldwater aquaria: 1st, Mrs. H. Smith; 2nd, Mr. H. Smith; 3rd, Mr. R. Jackson (Clayton-le-Moors). Ornamental aquaria or vivaria: 1st, Mrs. V. Stephenson ("The old mill by the stream," with



The Aquarist's Badge

PRODUCED in response to numerous requests from readers, this attractive silver, red and blue substantial metal emblem for the aquarist can now be obtained at cost price by all readers of *The Aquarist*. The design is pictured here (actual size). Two forms of the badge, one fitting the lapel button-hole and the other having a brooch-type fastening, are available.

To obtain your badge send a postal order for 2s. together with the **Aquarist's Badge Token** cut from page x, to Aquarist's Badge, *The Aquarist*, The Burrs, Half Acre, Brentford, Middlesex, and please specify which type of fitting you require.

running water and turning waterwheel, awarded special prize); 2nd, Mr. J. Pettifer ("Indian encampment by stream"); 3rd, Mrs. V. Stephenson ("Pet shop").
Furnished aquaria diploma: Mr. A. Wardle.

THE second annual show of the **Chester and District Aquarist Society** and the Chester and District Branch of the National Cactus and Succulent Society was held recently.

The unusual combination of exotic plants and glowing tropical fish, which was highly successful last year, this year attracted an even larger number of exhibitors. There were 36 tanks of fish on display, and hundreds of plants, many in full flower, and all collectors' specimens, entered in the cacti section.

A special attraction was a tank of water terrapins and axolotls, lent by the North of England Zoological Society from Chester Zoo. Mr. Fred Williams, who is in charge of the aquarium, there judged the fish, the results being as follows: Furnished aquaria: 1st, Mr. J. Bowyer; 2nd, Mr. P. Shobbrook; 3rd, Mr. R. Sharp. Individual fish: 1st, Mr. K. Parry; 2nd and 3rd, Mr. J. Bowyer. Matched pairs: 1st, Mr. K. Parry; 2nd, Mr. F. Oldbury; 3rd, Mr. L. Moulding and Mr. D. Peak. Breeders: 1st, Mr. J. Bowyer; 2nd, Mr. A. Lee; 3rd, Mr. L. Moulding.

THERE were slightly more entries in the competitive classes at the **Leeds and District Aquarists' Society** annual show which was held recently, and among the additional exhibits was a 10-inch scorpion fish shown by Mr. B. Gill of the Exotic Aquaria Supplies, Bradford. The results were:—Furnished aquaria, tropical: 1st, Mr. K. Tate; 2nd, Mr. K. Tate; 3rd, Mr. E. Dobson. Inter-Society furnished aquaria: 1st, Pontefract; 2nd, Selby; 3rd, York. Individual furnished coldwater aquaria: 1st, Mr. K. Tate; 2nd, Mr. G. Boothroyd; 3rd, Mr. P. Reynolds. Fighters: 1st, Mr. L. Greenall; 2nd, Mr. H. Cranswick; 3rd, Mr. Hodggets. A.O.V. Labyrinth: 1st, Mr. Lewis; 2nd, Mr. R. K. Wroe; 3rd, Mr. J. Cousins. Livebearers: 1st, Mr. D. I. Cadman; 2nd, Mr. Lewis; 3rd, Mr. K. Tate. Characins: 1st, Mr. D. I. Cadman; 2nd, Mr. D. I. Cadman; 3rd, Mr. Smith. Barbos species: 1st, Mrs. Loder; 2nd, Mr. R. W. Rhodes; 3rd, Mr. D. I. Cadman. A.O.V. Egglayers: 1st, Mr. K. A. Denham; 2nd, Mr. P. Reynolds; 3rd, Mr. Rannister. Breeders A: 1st, Mr. P. Reynolds; 2nd, Mr. R. S. Barnes; 3rd, Mr. K. Tate. Breeders B: 1st, Mr. K. A. Denham; 2nd, Mr. K. A. Denham; 3rd, Mr. F. Holloway.

STUDENTS of the Honor Oak Community Centre and Evening Institute Aquaria Class have arranged an exhibit in the hobbies room of Hilton House on Honor Oak Estate. Many species of tropical fish and goldfish illustrate the types which may be kept by beginners. Small sea-shore creatures show what can be done to keep children's "finds" in health.

Other aspects of the exhibit are dry foods such as vegetables and shrimps, a stuffed porcupine puffer fish (a great favourite with the children), and pictures projected on to the wall—some sequence depicting the spawning habits of the grouper, which comes ashore to bury its eggs in the sand.

Last year's students fanned themselves into a club, known as Brockley Breeders' Circle, who during the summer have continued to meet to discuss fish and to visit such places as the Zoo and Kew Gardens. They are installing a tank in a room at the John Stainer School, Brockley, and have recently presented 15 goldfish to the children of the day school.

AT the Bristol Horticultural Show the **Bristol Tropical Fish Club** staged an exhibit of four aquaria, set up by members, and showing in each case alternative settings of tropical aquatic plants and fish. Six smaller tanks were also included in the display, showing, in each, specimens of the plants most normally used in tropical aquaria. The whole exhibit attracted considerable interest from the public attending the show.

At the club monthly meeting held on 19th September, Mrs. W. M. Meadows was the

speaker. After giving an extremely interesting talk, Mrs. Meadows was kept busy for a considerable time answering questions put to her by club members.

AT the last meeting of **Sleaford and District Aquarists' Society** members were entertained by a very fine film show given by Mr. Mason-Smith of Cambridge. Members' wives provided refreshments, and the Society were pleased to welcome guests from Gainsborough, Grantham and Boston.

RIVERSIDE A.S. (Hammersmith) were hosts at a recent meeting to Slough and Southall Aquarist Societies on the occasion of the "Hall Trophy." Riverside retained the trophy after a close contest. The final pointing being Riverside 51 pts., Southall 50 pts., and Slough 46 pts. Mr. Gillman (Southall) was presented with the Spelthorn Cup for the best fish in the show. Future events include a friendly match with Staines and Chelsea, a table show for cats and lizards, and breeders' awards.

THE **Independent A.S.** is enjoying most successful seasons. Recent successes have been prizes at the Walthamstow, Bethnal Green and Willenden Annual Shows, and the club at present hold third place in the North West London Group of Aquarist Societies. Meetings are held every Monday at 8 p.m. at the Islington Men's Evening Institute, Hornsey Road, N.7 (about 3 mins. from the "Nags-Head," Holloway Road), and regular lectures are given by Mr. Riddle. New members interested in tropical or coldwater fishes are welcome, and are invited to come along any Monday evening. Hon. Sec., Mr. L. W. Dure, 17, Lady Somerset Road, N.W.5. Tel.: Gul 6709.

AT the last meeting of **Middleton and District A.S.**, Mr. Wardle gave a very useful and most interesting lecture on Furnished Aquaria. He gave a practical demonstration of how to plant a tropical tank, using his own plants, and gave suggestions on selection of fish for a community tank. He afterwards answered members' questions.

A TALK on fish keeping and breeding, followed by a film show, was given by Dr. P. N. Ghadially at the last meeting of **Bridlington and District Aquarists' Society**. Members of the Hull Pond and Aquarium Society also attended.

THE future programme of **Smethwick and District Aquarist Society** includes a Table Show (characins) and a talk on "Tanks in Winter." Recent events included a trip to Coventry Aquarium Society show. A number of awards were gained at the M.A.P.S. exhibition including a second in the Society Shield.

A COLDWATER section is now included in **Poole Aquarist Association**, and the first coldwater show is to be held on the 26th November. The first Home Aquaria competition is being held on the evening of the 11th November and members can enter tropical or coldwater aquaria.

THE monthly bulletin of **Mansfield and District Aquarists' Society** contains advance information of club activities up to March next year. Forthcoming lectures will include an illustrated one by Dr. Ghadially on "Feeding of Fishes." There is also a lecture on the 11th November on Elementary Identification and comparison of fishes, groups cichlids, barbs and labyrinth. The hon. secretary is Mr. A. Atkins, 53, Newton Street, Mansfield, and new members would be most welcome.

A SUCCESSFUL show was held by **East London Aquarist and Pondkeepers' Association** last month. The best fish in the show prize went to Mr. H. Laws with an *Aptistogramma ramirezi* and the two open club furnished aquaria for tropical and coldwater both went to Walthamstow and District Aquarist Society. Among other successes were Mr. F. Petto and Mr. H. Law, with four wins, in addition to a number of seconds and thirds. An additional attraction was Mr. Leutscher of the British Herpetological Society, with a fine display of lizards, snakes and frogs.

THE annual show of **Walthamstow and District Aquarists' Society** proved extremely successful, there being an excellent public attendance and a record number of entries on view. The best fish in the show award went to Mr. J. Walker of Hampstead. Stoke Newington and District Aquaria Society completed a double, winning both the tropical and cold-water Inter-Club Furnished Aquaria.

RECENT events of **Aylesbury Aquarist Association** included an illustrated talk on "Marine Life" by Mr. Bartlett, and also a cold-water table show. The hon. secretary is Mr. C. L. Stephens, 79, Abbey Road, Aylesbury.

Secretary Changes

CHANGES of secretaries and addresses have been reported from the following societies: Canterbury and District Aquarists' Society (Miss L. M. Achurch, 101, St. Stephen's Road, Canterbury, Kent); Kirkcaldy and District Aquarist Society (F. Wilkinson, 71, Sutherland Street, Kirkcaldy, Fife).

FORBIDDEN FISHES

When deep-sea fishermen from many countries attend the International Fisheries Exhibition at Lowestoft, from 21st-26th October, they will see trawlers sailing in a flax sea containing 200 fishes that must not be caught. The fishes will be in a large water tank made from plastic-coated flax canvas, and containing more than 2,000 gallons of water. A Scottish company is displaying this unusual exhibit (The Gourcock Ropework Co. Ltd.) at the Kensington Hall; other centres of the Exhibition will be at the Pavilion on the South Pier and at the Lowestoft Branch premises of the Scottish company. There will be displayed samples of ropes, nets and twines, and many types of flax and other canvases. Samples of the hemp ropes used on "Mayflower II," and the synthetic ropes on "Curry Sark," will be shown. The flax tank, which has to withstand the pressure of nearly 10 tons of water as well as be completely waterproof, will be coloured ice-blue in the inside and green on the outside with plastic coatings. There will be a model of a modern herring-drifter class trawler, and another of a 1914-type coal burner. These will be kept moving by submerged electric-pumping gear. The fishes, which will be tropicals normally used for ornamental purposes, will be supplied by a Lowestoft dealer. They must be small enough not to be caught in the miniature nets of the model trawlers.

Crossword Solution

P	E	A	R	L	G	O	U	R	A	M	I
T	R	I	O	U	R	A	N	R			
E	R	O	U	P	A	C	A	R	A		
R	A	S	S	F	E	D	I	T			
O	C	H	L	E	S	I	S	R	O	E	
P	I	P	I	S	I	L	O				
H	A	P	L	O	C	H	R	O	M	I	S
Y	F	A	B	E	E	O	C				
L	E	I	S	T	E	R	C	U	B	A	
L	A	S	T			S	O	S	L		
U	N	H	E	A	L	T	H	E	Y	M	E
M		D	D	B	Y	B	E	D			

PICK YOUR ANSWER (Solution)

1 (J). 2 (J). 3 (J). 4 (J). 5 (J). 6 (B).

