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Correspondence with intending contributors is welcomed.

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What is your opinion? No. III

by B. Whiteside

At last the letters have begun to arrive in response to the first article in the series. I must admit to having been surprised and pleased at the response so far, as I had held the view that aquarists were rather wary about putting pen to paper. Letters have arrived from many parts of England; one letter reached me from Scotland but neither the Welsh aquarists nor those from my own homeland Northern Ireland have, as yet, decided to give us of their knowledge. How about a few letters from other parts of the United Kingdom as well as plenty more from English aquarists. Remember, you don't have to be a long experienced expert to be able to contribute some useful information. The youngest people to send me information were 14 years old, and the eldest person admitted to being 70 years old. This goes to show that there is no age barrier to those who are keen enough to write even a few lines, or several pages.

Letters received from our readers

Now to the main point of the letters. Did they contain any information which would throw any light on the questions posed? (i.e. the use of under gravel filters; and the use of peat, loam etc. under the gravel, to aid plant growth.

Fourteen year old **Stephen Harris**, of Bognor Regis found that on using peat in his aquarium it took about a week for the tank to settle down but the water remained clear and the plants thrived. After a leak developed in his tank, he set it up again using loam from his father's allotment but the only plants successfully grown were *V. spiralis* and *V. toria*. The water did not remain as clear as when peat was used. In conclusion Stephen finds peat to be the best medium for clear water and thriving plants. Another 14 year old, **Geoffrey Leach** of Bury, is not keen on the use of peat as he finds it is inclined to float to the surface when plants are moved or when large scavengers are present. He uses small pots of loam covered with gravel. Geoffrey also thinks that under gravel filters tend to stunt the growth of plants, and finds that tanks have to be cleaned out every few months due to an accumulation of muck.

Continued on page 120

Feeding tropical marine fishes

by G. F. Cox

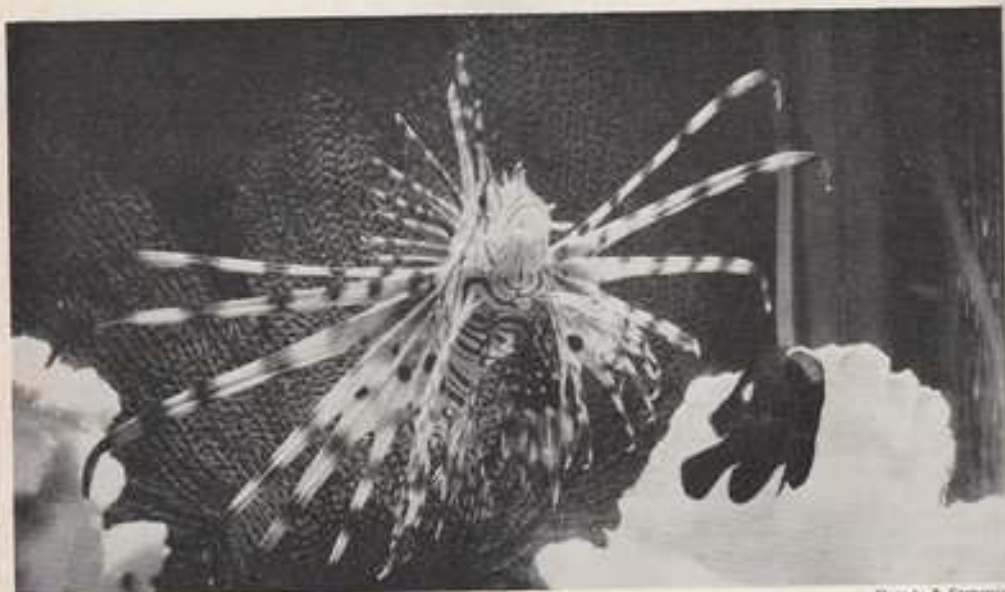


Photo by R. Fitzpatrick

Pterois volitans in temporary pursuit of *Dascyllus trimaculatus*

ALL living things, whether animals or plants, exhibit seven basic characteristics as follows:

1 Locomotion i.e. they are capable of autonomous movement.

2 Respiration i.e. they exchange gases with the environmental medium, free oxygen being consumed with the production of carbon dioxide as a waste product. This is true of green plants also, although the basic process is usually masked by their photosynthetic activities. A few forms of life can respire anaerobically, e.g. yeast cells change simple sugars into ethyl alcohol and carbon dioxide, releasing energy in the process, but they do not need oxygen to do it.

3 Reproduction. Since no living thing is immortal the species must be capable of producing their own kind to ensure the continuity of life.

4 Sensitivity. This means that a living thing is able to respond to a stimulus e.g. light, heat, sound, touch, gravity, etc.

5 Nutrition. All living things must either (a) synthesise their own organic food materials from basically inorganic compounds e.g. the green plants ability to make carbohydrates and simple nitrogenous compounds from CO_2 , H_2O , and mineral salts in the soil, using light as the energy needed for the process (called photosynthesis) OR (b) they must obtain their food directly from plants by feeding

on smaller animals which ultimately feed on these plants.

6 Growth. Leading directly from (5) above is the fact that, whereas some of the foods eaten are "burned" during catabolism (mostly fats and oils and carbohydrates), some of the foodstuffs—the amino-acid derived from proteins—are used during anabolic activities to make new protoplasm for new cells, tissues and organs or to repair damaged structures. The complementary processes of anabolism and catabolism are usually referred to collectively as **METABOLISM**.

7 Excretion. i.e. simply the removal from the body or the organism of the waste and unwanted materials.

In this article it is Sections (5), (6) and (7) above which mostly concern us.

In Section (5) above we stated that with the exception of the chlorophyll-containing green plants and parasitic or saprophytic fungi, organism is either *herbivorous* or *carnivorous* or in many cases *omnivorous*. This applies equally to marine tropical fish as well as other animals. As a direct result of the fact that no animal can synthesise its food but is dependent on other animals which ultimately depend on green plants, some very interesting *food chains* arise. A simple example is grass-zebra-lion, but nowhere are these food chains better developed and more complex than in the seas and oceans. A well-known example is the following—phyta-plankton-copepod-fish larvae-large predatory fish—

ing fish and shark. It is obvious, therefore, that with the exception of the purely herbivorous fishes and omnivores, whose normal diet includes a largish proportion of vegetable matter, in capturing coral fish and confining them in a "small" tank, (a relative term since even the largest aquarium in no way approaches the size of a coral reef), we are interrupting this food chain. With our power filtration, omission and low intensity illumination we effectively ensure that neither zoo- nor phytoplankton could exist. Fortunately, however, there are many omnivorous and carnivorous species which belong to the latter stages of a food chain and can therefore be fed in the aquarium using large crustaceans (brine shrimp, indigenous shrimps and prawns, daphnia, small crabs etc.) Molluscs (mussels) worms (ragworm, lugworm, earthworm, white-worm) and other smaller marine or fresh water fishes (e.g. Blenny, Whitefish, Guppy and Mollie etc.). The omnivorous species (*Amphiprion*, *Dascyllus* and *Abudefduf* species) will even take certain dried foods greedily.

Classification of aquarium species according to nutritional requirements

The following list was compiled as a result of my own experience with marine tropicals. There are, of course, other species which are imported but I have not included them because, never having kept them myself, I am unable to make any observations regarding their feeding. Furthermore even the apparently specific feeders such as the surgeon fish can, with a suitable example set by a "feeding instructor" such as *Monodactylus argenteus* or a Sergeant major (*Abudefduf*), learn to accept suitably-sized pieces of animal tissue such as the choicest parts of a marine mussel, or small fragments of uncooked fresh-killed shrimp, crab or prawn.

Herbivorous Species Surgeon fish, Tangs

In this group the food appears to consist almost entirely of green marine algae and various planktonic forms of life. In the aquarium they will take *Eutimorpha* species of seaweed but apparently no other of our native marine algae is acceptable. *Ulva lactuca* (Sea Lettuce), *Cladophora* sp. and *Chaetomorpha* sp. are never eaten in my experience. With training these somewhat difficult fish can be induced to eat brine shrimp, tubifex and small pieces of uncooked ammonium with the exoskeleton removed.

Omnivorous Species

Abudefduf sp. *Amphiprion* sp. *Chaetodon* sp. *butterfly* sp. *Dascyllus* sp. *Hemichus* sp. *Monodactylus* *Pomacentrus* *Pomacentrus* sp.

These fish will take a wide variety of foods including the marine mussel, chopped shrimp, chopped earthworm, ragworm, whiteworm and gnat larvae.

Puffer fish, Scorpionfish, Snappers, Therapon (Target fish).

This is obviously the largest group of fish which we keep in our aquaria, and in view of the catholicity of their diet this is not surprising. With the exception of most of the *Chaetodon* (pronounced not as Chat-o-don as I have often heard, but as Kee-see-don) and *Hemichus*, most fish in this group can even be trained to eat a good dried food. This supplies their vegetable requirements and together with a little fresh *Eutimorpha*, helps to keep them in first-class condition.

Carnivorous and Predatory species

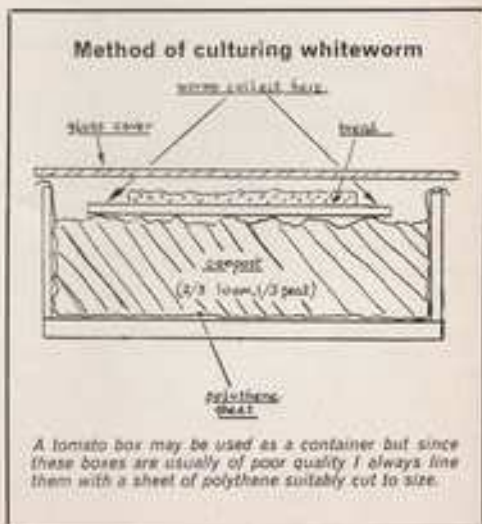
Betfish, Groupers, *Pterois* sp., See Hermit, Trigger Fish, Wrasse.

All the fish in this group are carnivores (i.e. they will normally eat only animal tissues), but whereas some of them will accept the flesh of recently killed foods, others will eat only living animals. Suitable foods for this group are as follows:—Earthworms and Ragworms, Mussels, Shrimps and Prawns, small Shore Crabs, pieces of steak, ox-heart, Whiteworms and, most important of all, perhaps, appropriately sized fresh-water and native marine species of fish. Worth mention here are the Trigger Fish which I have often observed on the coral reef surrounding the beautiful little island of Santa Carolina just off the coast of Mozambique. Whilst I often saw Triggers moving in transit over the coral-covered areas, I only ever saw them feed on the sandy stretches of the littoral zone. This they did in the same fashion as the *Symphysodon* species i.e. a high pressure jet of water is aimed at the sand in front of the fish. This dislodges all the small animals hiding in the sand e.g. shrimps, small crabs etc. which were promptly swallowed.

Some points with regard to live foods

1. Whiteworms

Everything I have read with regard to the culture of whiteworms recommends placing some water-logged bread on top of the culture medium (two thirds loam to one third peat) and then covering the whole box with a sheet of glass. With this method, however, I quickly found that both the bread and the medium became contaminated with strong growths of saprophytic fungi—mostly *Mucor* (Pinmould). In the accompanying diagram I have shown the method I use to obtain large quantities of worms over a long period of time (up to one year) without having to change the compost.



Using this method the collection of the worm is also much easier since they cluster in large numbers on the glass beneath, and to the side of, the bread and can easily be removed.

2 Mussels

These molluscs are easily kept alive, easily fed to the fish and above all, they are extremely nutritious. I can well see them becoming to the marine aquarist what Tubifex worms are to the freshwater enthusiast but since this food is of marine origin and therefore possibly infected by microscopic parasites, I obviate the risk of possible diseases by keeping them in a solution of an easily obtained Sulpha drug, added to ordinary sea-water. These treatments turn the seawater an amber colour but appear not to affect adversely the mussel. After being in this solution at a low temperature (approximately fifty degrees F) for 3 days they are fit to feed to even your most prized specimens. As an example of their value I fed the fish in one of my community aquaria exclusively on live mussels for six months. During this period a *Chorodon usque* grew 1 1/2 inches. The pieces most relished by the fish are the mantle, the adductor muscles and, most of all, the contractile "foot", (see diagram B). The kidney will also be eaten by most fish, and seems to be preferred by some species, e.g. *P. melanochir*.

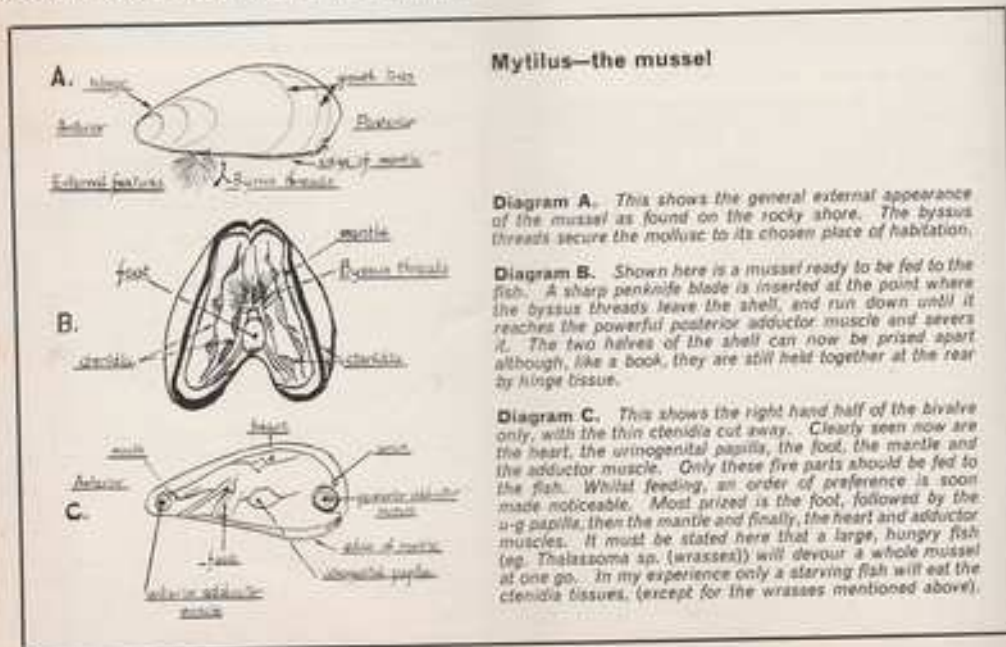
Before leaving this section I would like to say that occasional feedings of mussel, shrimp, prawn or crab

fish are a vital addition to the diet of all marine fish in captivity and especially those kept in even the very best of artificial salt solutions if vital trace elements are to be provided.

Collecting Earthworms

Digging for worms, the time-honoured method of collecting this excellent bait and live food, is antiquated, tiring and untidy. Furthermore, few people can practise this actively because their garden area is nearly covered with that modern status-symbol and gardening reducer, the turf lawn. Few people's dedication to fish keeping is so strong as to permit them to plough up the front lawn. However, this difficulty is easily overcome by using the following method: a stock solution of 15 per cent formaldehyde in water (e.g. 1 cupful to 2 pints of water) is prepared. Next, a piece of rope or string 4 yards long is arranged as a square with sides 1 yard long on the lawn or cultivated patch. Now, the yard square should be watered quite heavily using a watering can, preferably of the plastic rather than the galvanised type. (N.B.) This stage may be omitted if the ground is quite damp within 12 hours after a moderate rainfall. Next time dilute formaldehyde (formaldehyde can be obtained cheaply from most chemists) solution is watered over the same area i.e. the one square yard within the rope. Within two or three minutes, worms will begin to appear from their burrows at high speed.

Continued on page 126

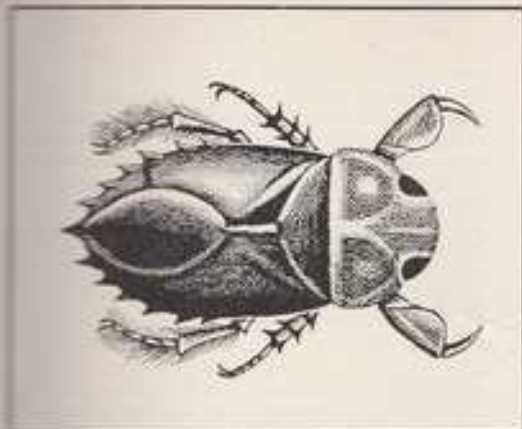


Mytilus—the mussel

Diagram A. This shows the general external appearance of the mussel as found on the rocky shore. The byssus threads secure the mollusc to its chosen place of habitation.

Diagram B. Shown here is a mussel ready to be fed to the fish. A sharp penknife blade is inserted at the point where the byssus threads leave the shell, and run down until it reaches the powerful posterior adductor muscle and severs it. The two halves of the shell can now be prised apart although, like a book, they are still held together at the rear by hinge tissue.

Diagram C. This shows the right hand half of the bivalve only, with the thin ctenidia cut away. Clearly seen now are the heart, the urino-genital papilla, the foot, the mantle and the adductor muscle. Only these five parts should be fed to the fish. Whilst feeding, an order of preference is soon made noticeable. Most prized is the foot, followed by the u-g papilla, then the mantle and finally, the heart and adductor muscles. It must be stated here that a large, hungry fish (eg. *Thalassoma* sp. (wrasses)) will devour a whole mussel at one go. In my experience only a starving fish will eat the ctenidia tissues, (except for the wrasses mentioned above).



The Junior Aquarist

Ilyocoris scorpion—Naucoris cimicoides

Ilyocoris scorpion

by Bill Simms

ANY aquarist who has incautiously handled one of these smaller water scorpions will probably be aware that they can cause pain. Like two others, *Nepa cinerea* and *Ranatra linearis*, the Ilyocoris Scorpion, sometimes called *Naucoris cimicoides*, has its front arms adapted for catching its prey, and a piercing mouth part with which to suck out its victim's juices.

It is this piercing mouth part, or proboscis, that causes the very but painful wound, for though this water scorpion is only half to three quarters of an inch long, the grip it can attain with its front legs enables it to tear into quite tough skin.

The hind legs, well covered with hairs, are shaped so that they can act as most efficient oars, and the creature swims very well—unlike the other two water scorpions which merely crawl about.

Because of this free swimming habit the Ilyocoris Scorpion is frequently mistaken for a water boatman. There are four main kinds of water boatmen of varying shape so this mistake is not surprising. But the water boatmen, though capable of piercing soft skin, cannot burrow so easily as can the three kinds of water scorpion.

All kinds of small water creatures are eaten by the water scorpions, particularly the larval form of insects. Because it can swim as well as crawl about among vegetation, this smallest of the three water scorpions is by far the most dangerous to fish fry and if one is seen in an aquarium it should be removed at once.

As well as the piercing mouth part the female Ilyocoris Scorpion has a sharp ovipositor, or egg-layer, at the rear. This is used to pierce the skin of underwater plants and the eggs are laid just inside the plant skin during May and June.

The larvae pass through five molts before becoming adults, taking most of the summer to do this and then the winter is spent as an adult—always in or on the water.

Being rather solitary in its habits this water scorpion is not noticed very often but it is fairly common and can be found almost everywhere in still water throughout Britain.

When water plants are collected from the wild with the intention of using them in an aquarium, this creature is one of the many pests that may be collected at the same time. A close watch should be kept for it.

ESSAY COMPETITION

Winning entry in the 8-10 years age group

My first aquarium

by Colin Anderson (age 10 years)

NOT very long ago I was told to clean out the garden shed. I was potting away some sacks and I found an old fish tank under them. That evening I asked my parents if I could have some tropical fish. My father said "maybe," but he was interested and it didn't take long to persuade him.

We cleaned the tank and made sure it did not leak. We brought gravel, a heater, thermometer and thermostat. Mother and I washed the gravel, put it in the tank and filled it with water. We brought the water to a temperature of 80° and let it settle for a few days.

The great day came on Saturday. We went to the fish shop and I chose a pair of angel fish because of their shape and movement, a pair of zebra fish because they are fast swimmers and a pair of swordtails because of their beautiful bright colour. We got 7 plants and some food. We feed

the fish three times a day—morning, mid-day and evening. I was surprised to find how little food they need.

At first the angel fish stayed at the back of the tank by the heater, the male swordtail stayed up in a top corner but the zebra fish flashed about the top of the tank and seemed quite at home.

For the first few days the zebra fish fed at the top of the tank, the swordtails caught the food as it fell halfway down the tank and the angel fish scratched around the bottom.

As the days went by the angel fish came to the front and got bolder and bolder. Sometimes they tried to feed at the top but were chased away by the zebra fish. The male swordtail also grew bold—the female found it easier to settle, it seemed—and he came out of his corner even when it wasn't feeding time.

In another few days we went to Blantyre to a shop called

'Aquascene' and bought a pair of tiger barbs, two wagtail platys and two neon tetras. We were worried in case the first fish would not like their new neighbours and so we put some live daphnia into the tank at the same time to distract them.

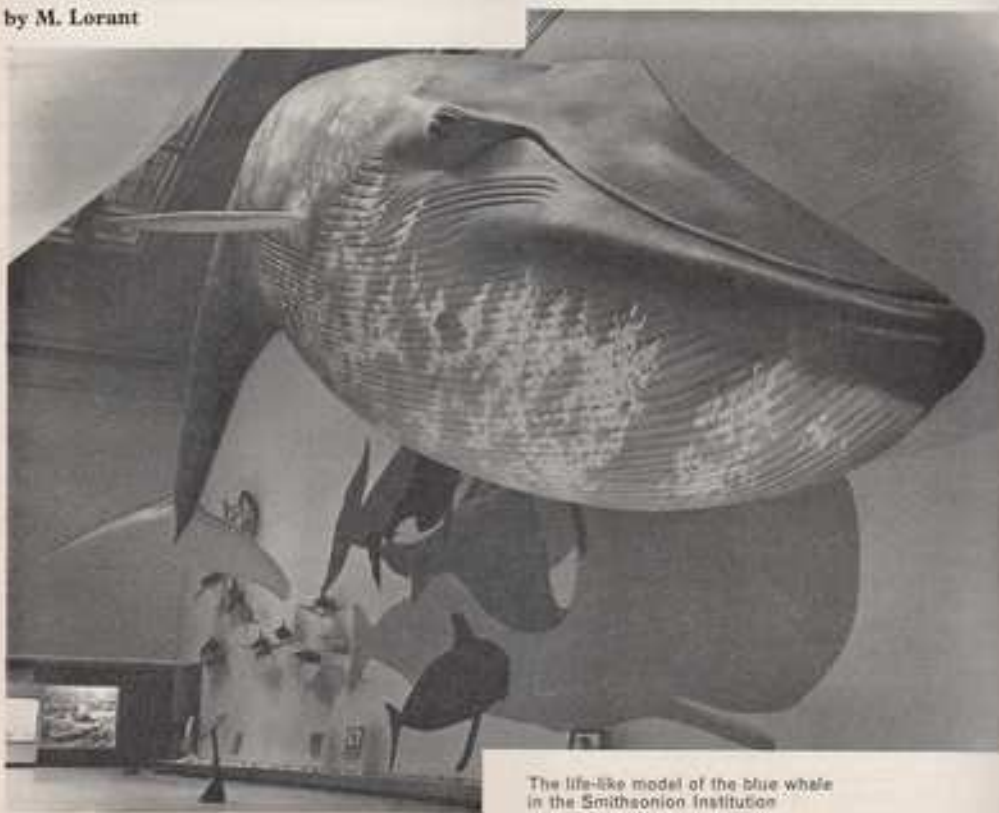
I have found the tiger barbs to be most playful. They chase each other up and down and round and round the plants. The wagtail platys are very funny to watch because of their jerky movement and wagging black tail. The neon tetras are so small that we wouldn't be able to see them if they weren't lit up.

I must get a filter soon and then start saving my pocket money to buy more fish. There are so many that I find interesting, but most of all I want a Siamese fighting fish, and perhaps someone might give me a discus fish for my birthday.

The blue whale

by M. Lorant

SMITHSONIAN Institution, America's national museum, has opened its greatest, modernized hall, named "Life in the Sea." The new hall, most spec-



The life-like model of the blue whale in the Smithsonian Institution

smaller ever, shows how some of the world's marine animals—ranging from the largest to the smallest—look in life.

A unique feature of the new hall is a life-size model of a blue whale, the largest mammal that has ever lived. Shown in diving position and suspended 30 feet above the floor, the fibreglass model is 92 feet long and weighs 4 tons. It represents a living whale that weighed about 135 tons. More than two years in the making, the model is an outstanding example of the highest degree of craftsmanship.

Blue whales are found from the polar to the temperate zone, and occasionally even at the equator. The migrational routes followed by these whales depend largely upon the seasonal locations of their food supply. In winter, when the water surfaces grow colder and food is scarce or inaccessible because of field ice and ice floes, the blue whales move to warmer waters. There the young are born.

Whales are mammals and exhibit all the characteristics of true mammals. They are backboned, warmblooded, bear traces of hair (along the margins of the lips), and suckle their young with milk. The blue whale calf at birth may be as much as 26 feet long. It is nursed for about 7 months and is weaned when it has attained a length of about 50 feet. Full grown it may attain a length of 100 feet and weigh 150 tons. Life span of the blue whale apparently does not exceed 25 years.

Millions of years ago the ancestors of the whale lived on land and walked on four legs. During the Tertiary period whales became completely adapted to aquatic life. Now their physical characteristics are such that they cannot survive on land. Were the blue whale not buoyed up by the water, its great weight would crush its skeletal framework and collapse its lungs, causing suffocation and death.

The body of the whale has become streamlined and torpedo shaped. With forelimbs in the shape of paddles, the whale moves itself through the sea and maintains its balance. The hind limbs have completely disappeared externally and exist only as vestigial bones buried deeply within the body. Unlike the vertical tail of fishes, the tail flukes of the whale lie in a horizontal plane. By powerful up-and-down motion of its flukes the animal propels itself forward and for short distances can attain a speed of more than 18 knots.

The thick layer of blubber beneath the skin of the blue whale represents a further adaptation of the whale to the cold sea water in which it spends its life. The blubber serves as an insulation that retards the escape of the whale's body heat into the cold sea. A large blue whale has been known to contain 20 or more tons of this blubber, normally about 25 per cent. of its total weight.

Both eyes and ears of this whale show additional adaptations to environment. The tough membranous eyes are protected from salt water by a greasy secretion from the tear glands. The external ears have entirely disappeared, leaving only minute auditory openings. Whales appear, however, to be highly sensitive to water-borne vibrations.

The nostrils of the blue whale are located on top of its head, and so the animal is able to breathe while almost

completely submerged. Water does not enter the lungs when the whale opens its mouth to feed, because the nasal passages lead directly into the windpipe instead of to the throat, as in land mammals. When the whale is beneath the surface its nostrils are tightly closed and the animal holds its breath. On coming to the surface from a deep dive the first "blow" of the blue whale may reach a height of 20 feet. The animal may then blow as many as seven times, with the height of the blast becoming relatively smaller until the vaporous formation disappears completely. Entirely in error is the belief that the water enters the mouth and is spouted out of the blow-holes. For the most part this spout is merely warm breath condensing in the colder air.

The mouth of the blue whale is equipped with blades of whalebone, or baleen, which hang down from each side of the upper jaw as long narrow strips with hairlike bristles on the inner edges. Whalebone originates in enormously developed horny protuberances, or papillae, along the edges of the upper jaws. During early fetal life conical tooth buds are located in the soft mucous membrane (gum) on the borders of the upper and lower jaws. However, these teeth disappear without trace when the horny papillae which grow into the baleen plates begin to develop.

The throat of a blue whale is so narrow that it can swallow nothing larger than a small fish. Because of this, its diet normally consists of tremendous masses of small crustaceans collectively known as krill. The external folds or grooves along the throat and abdomen are elastic and can be greatly expanded to increase the size of the mouth, so that quantities of krill may be taken in. When the mouth is full, the whale closes its jaws, and its huge tongue, weighing as much as 4 tons, forces water out through the baleen sieve, leaving the krill to be swallowed. As much as a ton of krill has been found in the stomach of a blue whale, and this is probably not a full day's quota of food.

Because of man's modern methods of hunting and killing whales, their number has greatly decreased over the years. For centuries man has pursued them in small ships and killed them with hand harpoons, but toward the end of the nineteenth century the harpoon gun was perfected. Today whales are hunted with harpoons shot from cannons. The carcasses are processed at sea on huge factory ships fully equipped to quickly extract the whale oil.

Throughout history whales have served man in a variety of ways. In the nineteenth century whalebone sold for as much as \$7.00 per pound and was used primarily as braces for ladies' corsets. Whale oil went into soaps, varnishes, paints, and was used to treat leather. Now that new uses for whale oil have been discovered, such as the production of edible fats, including margarine, the search for whales is more active than ever before.

Despite international agreements limiting the yearly catch, whalers each year take a toll in excess of the whale's natural rate of reproduction. If this exploitation of the whale stock continues, a time will come in the foreseeable future when whaling will become commercially unprofitable.

What is your opinion? No. III

continued from page 113

Christopher Heald of Bolton, who is 15 years old, on comparing his aquarium, which used a sponge filter, with another boy's tank which had an under gravel filter, found that his own plants grew much better and considered that the under gravel filter was removing plant foods from the gravel. Christopher's dealer was in agreement about the ill effects of sub-gravel filters. In buying the tank in question from the boy, Christopher established the tank without the filter and has had superb plant growth. Fifteen years old **Peter Brown** of St. Helena, has rejected under gravel filters in large tanks. He said that in a large tank which required two such filters, one at each end, plants only grew well in the 6 in. space in the centre of the tank, between the two filters. In smaller tanks Peter has found that an under gravel filter does a good job and does not hinder plant growth.

Mrs. M. Skinner of Birmingham tried peat under the gravel several years ago but had a lot of trouble with the peat rising over the gravel, and is still cleaning out peat, even after all this time. Regarding under gravel filters, Mrs. Skinner thinks them alright if they are kept running all the time, but she does not use any form of filter herself and cleans her tank every two or three weeks, replacing a bucketful of tank water with fresh water.

Mr. J. Boardman of Leigh, Lancs., uses peat and dried pea size pieces of clay, placed to a depth of 1 in. in plastic seed trays, covered with coarse gravel. The container is blended in with the existing gravel in the tank. Mr. Boardman states that the growth rate of most plants has been good and that to prevent clouding of the tank when plants are moved, the whole seed tray is removed.

Another reader, **Mr. J. Higham** of St. Helens, set up a 36 in. by 15 in. by 15 in. tank, two years ago and decided to break all the rules by placing 7 lbs. of John Innes Potting Compost No. 1, between two layers of gravel, with an under gravel filter at the bottom. The only drawback which he has found has been a slight brownish tinge in the water. Many species of fishes and plants have thrived, but the following plants are exceptions: *Alternanthera*, *Ludwigia*, *Limnophila*, *Vallisneria* have always been poor but *Nomophila stricta*, *Lobelia cardinalis* and Amazon Sword (*Brevipodocellatus*), *Bacopa monnieri* and *Ceratopteris* have always needed constant pruning. Angel fish and *P. kribbianus* have spawned regularly. The under gravel filters are almost in continual use and a power filter is also in prolonged use. From what Mr. Higham learned, he would not use the same medium again but states that no ill effects followed what he called his "rash experiment". He speaks very highly of the effects of u.g. filters on water and gravel. (The lime content of the John Innes P.C. No. 1 would render the water hard and alkaline, conditions which suit most of the plants which did well in Mr. Higham's tank).

Using the white, plastic, grid-type under gravel filters for 2-3 hours per day, for 4-5 days per week, **Mr. Hopkins** of Birmingham, found for the first 3 weeks, that all his plants became very light in colour, so he cut down the lighting in

his 24 in. by 12 in. by 12 in. tank to about 6 hours per day, with two 40 watt lamps. The colouring since has improved greatly. For the first 4-5 weeks little growth resulted, but after 9-10 weeks the young plants originally planted had filled the tank to such an extent that some had to be cleared out to see to the back of the aquarium.

Mr. G. McMorran of Shepshed found that by using fine industrial peat he managed to get some of his plants to grow—something which was rare for him before using the peat. Mr. McMorran also uses sub-gravel filters and thinks that more information should be supplied when the filters are bought, as regards how to have them working best. He emphasises the use of large grained gravel and not the more commonly used finer stuff. Mr. McMorran also maintains that the top of the air lift pipe should be well beneath the water surface to allow for aeration and better uplift of water, and that the air flow should be slow and leisurely to prevent reprocessing of the water too many times, thereby allowing the bacteria to absorb the released plant foods.

Mr. N. L. Morrison, a scientist from Widnes, is pleased with the crystal clear water which results from his using under gravel filters. Having decided to reposition his filters, the removal of the gravel after three months continuous use resulted in water which was black. His tank was crystal clear again after only three hours use of the under gravel filters. Mr. Morrison would use no other type of filter.

Mr. D. Hubble of Shephey has grown most common aquarium plants without any under gravel growing medium. He considers that fish waste is sufficient. Mr. Hubble thinks that under gravel filters work well but thinks that burrowing snails which are cheaper, more natural and do not agitate the water, are equally as good. Mr. Hubble is not impressed by the fact that under gravel filters give an all over constant water temperature which he considers unnatural.

Mr. S. Fox, chairman of the Newcastle Guppy and Livebearer Society, installed an under gravel filter when they first became available, in a 24 in. by 12 in. by 12 in. tank. At first the results seemed to be all that were claimed but after several months he found his plants to be deteriorating and his fish to be "out of condition". On stripping down the aquarium, Mr. Fox found the gravel to be caked solid to a depth of about 1 in. Beneath this layer the gravel was completely black, the water cold, and the plants' roots rotting away. Normal weekly tank servicing was carried out and the filter was in use for 12-14 hours per day. Mr. Fox suggests that under gravel filters only be used for 3-4 days per week, a box filter being used during the other days, and that the surface of the gravel is raked at least twice per week with a planting stick to prevent the gravel from cementing up. He also suggests a couple of catfish to keep the gravel on the move. Mr. Fox warns that no silt soil or peat should be used with under gravel filters.

Mr. J. V. Jeffery of Bournemouth sent an interesting

letter in which he stated that a peat base seemed beneficial to some plants but not to others. His common Spatterdocks almost outgrew a 36 in. x 25 in. x 15 in. tank when grown in peat, producing many hard, glossy surface leaves. His Cape Fear Spatterdock also showed a marked improvement. Other plants which Mr. Jeffery found to benefit were *Aponogon fenestratus*, *A. undulatus* and *A. ulvaceus*, all of which flowered profusely. (My own findings agree with those of Mr. Jeffery, in the case of *Aponogon* species.) He noticed little or no improvement in *Vallisneria* or *Sagittaria* growth, or that of the smaller *Cryptocoryne*s but found *C. haerteliana* (i.e. *C. affinis*) to benefit somewhat. (I again agree except in the case of *Sagittaria* which I found to improve quite a bit.) Mr. Jeffery also complained of fragments of peat getting released onto the surface of the gravel resulting in water which was never really clear. As he said, use of a filter would clear this although the filter would need frequent cleaning. The writer also used sterilised, fine loam but he found this to become foul quite quickly and has never used it since. He has not used clay either as he thinks it packs down too tightly. Mr. Jeffery has not used under gravel filters but considers outside filters excellent for water clarity, although he states that they only remove sediment which is already held in suspension.

From Alton, Hants., Mr. W. Savage sent me a long and interesting letter, and I hope that he will not mind my saying that he is 76 years old. Although Mr. Savage has not kept fish for many years (not since his home, tanks and pond were destroyed by a flying bomb, and Neoms cost 25s. each) he still, with a remarkable memory, recalls that he got his best growing plants by using a 2 in. layer of garden soil, covered with 1 in. of gravel. The water was continually filtered with an air-lift outside filter made from a flat glass tank about 10 in. square and 2 in. thick, using glass wool and activated charcoal. For fertilising the soil medium, pellets of rabbit droppings were pushed into the compost. Strip lighting was used and the tank was a "perfect picture".

These are the views of those who were good enough to reply to the first questions of the new feature. To try to draw any fixed conclusions would, I think, be a mistake which many authors are inclined to make, especially in books. Rather than draw one conclusion from each of the two questions which I posed, I would rather express my own views and findings, for what they are worth.

I have used under gravel filters in all my tanks for about five years, both with, and without calcium carbonate free gravel, and found that they kept the water in both large and small tanks very clear if lighting conditions were not so excessive that they produced green water due to free swimming algae forms. Having all my tanks filtered with under gravel filters, I recently decided to remove them and to experiment with under gravel peat in some tanks, and loam etc. in others, together with external filters. In the re-established tanks I found that the loam, where used, produced hard and alkaline water which encouraged an excessive growth of algae. Plants grew fairly well but became rather choked with algae, despite cutting down on light.

Under gravel peat, producing acid water conditions, discouraged the growth of algae to such an extent that in

one of my smaller tanks, the algae-eating *Gyrinocheilus aymonieri* (one pair) died from lack of food, although other fish of the same species are often seen to eat normal dried foods. I would say that the plants in the peat based tanks were the most satisfactory. Plants growing well include dwarf lily, *Bacopa*, *Ludwigia*, Malayan Swords, *Aponogon* species and some species of *Cryptocoryne*s, especially *C. affinis*. Other *Cryptocoryne*s are growing rather slowly and they often have a period in which many lose most of their leaves for no apparent reason. I have been trying *Cabomba* again and it appears to be growing quite well at present, but I do not want to make any premature assumptions before a much longer trial period.

With a loam base, plants which appreciate fairly hard, alkaline water have been growing quite well, despite excessive algae. The two plants which are growing best are *Elodea* and *Geratophyllum* (Hornwort). The latter is doing especially well although it does not form any roots. Obviously the effect of the loam on the mineral salts content of the water is the reason for the plant's success as it cannot be obtaining any food directly from the loam, being rootless.

In a tank with a peat base and Geo Lux lighting, most plants present have been growing quite well, especially *Cryptocoryne* species and *Ludwigia* and (dare I say it, *Cabomba*). Some exceptions are an Amazon Sword which is very slow indeed, and *Vallis spiralis* and *V. teres*, both of which I just cannot grow under any conditions in any tropical aquarium. Some plants are developing malformed leaves under Geo Lux but I will leave this subject for the next article in this series. I was a keen user of sand burrowing snails but discarded them with my under gravel filters (by boiling the gravel to kill off the snail population). Their effect would have been a nuisance with under gravel peat or loam. I never had any bother with under gravel filters causing gravel to solidify except when I tried to soften and acidify hard, alkaline water by using dilute phosphoric acid, when the tanks contained gravel with a proportion of solid calcium carbonate in the form of small pieces of limestone and shell fragments. This was due to a reaction between the acid and the CaCO_3 forming deposits of calcium phosphate. This would naturally have happened despite the use of under gravel filters but their use speeded up the effect.

Two more questions for discussion

My two questions for the next article are: (1) What is your favourite method of raising brine shrimp as one of the first foods for baby fishes? (2) What are the conditions under which you successfully grow species of *Cryptocoryne* plants? (Details of species, lighting, water hardness and pH, type of gravel, feeding, filtration etc. and other types of plants which are grown with the *Cryptocoryne*s would all be useful; however any facts at all will be appreciated, no matter how few or simple they are.)

Just two requests. Please write your name and home town or city clearly. A few of the letters were a little difficult to decipher.

our readers



write

Readers are invited to express their views and opinions on subjects of interest to aquarists. The Editor reserves the right to shorten letters when considered necessary and is not responsible for the opinions expressed by correspondents.

Address letters to The Editor, *The Aquarist*,
The Butts, Half Acre, Brentford, Middlesex

B. Fry v. Small Fry

I HAVE a complaint to make about Mr. B. Fry's article on the Minnow (May), which runs as follows: Mr. Fry says that the minnow "is a sociable little fish and likes the company of its own kind."

I have a rather strong feeling that this statement (if he is talking on the subject of keeping minnows in an aquarium) is untrue. I have, at various times in the years gone by (and I am not getting confused with the stickleback male) kept 4 or 5 minnows together in a smallish tank of dimensions 1 ft x 10 ins. x 9 ins.—and although the reason may be lack of open water space, the fish have attacked each other viciously and have bitten each other's gills; some went into convulsive leaps out of the water.

Conditions were as follows: the tank had galvanized zinc panes as corner supports and was, of course, not heated; river plants from a river, which (this may be of interest) runs through the grounds of a mill, and whose surface is foam-covered.

I leave this with you and my last statement is that perhaps Hertfordshire minnows are extraordinary!

Yours faithfully,

G. W. BARTLEY,

(age 12 yrs.)

A newcomer to this magazine.

"Torrey Canyon" Disaster

DOUBTLESS by now, every aquarist has heard of, and many have read reports, on, the "Torrey Canyon" oil tanker disaster.

Every effort was and is being made to lessen the effect of both this and future disasters of this kind but, unfortunately, apart from a few organisations, the majority of this effort has been directed towards the affected bird and animal life and little towards the fish and other littoral zone fauna.

Since this disaster seemed likely to affect the coastal life, we in Marine Study were one of the organisations first on the scene to determine the best possible course of action that we could take in the alleviation or further prevention of this and other related disasters.

We established a nationwide Relief Fund for the furtherance of investigations into the effects of contaminants

on the marine fauna; this was kindly given notice in both the *Evening News* and *Manchester Evening News*.

We have now produced a special report on the "Torrey Canyon" disaster and the role played by the I.M.S.S., in co-operation with other organisations working on the problem. This report we are making available to anyone wishing to obtain a copy as all proceeds from its sale go towards the Relief Fund.

This report, price 2s. 6d., plus 5d. postage, is available from: International Marine Study Society, T.C., 2 Gatcombe Road, London, N.19, England.

Any person interested in becoming a member of the I.M.S.S. should write to the Membership Secretary, Mr. K. Martin, 158, Oxford Road, Swindon, Wilts., who will be only too pleased to forward details on all of our many activities.

INTERNATIONAL MARINE STUDY SOCIETY

Aphyosemion eggs required

CAN you please put me in touch with any dealer or organisation who could sell me eggs of the following:

A. australe—*A. bicoloratum*—*A. galare coeruleum*.

I am unable to obtain either eggs or fish here.

Yours in anticipation,

JAMES MCCOY,

Arncliffe, Sydney, Australia.

Penfriends Required

HELLO everybody, friends of tropical fishes. My name is Stig Pettersson and I am 22 years old. The reason why I write to you is that I am seeking penfriends all over the world and I am hoping that you can help me. I like all sorts of tropical fishes and most Gouramis and Cichlids. If you can't fix penfriends direct for me I hope you can give me some addresses where I can find penfriends who are interested in fishes.

I am one of the two masters we have here in Uppsala for the young boys and girls who have fishes. It will be a short letter because I think you are in hurry and my English is not so very good.

Yours faithfully,

STIG PETERSSON,

Wallingatan 26A,

Uppsala, Sweden.

THE AQUARIST

Aquarium Heater

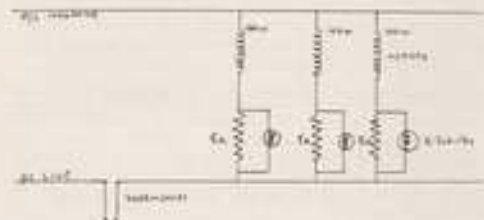
AFTER reading and hearing of many aquarists losing fish due to chills caused by heaters going open circuit I am submitting a design which I have used on my tank and found to be successful. The resistors in the diagram are in series with their corresponding heaters. When the thermostat is closed a current flows through the resistors and heaters $I = R = V$ therefore a voltage is developed across each resistor which in turn lights a bulb. If one heater goes open circuit the corresponding light goes out, but the others stay on so long as the heaters are in circuit. Calculations for bulb value and resistors: 100 watt heater, 250 volts mains supply, current $(I) = \frac{100 \text{ watt}}{250 \text{ volts}} = 4 \text{ Amp}$.

If a 2.5v bulb is chosen as, in my case, then the value of each resistor is:

2.5 volts \div 5.1 ohms (5 ohm preferred value) 2 watt.

4 amps

Wattage $= I \times V = 4 \text{ amps} \times 2.5 \text{ volts} = 1 \text{ watt}$. 2 watts for safety.



If a different heater value is used, just supplement figures where necessary.

In the July issue of *Aquarist* a safety circuit by Mr. Hugh Spence was shown using neons. I would like to point out that all the three neons only indicate whether or not the thermostat is open or closed and not whether a heater is open circuit. This is because the two neons across the mains supply whether the heater is open circuit or not when thermostat is closed.

Yours sincerely,

E. WELCH,

Barnstead, Surrey.

A Slight Clarification?

WITH reference to Mr. Woodasen's comments (Letters, July issue), I feel that perhaps I did not express myself too well, so I will clarify the points raised:

Firstly I did not mean "use twelve eggs" but twelve *hatched* shrimps. As for the digestive system of the brine shrimp I did not suggest that the adult shrimps swallowed the newly hatched ones whole at all but that they ate them. I have seen large shrimps devouring smaller ones many times and stick to my guns. Liquifry is perfectly alright provided it is not used too abundantly, for most people seem to kill off the shrimp by feeding too much Liquifry. Lastly, I prefer to use natural sea water every time in preference to artificial for the former is much richer in the brine shrimps' more natural foods.

Incidentally, I personally believe that brine shrimp purchased now (while the marine boom is on) is much more likely to be fresh and not old stocks, for the marine fanciers are using up great quantities at present and stocks are not allowed to age. I know the eggs last for some time but fresh eggs are undoubtedly better. A last point, when I set up twelve eggs to hatch they do just that—hatch!

T. Ravensdale.

Are Fish Conscious?

DURING my recent holiday abroad I had the opportunity of discussing the question of whether fish have consciousness. The point of view expressed by my friend, was that fish have no consciousness, that their lives were governed by instinct, purely and simply. A further point arose regarding the state of fish when caught at sea, my friend maintained that when transported by boat to port that they were sleeping, as distinct from being alive or dead. To me this appears inconsistent, as the fish can only survive for a short time out of their natural environment.

I gave an example of feeding club at the London Zoo, the fish were in a huge tank in the Aquarium and being a Fellow of the Zoological Society, I had the opportunity of visiting the back of the tanks for inspection and in fact to actually finger feed the fish, which rose to the surface and took the food from between my fingers. This surely indicates training but also proves consciousness. Perhaps, Mr. Editor, we could have the opinions and views of other readers.

Yours faithfully,

M. MICHAELS,

London, N.W.6.

Change of address

Keith Barraclough has now moved to new premises at 568 Great Horton Road, Bradford 7.

Book review

The Vivarium by George F. Hervey and Jack Hems published by Faber & Faber at 16/-

Whenever I am requested to read, prior to publication (and with the submission of a review in mind), a popular or lightly technical survey of the herpetological possibilities of some of the more readily available creatures within this field, I find myself unconsciously adopting the attitude characteristic of a predatory mongoose rather than that of a consciously sympathetic squamophile! How readily do the hackles rise at the merest suggestion of a differing viewpoint and how often does the unwary critic emulate Riki-Tiki-Tavi when confronted by a cobra! It is on this account that I am aware of a blissful, almost dreamlike sense of satisfaction after having read this essentially successful collaboration of George Hervey and Jack Hems who have been able to create, within the relatively restricted ambit of 86 pages, an accurate, but not pedantic, examination of those batrachians and reptiles which are of most interest to would-be vivarium-keepers—and, indeed, to many mature enthusiasts of veteran vintage for that matter.

I must on no account fail to accord due appreciation to Eileen Hill, the very able and observant artist whose delightful knack of selecting specific attitudes characteristic of individual species coupled with such accuracy of depiction makes it not only possible for the experienced eye to be independent of the captions but, in most cases, to relate the drawings to the sex of the subject! This is indeed a distinction of quality.

Messrs Hervey and Hems are to be congratulated upon a timely and tasteful production.

B.G.

Coldwater fish-keeping queries answered by A. Boarder

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

I would like to breed some goldfish with a deeper body than the ordinary goldfish. Could I obtain some by crossing a Crucian carp with my goldfish?

It would be a very retrograde step to cross a Crucian carp with goldfish. The result would be a very mixed lot and very few, if any, would change from the original bronze to the desired red. It would be much better to get some nymphs. These varieties of goldfish have deep bodies and large tails. They are often obtained in spawnings from veiltails and fantails as throw-outs.

In our pond we have a lot of recently born goldfish fry, and there is still some spawn on the bottom of the water lily leaves. These fry are rapidly being eaten by the slider fish. Can you tell me how to stop them?

You cannot stop the larger fish from eating the fry unless you can make a division in the pond and transfer all the fry into one section. Alternatively you could catch as many as possible of the fry and put them in another pond or container to rear in safety. The "spawn" on the bottom of the leaves is probably that of snails. Goldfish eggs are like tiny beads of jelly about the size of pins' heads.

We have sunk a six foot bath in the ground to make a small fish pond. There are a few water plants and goldfish in it, but the goldfish seem very scared and dash about when anyone goes near the pond. Do you think it is because the bottom is white and would I be able to paint it to darken it?

It is possible that the fishes do not like the white base of the bath. You can paint it with a very strong solution of permanganate of potash. This should darken it and it will be quite safe after a light washing out. In time the sides and base would become greenish-brown and so look more natural.

Having stocked my new pond with young golden orfe I have now lost six of them and on being taken out of the pond I find that pieces of their abdomens have been eaten away. Some children put some minnows in the pond, do you think these have killed the fish?

I think it highly improbable that the minnows have killed your orfe. These fishes do not usually attack any others. It is more likely that they have been killed by the larvae of either dragon flies or water beetles. These creatures will eat from the body of a young fish. It is possible that the fishes died because either they were unhealthy when procured or that the water was not in good heart. Orfe must have well oxygenated water in which to thrive. Search with a strong torch at night and you may see the larvae which may be the culprits.

I would like some information on the Moor. I live in Fiji and as none are procurable here I have sent to Australia for a breeding pair. I have a large tank with water plants and a few snails. What are the breeding requirements for Moors. It may interest you to know that *The Aquarist* magazine is read here in Fiji by several of my friends.

The moor is a variety of the goldfish and as such requires the same breeding conditions if success is to be obtained. Your warm climate should be good for spawning and hatching but I have an idea that if you keep moors in too warm conditions they may lose some of their sooty black and become bronze. I may be mistaken in this but I had this same thing happen to a moor of mine I once lent for exhibition purposes and it was kept for some weeks in

tropical conditions. When it was returned it was bronze instead of black. Have no snails in breeding tanks.

Would aeration clear my pond of blanket weed. It was cleaned out after the winter freeze-up and has become badly infested with the weed since?

You would need a lot of aeration to have any effect in a pond, and then I do not think that it would stop the growth of the blanket weed. This weed has grown because the other water plants have not yet become re-established. Once they grow up they will help to choke out the harmful weed. Meanwhile thrust a broken stick into the weed and twist it. You will be surprised how easily the weed can be removed by this means.

I am recently moving and in transferring my water plants I wonder if it is possible to destroy the blanket weed on them by immersing them in any solution?

Any solution strong enough to kill the blanket weed would also kill the water plants you wish to save. You must pull off all the blanket weed you can see before replanting the needed ones. If the water plants are immersed in a pail of water the blanket weed will be more easily seen and can be removed.

Our concrete pond was porous and so we painted it with two coats of "Aquasol." We have filled the pond with rain water and returned the plants. Will it now be safe to return the fish?

It would have been better to have washed the pond out before returning the plants, etc., not to have scrubbed it round but just a rinse. You could try out one fish to see if it lives for a day or so and then the others could be added if all goes well.

I have read Mr. Boarder's articles about having a tank set-up for 17 years and just cannot understand how he does it. My fishes pull the plants up and the water becomes foul after a few days of feeding the fishes with various foods. What is the secret, please!

There is no secret. My tanks in the living room keep perfectly clear and in good condition. The fishes are always in tip-top condition, too. One or two points may be of help. I do not use large fishes, not more than two-year-old fantails. I do not use much dried food. My fishes never pull up a plant, perhaps because they are so well rooted and established. I think large fish in any tank no larger than 24 x 12 x 15 in. look out of place and certainly it is far more difficult to keep the tank in good order than if three or four fishes not more than two years old were used.

I have six Golden Orfe, 8-10 inches long, and six goldfish 4-5 inches long, which I wish to take to Cornwall in late autumn. Can these be safely transported and by what means?

If you move the fishes in as cold weather as possible it will help a lot, as the colder the water the longer can the fishes survive. If you get in touch with one of the dealers who advertise in *The Aquarist* it is probable that you may be able to obtain one of the containers as used to import fishes in. These are sometimes strong plastic bags inside strong cardboard containers. Oxygen is often introduced into the bags before they are sealed up.

I have read that when a fish has its dorsal fin down it is unwell. My fishes often have theirs down, is this a sign of ill health?

Most healthy goldfish keep their dorsal fin nicely erect nearly all the time, unless they are swimming about in rather dense plants. The water may be rather foul or the fishes may have been over-fed. Cease all feeding for a week and see if the condition of the fishes improves. Then go carefully with the dried food, and make a change to see if you have been feeding with something which either upsets the fish or the water.

THE AQUARIST

Our experts' answers to tropical fish-keeping queries

What sort of conditions and food do you recommend for a sleeper goby known as *Eleotris labreus*? Also, will this fish settle down satisfactorily in a community aquarium?

Nothing special in the way of water or temperature is needed for *E. labreus*. But only small specimens are docile enough for a community tank. A generous diet of meat and worms is called for.

While some authorities give 8 in. as the maximum size for *Cichlasoma nigrofasciatum*, others state that this species does not exceed 4 in. Can you say with any certainty how large the zebra cichlid will grow?

Given plenty of meaty food and abundant swimming space in clean, well-aerated water, the zebra cichlid may reach a length of about 6 in. But if young fish are crowded from the start and later are kept in tanks which do not permit much swimming space, then 4 in. is about the limit of their growth.

I have prised away some dead ivy stems from an old wall. Would these aged and weather-worn stems be suitable for aquarium decoration?

Provided the dead stems are given a good soaking in several changes of water, a few of them introduced into an aquarium should not prove harmful to the fishes. You would be well advised, however, to try out the dead ivy stems on easily procured and/or inexpensive fishes. It is always best to play for safety.

I have acquired a couple of *Garra taniata*. To which family of fishes does this species belong and what are its requirements in the tropical aquarium?

Ichthyologists include the genus *Garra* in the family Cyprinidae. Until quite recently (as a matter of interest) *Garra* spp. were referred to under the generic name of *Diosognathus*. They flourish best in well-aerated water maintained at from about 71°F (21°C) to 78°F (26°C). They are great greenstuff eaters and like to browse on soft algae. Apart from this, they will take the usual live and dried foods.

Do freshwater shrimps make a suitable food for tropicals, and what is the best way to keep these crustaceans alive and easily available?

Freshwater shrimps make a valuable livefood for all fishes large enough to swallow them. The surest way to keep the shrimps alive and in good condition is to place them in an old bath or sink stood outdoors, but screened from too much sunlight. The bottom of the container should be furnished with washed fine grit or sand and some flat stones for shelter. Freshwater shrimps live on decaying animal and vegetable matter, but only small quantities of either should be permitted to remain on the bottom or else the water will become too polluted for the shrimps' well-being.

I have acquired a strongly made angle-iron aquarium frame measuring 8 ft. by 2 ft. by 1 ft. What thickness of glass should I buy to glaze it?

You will need polished plate glass three-eighths of an inch thick.

I saw some aphyosemions for the first time at a local fish show. I should like to set up my first aquarium as a community tank of these colorful species. Please supply me with the names of the most easily procured and managed species.

We are sorry to have to tell you that aphyosemions are not suited to a community tank. A number of them are antagonistic towards other fishes and the males of most species fight among themselves. The general practice is to keep a male and two or three females of a given species in a tank filled with soft and acid water and shaded from very bright light.

The other day I inadvertently knocked some flakes of rusty iron from the top of my aquarium into the water. I have been unable to recover any of the flakes from the camouflaging compost. Will this accident result in any deterioration in the health of my plants or fish?

A small quantity of rusty iron in the water will do no harm to freshwater tropicals or plants. But we do advise you to scrape the loose rusted iron away onto a sheet of cardboard, and then cover the top bars of the tank with U-shaped plastic strip.

A friend has no more use for what remains of a load of fine granite chippings. Would these chippings do to cover the bottom of a tropical tank?

Granite chippings make a good planting medium (especially when spread over a thin layer of yellow clay or granulated peat), but you must be on the look-out for any unclean food working into the interstices and turning the water sour.

What sort of food and environment is preferred by the upside-down catfish?

We imagine you refer to *Synodontis nigricentris*? If so, this species is easy to cater for but should have access to algae. If this does not grow in the aquarium it should be grown on plants stood in jars outdoors. Then, an algae-coated leaf should be given to the catfish to browse on every so often. A well planted aquarium maintained in the middle seventies (°F.) is what the fish likes.

I have just purchased two *Barbus laticauda* of a length of about 1 1/2 in. Please can you tell me how to tell the sexes apart and to what size will this species grow?

In well-grown specimens the females are paler in colour and show fuller bodies than the males. A length of about 4 1/2 in. is attained.

I have tried to keep two pairs of *Aristonema ramirezi* alive over the last nine months without any success. They were accommodated in a 3 ft. community aquarium stocked with various herbs, cyprinodonts and characins. From the start both pairs were not at all eager for food and hid away in the plants. Please give me some information on the care of this fish.

A. ramirezi is not one of the easiest of the dwarf cichlids. A couple or more really need a tank to themselves. *A. ramirezi* is naturally shy and does need dense thickets of plants to retire into. It can be faddy about its food too. But often a lack of interest in food can be traced to unsuitable water. This cichlid is one that will only flourish in soft and neutral to acid water.



Female (left) and male *A. ramirezi* about to spawn on a rock.

Marine queries answered by T. Ravensdale

My query is about ozone in the marine aquarium. I have been maintaining marine fish for several months now in a 24 x 12 x 12 in. tank. I have an Eheim filter with a Series II filter medium which I leave on 24 hours a day. I have also been told by my dealer that ozone (with a reactor tube) should be left on day and night, which I do with the setting at 10 m.g. (it is the variable type). So to condense my query it is this: should I leave my Ozonizer on all the time? If so what maximum setting for acclimatised fish? And if not, how long a period in the 24 hours and at what setting? I have eight 1 in. fish in my tank.

You may leave your ozone on at full strength all the time provided you use a reactor tube. An average healthy aquarium, however, will only require 10 m.g. per hour and this can be left all the time. Signs of distress can be followed by an increase of 5 m.g. per hour but ozone should be dropped to 5 m.g. per hour for the first few days following a new arrival, raising it by 5 m.g. per hour per day until your usual strength is obtained.

In my 24 x 12 x 12 in. marine tank I have one pair of *Acropora percula* and I would like a few more fish. Please could you suggest a colourful community of fish? Also could you tell me what the ideal hydrometer and thermometer readings should be?

To suggest an ideal community is extremely difficult for many specimens of the same species have completely different temperaments. There are, however, several fishes which will mix with your *A. percula*, and I would suggest one or two green damselfish, a neon goby and one or two of the smaller butterflies such as *Oetofaciatus* or the *Parachanna*. Your hydrometer reading should be between 1.020 and 1.027, a happy medium being 1.025. The temperature should range between 74°F and 80°F, again a medium being 76°F.

How large does the clown fish grow?

There are at least 12 different types of clown fish but I have actually seen *A. percula* at a size of 8 in.

Will the clown fish mix with damselfish?

The clown fish is a damselfish but this does not mean it will mix readily with all damselfish. The blue finned damselfish is extremely vicious and the domino can be nasty, but even the clown can set about other fish. Trial and error is the only answer.

Readers of Tom Ravensdale's articles on marine fish-keeping will be interested to learn that his book entitled *Coral Fish* will be published towards the end of this year. It will comprise 256 pages, contain 175 colour plates and deal with ozone, diseases and their diagnosis and cure, water filtration, poisoning, invertebrates, feeding, breeding, plants, etc.

The author has devoted many years of practical study to this subject both from under the sea and in the laboratory and is a well known figure at many aquariums the world over.

Feeding marines

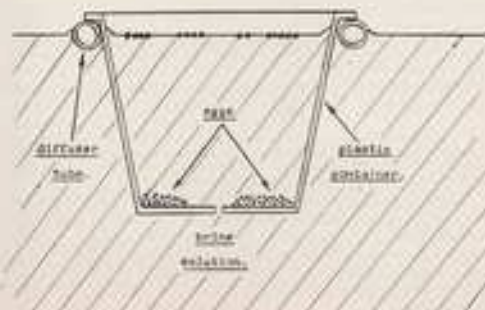
continued from page 115

They should now be collected, washed vigorously in a nearby bucket of water, and then placed in damp newspaper until required for feeding. I need not stress here the importance of washing every worm thoroughly as soon as it is collected. Using this simple method I have collected as many as 54 worms per square yard within the space of 5-10 minutes when working on short-cut turf growing on chalk downland. With numbers as high as these one can ignore the worms which escape by going deeper into the adjacent untreated areas. I have been unable to detect any ill-effects on the grass within the treated area, but to be on the safe side I usually water the square yard containing the formalin with the remaining fresh water. Potassium permanganate can be used instead of formalin but the results do not compare with those described above. **CAUTION.** Please make certain that the formaldehyde (formalin) is never left within the reach of children and that all cups and utensils are thoroughly washed after use.

Brine Shrimp

For those who cannot afford to use a tank for hatching brine shrimp, the following system will provide large numbers of shrimps with the minimum of debris in the tank. It requires no effort on your part except for the regular refilling of the hatching unit. (See diagram). The container is one of the small plastic marmalade pots sold to breeders by a large jam-making concern. One small hole is burnt in the bottom of the pot with a hot needle. The pot is made to float by a circle of aerator tubing slightly longer than the circumference of the marmalade container. One end is then enlarged with a warm knitting needle and the other small end fed into it to make a "life-belt" which supports and floats the pot. Eggs are now floated inside the container. Some sink of course, but very few get through the small hole in the floor of the holder, whereas all the nauplii find their way out eventually into the aquarium to become a readily-available source of food.

Brine shrimp hatcher





Award to winner at OPEN SHOWS

In recent issues of *The Aquarist*, announcements have appeared regarding an award being made to the winners of the "Best Fish in the Show" in connection with the Open Shows now being held.

The illustration shown is the gold-plated pin awarded to the winners of the "Best Fish in the Show" and up to the time of going to press the following have been presented with the award.

Name	Club	Species of fish	Open Show
R. Atherton	International Marine Study Society	<i>Stenophagus argus</i>	Stockton-on-Tees A.S.
F. Ritchie	Scottish A.S.	Red Hill Swordtail	Lancashire A.S.
Mrs. J. A. Denton	East Dulwich A.S.	Giant Australian Rainbow	Freetown A.S.
K. Parker	Hershey A.S.	Tufted Barb	Mosden T.F.S.
Mrs. F. Pearce	Traversebridge & Dist. A. & P.S.	Moonlight Gourami	Traversebridge & Dist. A. & P.S.
J. Siffwell	Reading & Dist. A.S.	<i>Legenia gibbesii</i>	Brighton & Southern A.S.
J. & H. Gernie	Woking A. & Z.S.	Keating	Punchford & Dist. A.S.
C.W. Eason	Weymouth & Dist. A.S.	Red Flaxy	Salisbury & Dist. A.S.
D. Sides	Chapelton A.S.	Albino Clariid	Atherton & Dist. A.S.
A. Maxwell	Worktop A. & Z.S.	Ramirez	Glossop A.S.
R. J. Thorne	Hounslow & Dist. A.S.	<i>Cochlosoma senorum</i>	Uxbridge & Dist. A.S.
R. J. Thorne	Hounslow & Dist. A.S.	<i>Cochlosoma senorum</i>	Calford A.S.
A. Phillips	East Lancy A.S.	Black Moor	Skipton & Dist. A.S.
J. Robinson	Harrowby A.S.	Peto	Hershey A.S.
K. J. Harvey	Isane A.S.	Parake	Leamington & Dist. A.S.
I. Andrews	Bournemouth A.C.	Silver Shark	Gosport & Dist. A.S.

As it is possible that some winners have not received a pin, they are requested to apply to the secretary of the Open Show where they won the award, for the appropriate form. If in difficulty these forms are obtainable direct from *The Aquarist*, The Botts, Brentford, Middlesex.

Upon receipt of the completed form an award pin will be sent direct to the winner.

Book review

'*Encyclopedia of Water Plants*' by Dr. Jiri Stodola. Illustrated in colour by Mirko Vosatka. T.F.H. Publications, Inc. Jersey City, New Jersey, U.S.A. Distributed in Gt. Britain by T.F.H. Publications (London), Reigate, Surrey, 75s.

THE beauty of the illustrations (reproductions in colour of paintings by a gifted botanical artist), the large number of plants adequately described in the well-printed text, the solid and attractive binding: these are the first things that catch the eye in this really splendid book. Both the author and the illustrator are Czechs.

It is to the great credit of Dr. Herbert Axelrod, of T.F.H. Publications, Inc., that he should publish their work in so grand a style. Indeed, it is hard to imagine any subsequent book on aquarium plants—and this is what the book is all about—published anywhere in the world outshining it in the foreseeable future.

I believe it was William T. Innes who once said that an aquarium without plants is like a bird without feathers. But we all know, or ought to, that it is not just feathers, but fine feathers, that make fine birds. Reference to the *Encyclopedia of Water Plants* will enable any aquarium keeper to feather his tank, or tanks, not only usefully—in regard to the cover and oxygen the right choice of plants

will provide—but artistically. Furthermore, it will not take the aquarist with this book in his hands more than a few moments to look up just the plant, or plants, to fill his special needs; for the author has created (for the benefit of the non-technical reader) ten artificial groups of plants, which he refers to as Biological Types. Each group of plants has been given an identifying number. These are not dotted haphazardly about the book but rise in ascending order. After each description of a plant, or group of plants, the reader will find the appropriate illustration, or illustrations. Each plant is given its correct scientific name, with common name where known, its synonyms, and its country of origin. Its requirements in the way of lighting, planting medium and so forth are well covered. Other plants that will flourish with it in the same aquarium are listed. There is a generous glossary of botanical terms and a table showing the scientific classification of the plants written about.

I am so enthusiastic about this book that I would advise any aquarist with a deep enough pocket to buy two copies: one for ordinary use and one to preserve against the blemishes of frequent handling. Yes, the *Encyclopedia of Water Plants* is as good as that.

Jack Hems.

More fish on stamps

by A. G. K. Leonard



Pseudotropheus auratus
(female)



Labotropheus trewavasi (male)



Pseudotropheus zebra

THE world's postal authorities continue to make frequent contributions to stock the philatelic aquaria, steadily widening a collecting theme that is already extensive, as indicated in the writer's previous surveys of "fish on stamps" published in *The Aquarist* of February 1966, December 1964 and September 1962.

The latest addition comes this summer from Malawi (formerly Nyasaland) in the form of a handsome large quartet designed by R. Granger Barrett and photogravure-printed by a famous Dutch firm in full colours to display the beauties of four of the many tropical freshwater fishes to be found in Lake Malawi. The most southerly of the Great Rift Valley lakes of Africa, it boasts some 240 species, of which three quarters are found nowhere else in the world, most of them belonging to the family Cichlidae.

The four selected for stamp designs are small enough for the domestic aquarium—although by their nature unsuitable for the community tank and best kept in pairs in tanks furnished mainly with rocks because of the way they attack plants. These rock fish are known locally as Mbuna or Chindongo.

One of the most striking patterns of Lake Malawi fish is the black and gold of the female *Pseudotropheus auratus*, which makes an attractive stamp subject. A companion stamp depicts one of the several colour forms of *Pseudotropheus zebra*; another illustrates *Pseudotropheus trewavasi*, no less variable in colour, and the set is completed with a miniature of the male *Labotropheus trewavasi*. The fascinating community life of the Mbuna fish of Lake Malawi and the variety of their feeding and courtship habits were described by Geoffrey Fryer in a paper published in 1959 in the Proceedings of the Zoological Society of London.

Across in the Indian Ocean, the Maldives released in April another stamp series—designed by M. Shamir of Tel Aviv and finely produced in four colours by the Israel Government Printer—illustrating five of the many different tropical fish that abound in the waters around the two thousand little islands making up this enchanted group.

One depicted *Chaetodon semaninus*, one of the most striking of butterfly fishes; with its bright yellow body marked with seven oblique stripes of dark brown and its tail rosy pink, it grows to about six inches at maturity. Longer and more variable in colour is the boxfish *Ostracion letrigatus*, shown on another stamp, while two more are devoted to *Pomacanthus semicirculatus*, sometimes known as the Koran Butterfly Fish from the presumed resemblance of its tail markings to the characters of the sacred book of the Mohammedans. The other stamps depict *Chaetogaster cinctus* and *Rhinocanthus aculeatus*.

The latter also appeared last August on a pair of stamps—one inscribed in English, the other in French—serving the Anglo-French condominium of the New Hebrides. Another group in the Pacific, the British



Moorish Idol



Rhinocanthus aculeatus



THE AQUARIST



Chaetodon fasciatus



Rhinecanthus aculeatus



Pomacanthus semicirculatus
(JUV.)

Solomon Islands, signalled its adoption of decimal currency in line with Australia by re-issuing last year with surcharges in new cents values, the stamps which included a neat representation of a Moorish Idol, mentioned in a previous article.

Australia's 1966 decimal stamps are a colourful pictorial series which includes three tropical fish designs. One depicts *Chelmon rostratus*, the beaked coral fish, striped rich orange and yellow, which frequents the coral reefs around Australian coasts and is sometimes known as the Longnose Butterfly Fish. A second stamp pictures the Clown Anemone Fish, *Amphiprion percula*, among the best known of marine aquarium fish but expensive because it cannot be raised to maturity under aquarium conditions and must therefore be imported. It lives among the tentacles of sea anemones, but for some reason enjoys perfect immunity from their poisonous stinging cells and is allowed to feed on scraps from the anemone's kills. Its white-banded orange body grows to about four inches in length.

The third Australian stamp is captioned Humberg Fish, this being *Dascyllus aruanus*, another of the Damselfish family. About three inches long, its body is silver with black bars, widely known from the Red Sea to the Pacific and found in large numbers among the staghorn corals of the Great Barrier Reef. When removed from its familiar coral branches, it seems quite lost and helpless.

During the past eighteen months, the Japanese Post Office has been issuing at almost monthly intervals an attractive series of artistic stamp pictures of various fish, mostly of greater interest to the fisherman than the aquarist. Now the Ryukyu Islands are following suit. Their April offering was *Ferocaris longirostris*, the long-nosed butterfly fish, scientifically known as long ago as 1782; this was followed a month later by a postal miniature of *Balitor niger* and in June by another stamp featuring *Chaetodon ephippius*, one of many attractive butterfly fish from Eastern waters.

Japan added a delicate picture of a goldfish to its regular stamp series last summer, while this year Thailand issued a quartet of multicoloured pictures of local freshwater fish. One of them was naturally the Siamese Fighting Fish, *Betta splendens*; the others were *Puntius gonionotus*, *Rastrelliger brachyomus* and *Channa iriata*, the pugnacious and voracious Snake Head or Walking Fish, which can propel itself overland and is a popular exhibit with itinerant showmen in the East.

Turning to the African continent again, the republic of Togo is generous in its issues of attractive stamps aimed at the philatelic market. A colourful set released this January was in eye-catching diamond style, having for its subjects the African Mouthbreeder, *Tilapia melanopleura*; the Yellow Jack, *Gnathodon* species; the Banded Distichodus *D. sexfasciatus*, and the African Jewel Fish, *Hemichromis bimaculatus*—of which the male is literally a lady-killer, while both sexes display a wealth of colour at breeding time.

The same Red Cichlid was one of the subjects of a series of 16 stamps, each printed in six colours, which the republic of Burundi (the territory in Central East Africa formerly under Belgian administration) released in April-May this year. Other freshwater fish depicted on these stamps

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Cherodon aeneus



Microgophagus ramirezi
Calisa chani



3rd British Coarse Fish Conference

by Eric Hardy

THE third British coarse fish conference, held in Liverpool University for three days in March, saw biologists from several European countries in discussion with anglers and river authorities. They decided to form a new British Fisheries Society to link rod-and-line anglers with biologists who will investigate their problems and in turn receive more co-operation for their researches.

The Pennell Lecture, which is to be a regular memorial to the late F. T. K. Pentelow, was given by his successor the Ministry's Chief Officer for Salmon and Freshwater Fisheries, I. R. H. Allen. Reviewing the mortality of fishes sent to the Ministry between 1948 and 1966, he said that of 16 species received, most were roach of which 30 had died from diseases with lesions; but there were also a few deaths from parasites, gall-bladder trouble showing necrosis at the base of the pectoral fins, pollution and even starvation. Carp, goldfish and bream were the next most frequently received. The peak of mortality was in July, and lowest in December, perhaps because parasites flourished in the fishes' main feeding season. *Choufrococcus colossus* had been reported in roach by public health authorities, and epizootic outbreaks were more lethal in closed waters than in rivers and in water with high organic content; but it was not always greatest where weed growth was greatest. Much of it was a natural population control and some fish might be affected while other species in the same water were not. Salmon disease was not known to be transmitted from roach and was probably a different disease. Not everyone present accepted *salmonaris* as the identification of disease in roach, and a Liverpool biologist did not agree with calling the Irish salmon disease dermal necrosis.

The Ministry was setting up a Fish Authority to investigate fish diseases and parasites as never hitherto and under the new law, river authorities could gain permission to poison-out diseased fish in order to begin again with healthy stock. But Dr. Wynne Owen, of Leeds University pointed out that it was impossible to exterminate all fish-parasites, many of which were harmless, and nearly 900 had been found in a single fish. The larger and older the fish the more it carried, especially Black Spot, which accumulated with age. Fish obtained fluke-worms from fish-eating gulls via freshwater snails, the larvae of some penetrating the skin or the eyes of fish while another species infected the brain. Black spot, which causes cysts in roach, bream, silver-bream, chub, dace and minnow, and which deformed young fish, was caused by flukes transmitted by herons in this country and by bitterns and egrets abroad.

Miss A. E. Caunt, a bacteriologist at the University, described the examination of diseased roach from the outbreak at Welbeck Abbey and from whose blood she showed us under the microscope the curved, rounded-ended little rods of *Vibrio* bacteria, as well as the less important *Aeromonas* and *Coccus* bacteria her team of

workers found. *Vibrio* bacteria thrive in alkaline waters and Japanese workers have found them in trout, and others have found three strains of *V. anguillarum* in pike, eels, finnock and plaice, identifying them by oxidation tests. Maybe roach are more easily infected because they are more loosely-scaled than many fish, and easily injured? In any case the discovery of these bacteria still didn't rule out a possible virus. *Vibrio* mortality increases with a rise of temperature and there was more infection where sewage was in the Witham. Yet disease wasn't always linked with organic pollution from decaying weed. The safest treatment to disinfect tackle was a strong bleach solution, like chlorox, for 24 hours, then washing it off.

In the Wye, where Miss Elizabeth Davies has been working on the comparatively harmless *Myxosporidium mulleri* encysted in the tissues of fish in the tributary Lugg, it was found in 80 per cent of the chub, 30 per cent of dace and 11 per cent of the roach. A Wye salmon had been found with its eye destroyed by this parasite which can affect the brain and its optic tract in trout and salmon. *Psephenorhynchus larvae*, whose shelled larvae are eaten by freshwater shrimps, continue development when eaten by chub, trout, dace and eels, which thus become infected, but little if any harm is caused them. Mature chub seemed to be its natural host. *Echinorhynchus* larva in Bala spent part of their life in *Gammarus*, the freshwater shrimp, and mostly infected mature eels, only a few were in grayling, pike and roach.

The second day was devoted more directly to fish themselves. A Dutch lecture entitled "Methods of age determination of coarse fish using fin-rays" didn't seem to reveal anything more than that stocking canals or rivers with roach made the main influence on catches only very shortly afterwards, the major distribution being downstream, and that clipped fins could be recognised after a year. Dr. J. Willemsen of the Netherlands Institute for Fishery Investigation showed that only 1 or 2 per cent of pike were cannibalistic. Depending mostly upon what was most available, their food consisted much of cyprinodonts like roach and rudd, with frogs chiefly in winter. Less food was taken in November when digestion was slow and growth at a standstill. Maximum feeding was in February and March. There was no mention of birds in his list of stomach-contents, though in Britain I've known pike to take ducklings and other young waterfowl. It took 3 grams of fish food to produce a gram of pike growth, but its food conversion index varied a little from this 3 or 4. It could be 4 or 5 for a 28 inch fish. A catchable pike needs 4 times the amount in food compared with its weight increase and in Holland, where food is abundant, up to 6 times. Though pike below 20 inches rarely take bream, a pike had eaten a bream over half its length. There was also talk of pike changing sex, and of Dutch

Continued opposite ▶

Rasbora maculata

by Jack Hems



THE subject of this article, popularly known as the pygmy or spotted rasbora, seldom, if ever, exceeds 1 in. in length, and is the smallest member of its widespread genus. It has the charm and attraction of many tiny living things—delicacy of coloring, merry, darting movement, and a pleasing shape.

It is found in the natural state in woody ditches and ponds of the Malay Peninsula and Sumatra and the waters it inhabits are soft and acid. It hardly needs emphasizing, then, that similar conditions should be provided for this species in the aquarium.

It asks for nothing special in the way of food; in fact it eats anything alive or dried small enough to be swallowed, but like all very active fishes, it does keep in better health if it is fed several times every day. A temperature of from 73°F (23°C) to 78°F (26°C) is perfectly satisfactory.

The back is greenish gold to golden olive shading through pink to a greenish or yellowish white belly. The sides, which are overcast with a purplish to violet sheen, are adorned with three blue-black spots edged with red. One, the most conspicuous, behind the gill-covers, another just above the anal fin, and a third on the base of the tail. The fins are light to dark red melting into fair yellow posteriorly. The anterior rays of the dorsal and anal fins are streaked with black. The female is rather plumper, and her colours are slightly paler, compared with the male. To see this enchanting little fish at its best it should be viewed against a dark green background lit brilliantly from above.

A community tank occupied by fishes that are rough in their manners or great in their bulk and/or curiosity is not the place for the pygmy rasbora. But in the company of neon tetras, pristellas, and the like, it should flourish well. Be this as it may, it does appear to be more contented and certainly lives longest—when it is given a tank to itself. A tank measuring about 18 in. by 12 in. by 12 in. makes a sufficiently roomy home for a pair or more.

R. maculata can be bred in the aquarium but demands all the skill, patience, and experience that the knowledgeable aquarist has at his command. The essential requirements (to stress what has been said above) are soft water giving a pH reaction of about 6.5 (rainwater collected in clean glass or china receptacles some short while after it has begun to fall and thus cleared the atmosphere of chemical pollution) passed through wet peat until the right degree of acidity is obtained as good as any, a rather diffused light, and a temperature of about 80°F (26°C).

Since the eggs of this species are scattered haphazardly—or appear to be—as the energetic and, at this time, more brilliantly coloured male drives the female about the aquarium, and do not always adhere firmly to the foliage of the plants (thread-foiled plants such as *Wolffia* or *Myriophyllum* must be provided), it is a good plan to cover the floor of the tank with a layer of well-washed shingle.

After driving is over, the fish must be removed from the tank without delay or else all, or most, of the eggs will be

eaten. To return once more to the question of lighting, it is important to screen the tank from all strong light, even from above, during the period of incubation. This is usually of about twenty-four hours' duration.

The newly hatched fry need an abundant supply of freshly cultured infusoria dispensed from a clean jar (preferably by a slow-dripping siphon tube) until they are large enough to take the sort of varied diet their parents thrive on. The non-starters in the battle for life will die before the first nine days are out, but the fry left alive should make rapid headway. A partial change of water—soft and acid, of course, and heated to the same temperature as the aquarium—is beneficial after a month has passed.

The pygmy rasbora is far from a newcomer to the hobby. It was first introduced to tropical aquarium keepers in Germany in 1905 and was sometimes described in books and magazines published more than forty years ago under the erroneous name of *R. kufachroma*.

3rd British Coarse Fish Conference

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pike-hatcheries annually stocking their waters with a million young pike.

R. H. K. Mann, of the Freshwater Biological Association laboratory at East Stoke in Somerset, showed how bullheads dominating small southern chalk streams eat more food than the trout do. These rivers make a greater annual production of dace than of salmonids, despite their fame for the latter. Coarse fish are biologically more important in them. Dace lived 8-9 years, roach longer, to 15 years. Perch moved about the river returned to their old haunts.

Discussion showed that though grayling have increased in recent years in the Welsh Dee, the Wye and other rivers, they have decreased in the Test. Wye grayling feed on small minnows and miller's thumb and can thus be taken on artificial spinner; but they do not do this in Bala Lake. Dragonfly nymphs are an important food for trout in Liverpool's new Cefni reservoir above Bala, an alkaline water with brown trout and rudd.

In Holland, said Dr. J. Dhal, the normally slow growth of eels had been much increased by introducing them to old carp-breeding ponds where eelvers metamorphosed in 2½ years, ready to return to the sea; but most took 3 to 6 years. Eelvers there made nearly 4½ inches growth in their first half-year and up to 20 inches in 2½ years.

We heard also how the netting of over 8,000 pike from Windermere since 1944 had not greatly altered their numbers, but had reduced the size and age of the stock. The oldest was a female of 17 years; the biggest 35½ lb and 14 years old. The netting had increased the number of charr, on which the pike fed extensively in the winter spawning time, and the trout had also increased. Perch were the major summer food of these pike.

An outdoor reptile collection

by M. Peaker, B.Sc.

1. The Snake Pit

IT is the ambition of most amateur keepers of reptiles and amphibians to own at least one outdoor reptiliary on the lines of those seen in zoological gardens and research establishments. The construction of outdoor enclosures and the maintenance of their inhabitants is a fairly simple matter and in a series of articles I shall attempt to describe how enclosures may be constructed and furnished to house snakes, lizards, terrapins, tortoises and amphibians.

A typical design for a snake-pit type of reptiliary is shown in the diagrams. I strongly suggest buildings as large an enclosure as space and funds will allow so that the interior may be laid out to form a 'natural type' of rockery facing south. Plants can be grown so that in several years the whole construction has a weathered appearance. The first reptiliary I built was three feet by four feet which was rather small. A second (seven feet by four feet) was more suitable but I would have preferred one that was even larger. A point to bear in mind when choosing the site is that a well-drained area should be chosen so that dampness can be avoided.

Construction

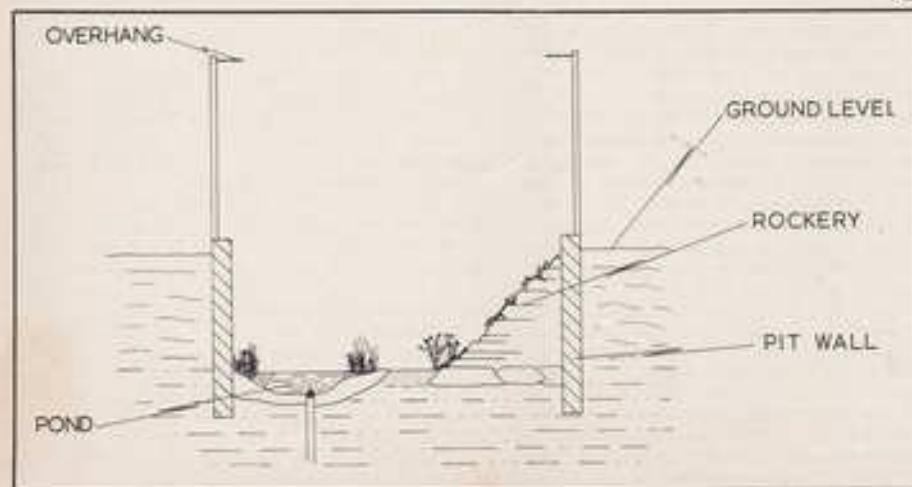
The most strenuous part of the job is excavating the pit to a depth of three feet or more. A further area should then be dug out and filled with rubble to make an effective soak-away for the pond. Over this a shallow concrete pool can then be constructed in the usual way. A drain from the pond into the soakaway is essential for ease of cleaning.

When the pit walls have been built of concrete, breeze blocks or bricks and mortar, the whole pit can be covered with a five inch layer of ballast for drainage. I cannot over-emphasise that the walls must be snake-proof and this means checking and doubly-checking that every crack is filled with cement.

The rockery can be built of any rock preferred. I have always used sandstone and left large soil-filled gaps in



Plan view of the pit



Cut away and elevation



The grass snake—*Natrix natrix*

which plants can grow and thrive. Logs can be positioned and small shrubs can be planted in the centre of the pit but all plants should be kept trimmed down to prevent the inhabitants using them as a ladder to scale the wall.

I strongly suggest building the pit in late summer or autumn, allowing the concrete of the pond to mature and the plants to settle. In the following spring the first inhabitants can be introduced after the upper walls have been built. For the walls I have always used hardboard securely fastened to wooden frames. With sufficient paint I have had walls still in use after seven years. The shiny surface of the hardboard should face inwards and an effective seal should be made between the bottom of the frame and the pit walls. I suggest that the height of the walls should not be less than three feet six inches. An overhang is useful not only to keep the inhabitants in but as a ledge to support a wire netting-covered frame—to keep the neighbourhood cats out.

Other Features

Depending on circumstance it may be desirable to build hibernation chambers into the rockery. They should be frostproof and therefore at least a foot below the surface and must also be in a very well-drained position. The entrance via a drain-pipe should be protected so that rain cannot run in. I prefer the chamber to be made of thick concrete with a heavy close-fitting lid which will very rarely need to be removed. Thick layers of moss can be left over the entrance in winter to reduce but not prevent the turn-over of air inside.

Another useful feature to observe specimens which are active at dusk or by night is a blue light over the structure which can be switched on at will. The lamp and the fittings should, of course, be suitable for outdoor use.

In the second article I shall describe and discuss some of the species available which are suitable for this type of structure.

More fish on stamps

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included the small Egyptian Mouth-breeder *Haplochromis multicolor*; *Gomphoma acutirostre*, the African Climbing Perch, which in the wild often leaves the water (although not to the extent of climbing trees as is sometimes related); *Channa obscura*, another walking fish; the six-banded Panchax; Gunther's Fundulus; and *Nanaethiops viciatensis*, the African Tetra, an excellent aquarium fish of small size and hardy disposition, attractive and friendly, which breeds easily and eats almost anything.

On the Arabian Gulf, the little sheikhdom of Umm Al-Qawain has this year also catered for collectors with an even longer series of 27 multicoloured labels illustrating a variety of tropical fish of the local waters—too many to consider here. More modest in their output were the authorities of the French Somali Coast among whose stamp subjects last year were the graceful and brilliant Regal Angelfish, *Pygoplites diacanthus*; the damsel or clown fish *Amphiprion ephippium*; the squirrel fish *Holocentrus spinifer*; a Surgeon Fish and the colourfully fearsome lion fish, *Pterois lunulatus*, whose sharp dorsal spines contain poison.

Across in South America, Colombia's contribution to our theme last year included miniatures of an angel fish, *Molocanthis jacobita*, while Venezuela issued a set of six stamps, colourfully printed in Berlin, showing freshwater fishes of the region. Those depicted were the Chocolate Cichlid *Astronotus ocellatus*, known also as Peacock-Eye, an attractive fish but one whose size (12 in.) is unfortunately too large for the domestic aquarium; *Cichla ocellaris*; *Serranulus nanatus*, native to the Orinoco, another fish only for the specialist, being the most bloodthirsty of all freshwater specimens; *Giliodus punctatus*, by contrast small and peaceful, which spends most of its time in a vertical position, head downwards and is popularly called the Head-standing Fish. The set was completed with the interesting little swordtail characin, *Corynopoma risti*, and the dwarf butterfly cichlid *Apingranema ramirezi*.

On the European stamp front, Albania, Roumania and San Marino are among those recently presenting through the post many diverse forms of marine life. The countries of Eastern Europe are prolific in their stamp issues as much for philatelic as for propaganda purposes. East Germany's multicoloured half dozen devoted to aquarium fish last November included *Cichlasoma cyanoauratus*; the Blue Gularis *Aphyanemus ocellatus* and *Callis chana*, one of the gouramis.

The latest offering from Poland is a set of nine artistic and colourful miniatures of exotic fish from the South Seas. This beautiful philatelic aquarium contains several members of the family *Chaetodontidae*, the butterfly fishes *C. ephippium*, *C. fasciatus*, *C. melanurus* and *C. melapterus*; the showy yellow and purple *Pomacanthus imperator* and the spotted *P. semicirculatus*; the orange striped trigger fish *Balistapus undulatus*; another trigger fish, *Rhinocanthus aculeatus*, with pride of place for *Balistoides conspicillum*, perhaps the world's most beautiful fish.

Keeping the golden orfe

by A. Boarder

THE golden variety of the Orfe (*Ibus idus*) is one of the finest fish for the garden pond as long as it is fairly large and well oxygenated. Small specimens can be kept in tanks as long as the tanks are not small and their care is taken to ensure that the fish can be removed to an outside pond when they grow too large. The golden variety appear to have developed from the silver orfe and in certain parts of Germany many of the young silver orfe turn to the golden colour. Orfe appear to adapt themselves to varied conditions and also to differing temperatures. They can stand any cold which goldfish are capable of putting up with but the larger specimens are soon in trouble if the water in the pond becomes unhealthy through too much foul gas and lack of oxygen.

In a medium to large garden pond a small shoal of golden orfe are always attractive and during the warmer months of the year will be seen near the surface cruising around after flies or other insects which have fallen on the water. They will eat most foods taken by goldfish but they have a preference for live food. Very little in the form of live food will be rejected by these fish and I have seen them take live wasps with gusto.

In general shape the orfe may be likened to the Herring as it is rather stream-lined and has no barbels. The lack of barbels indicates that this fish is not a bottom feeder, which is a good recommendation for the fish as an inhabitant of the garden pond. By being mostly a surface feeder this fish is not likely to stir up the mud from the bottom as would bottom feeders such as the carp and bream. The colour of the golden orfe is paler than that of the goldfish, being a soft orange-yellow. The under parts are paler being almost white. Many large orfe develop a number of black markings, especially along the back. There does not seem to be any logical reason for this appearance of the black, but many otherwise show-specimens lose points for the amount of black they show.

As this fish is a rather fast swimmer it requires plenty of swimming space and will not thrive without it. In a fairly large pond, providing the fish gets plenty of live food it will soon grow to a large size, even up to eighteen inches long. For this reason I do not recommend keeping golden orfe in small tanks. Any orfe over three inches body length should be taken from a tank and placed in an outdoor pond. Another point to watch for when they are kept in a tank is that they are great jumpers and if the water is not to their liking they can jump out unless the tank is covered.

Feeding the orfe presents no problems to the experienced pondkeeper. Besides taking foods such as Bemax, rolled oats, packet foods and normal dried food as used for goldfish, the orfe will appreciate practically all kinds of live foods and will ignore dried ones as long as the others are available. The garden worm is the usual stand-by for most pondkeepers as this food is a favourite one for the orfe. In addition they will take white worms (*Enchytraea*), Water fleas (*Daphnia*), Mosquito larvae, Tubifex worms, Freshwater shrimps (*Gammarus*), Water louse (*Asellus*),



maggots, various crustaceans, such as water snails and fresh water mussels (if small), most types of insects, including blue-bottles, house flies and wasps.

Orfe will also eat strips of meat and chopped horse heart or liver. I have even seen large orfe tearing at and eating the entrails of a chicken. From this it will be seen that the orfe are not at all fussy feeders and providing they get plenty during the warmer months of the year they will grow at a fast rate. This rapid growth must not be lost sight of as if anyone stocked a garden pond which was rather small it is quite possible that the orfe would grow too large for the pond within two or three years. One very important point to watch for is the condition of the water during hot, close or thundery weather. Large orfe can soon be in trouble as soon as the oxygen content of the water drops. This condition can easily occur during one night if the water is a little foul through unseason dried food having polluted the water.

Golden orfe can be bred in the garden pond but it seems that they have to be well grown before they will do so. I have had no reports of them having been bred either when small or when they are in a small pond. I have known them to breed in a fairly large pond which is kept in a good state by the presence of plenty of growing water plants and the occasional use of a small waterfall.

Breeding follows the usual pattern of the breeding habits of goldfish. The males show the white, raised tubercles on the gill plates and front of the pectoral fins. The females show an extended belly when in egg-laying condition. The chasing is very vigorous and the eggs are adhesive, being laid singly in large numbers. The underwater roots of such trees as Willows are a favourite site for the reception of the eggs. As with most fresh water fishes the orfe prefer to lay their eggs in shallow water where other fishes may not care to swim in search of them. It is also where the water is warmer as a rule so that the eggs will hatch in a minimum of time. If the breeding orfe are kept with other fishes it is essential that watch should be kept when they are spawning so that the eggs can be gathered on their weed for hatching in a safe place. Most of the fishes in the pond will try and eat as many of the eggs as they can find, and this includes the orfe once the excitement of the chase has ended.

The young soon become the desired pale golden colour but they must have plenty of small live foods to enable them

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Champion of Champions contest

In the May issue of *The Aquarist* appeared details of a contest which would be held to find the Best Fish of the Open Shows.

All entries would come from the winners of the "Best Fish in the Show" awards and the contest would be staged in conjunction with the British Aquarist Festival to be held at Belle Vue, Manchester on the 28-29th October.

The interest created by the various announcements which have appeared has already highlighted this contest as the outstanding event in the aquarist world this year, and a list of those so far eligible for entry at the time of this issue going to press appears on page 127. The awards which will be presented to the winners are shown below.



Award to winner of THE CHAMPION OF CHAMPIONS CONTEST

The winner of the 'Champion of Champions' contest will be awarded a Hall-marked 9ct gold lapel pin in the shape of *The Aquarist* badge inscribed—'Champion of Champions'. Laurels support this badge to differentiate between the 'Champion of Champions' and the 'Best Fish in the Show' awards. A cash prize of twenty guineas together with an inscribed plaque will also be awarded.

An oxydised silver-plated plaque, mounted on a hand-made Indian Rosewood back, will be awarded to the winner of the 'Champion of Champions' contest, together with a solid gold pin as described above. A similar plaque will also be awarded to the second and third successful contestants together with a cash prize of thirteen guineas and seven guineas respectively. The plaques are inscribed with the names of the recipients and the position gained in the contest.



Trout in the home aquarium

by T. Hinitt

BOOTH our native Brown trout (*Salmo trutta*) and the imported Rainbow trout (*Salmo irideus*) make excellent inmates for the cold water aquarium. They are very attractive in all respects, being of pleasant coloration and interesting in behaviour. After only a short period they will take earthworms from their owners' fingers and will display a very high degree of intelligence in their general behaviour. Belonging to the order *Isospondyli*, they inhabit fast flowing, clear streams, both in this country and many others, ranging from torrents in Africa to mountain streams in the Pyrenees. The coloration of both species is extremely attractive. Most Brown trout are liberally sprinkled with black and red spots whilst the Rainbow trout is similar but with the addition of a pink stripe along the flanks. The colour will vary depending on what type of water they inhabit. Those from weed filled chalk streams will usually be of a fairly light hue but with a greeny tint whilst fish from highland streams are much darker with a profusion of spots on the flanks and back.

To keep these delightful fish in good health is not the easiest task but as long as a few conditions are observed they will flourish for a considerable length of time. The fish are best obtained when they measure about three inches in length. At this size they are one year old and can be obtained from any trout hatchery for quite a moderate fee. Larger fish are considerably more expensive and are not so easy to acclimatise to aquarium conditions. The fish are usually sent by rail and have to be collected from the station on arrival.

The aquarium for these fish should be at least three feet long and fifteen inches deep. A tank of this size will accommodate four three inch yearlings but any more and trouble will occur over territories. Trout are extremely territorial by nature and are quite aggressive towards intruders in their chosen area. Because of this they should not be kept with fish of other species.

The most important factor in the successful management of a tank of trout is the water temperature. Brown trout, especially, will not tolerate a sustained temperature above 55° Fahrenheit. If the water rises above this the fish will develop gill infections and will rapidly die. The best place to position the tank is in a cool outhouse or other situation where the water will not be liable to reach high temperatures. Rainbow trout are not quite so demanding as regards water temperature and will happily withstand anything up to about 65° F. For this reason they are possibly more suitable for the home aquarium. Both brown and rainbow trout like violent water movement. This can either be provided by a hosepipe for a period every day or by a power filter, such as the Eheim, running continuously. This is not expensive as these filters use very little electricity. When settled in the trout will hover in the current waiting for food to be given them.

This forms a most attractive picture and, to my mind, rivals the beauty of a well laid out tropical aquarium.

Plants should not be put in the tank as they very rarely flourish in the current and will only rot away detracting from the appearance of the aquarium. The bottom should be lined with gravel interspersed with larger stones, which will provide shelter for the fish when they wish to rest out of the water flow.

Trout of both species are gross eaters and will consume large quantities of worms, house-flies and assorted grubs. As mentioned earlier, they will readily snatch food from the fingers once they become accustomed to their owner. (There is a wild trout in Germany that will emerge from the depths of a mill-pond to take a worm from a beer mug held just on the surface of the water by the owner of the mill). One point worth mentioning is that trout will not take dried food unless it is of a very meaty nature.

As far as I know trout have not been bred in the aquarium, possibly because they would have to be far too large before they reach maturity. However, I should imagine that it would not be impossible to obtain a spawning as small trout of 6 or 7 inches breed readily in mountain streams where the lack of space and food restricts their growth.

If possible, pay a visit to the cold-water hall of the London Zoo aquarium. Here they have a huge tank full of magnificent trout of both species. All the fish are in perfect condition and make a very fine display.

Keeping the golden orfe

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to grow at their maximum. Aeration would be essential in the early stages and at no time will these fish tolerate foul conditions. To stand any chance of success at breeding these handsome fishes I recommend that fishes at least a foot long should be used, that they are kept in as large a pond as possible and that either a waterfall or fountain should be available to freshen up the water during warm spells.

For exhibition purposes the golden orfe should be undamaged, with as clear a colour as possible, that is few black markings along the back, and be of a fair size. As practically all orfe will be of the same shape, not having been altered from their original shape by mutations and selection as with the goldfish, it will be found that there is no difference in the general shape of the fish or its fins. The only points the judge can assess will be for condition, colour and size. Naturally the larger the fish the more chance it will have of winning, other points being equal. When showing large fish inform the show secretary so that a large tank is provided.

Going marine Part 7—Diseases

by T. Ravensdale, F.B.I.S., F.M.S.S., A.M.Z.S.

Lymphocystis

THIS is a rather unusual disease and is usually formed by mineral masses which bubble up onto the fish's skin like over grown white spot. It is often thought to be boils and is usually found on newly imported specimens.

The only method of removing these infections I have found to be surgery. This often results in death, an inevitable condition in any case, so nothing is lost except perhaps a little ignorance. The incisions should be made, in a wedge shape, one slicing underneath the growth and one to lift it off. The wound should often be bathed in a dilute iodine solution. The fish should then be provided with complete rest and darkness in a quarantine tank.

Saprolegnia

This state is more commonly known as fungus and can be caused in many ways, the most common being the aftermath of an injury which has not healed.

A chill can also cause fungus but, strangely enough it may also effect a cure! Although fungus on a fresh water fish is usually like a ball of fluffy cotton wool, it looks more like flat grey patches on a marine fish.

Water changes must be made when a bad attack occurs and a more drastic cure may be effected by a salinity change.

Argulus

This is a disease common to sea horses, in fact there aren't many imported which are free from this pest and all new sea horses should be inspected for it. It is a rather large parasite which can be seen with the naked eye clinging to the skin of the sea horse. Most aquarists prefer to pick them off with a pair of tweezers and I know of no better remedy.

Exophthalmus

This disease or ailment is of course the well known "pop-eye". Coral fish seem far more prone to catching it, probably due to a diet deficiency. So many marines arrive suffering from malnutrition and a further deprivation of natural foods (inevitable) leads to weak blood and a poor circulation especially towards the smaller blood vessels such as those of the eye. Pop-eye due to these causes can often be cured by a new diet but look for other causes too. Excess aeration with extra fine air bubbles can cause pop-eye by being taken into the blood stream and blocking a transfer capillary (where vein meets artery) in such delicate places as the eye. The blockage may cause a burst which is indicated by streaks of blood visible in the eye, or starvation of a blood supply. In either case the eye will swell to prodigious proportions. Pop-eye caused by over fine aeration is, however, quite rare and a more likely cause will be pollution. Dirty food or water can cause pop-eye and water changes must be made.

In all cases of pop-eye the lights must be turned off and the temperature reduced by five degrees.

Wounds

Cuts, damaged fins and wounds should be treated as highly dangerous when they first appear and, as they are usually caused by an aggressive fish, the culprit should be detected and dealt with. Severely damaged fish should be removed from the community tank and left in peace where a recovery should be made at a remarkably fast speed. No further treatment should be necessary but watch out for infections.

Next month: Ozone in the Marine Aquarium.



from AQUARISTS' SOCIETIES

At the May meeting of the Yeovil and District A.S. the Steiner-Burgess Cup which is awarded annually for the best pair of Tropical fish on show was won by Mr. A. Nicholls, secretary of the Society, who exhibited a pair of Red Platies; the second was Mr. G. Gillard with a pair of Meryzmia, and third Mr. N. Swain who entered a pair of Schubertii Barb.

Members of the society met with considerable success at two Open Shows. At Bath training exhibitors were Mr. G. Gillard who had a first with a Loach, Boris Lucenari, a second with a Barbora Haggan and a third with a Blue Platy. Mr. N. Wright took a first with a Goldfish and a second with a Rainbow (Breeders Class). At Truro/Trigg Open Show successful exhibitors were: second Mr. A. Nicholls, Sea-Fin Mollie; Mr. A. Nicholls second and fourth Red Platy; fourth Mr. N. Wright, Rainbow (Breeders Class); third Mr.

G. Gillard, Red Platy; fourth Mr. G. Gillard, Meryzmia; fourth Mr. W. Reeves, Goldfish; Highly commended Mr. W. Reeves.

THE Hounslow and District A.S. last meeting was devoted to a very interesting talk by the Club's chairman, Mr. John Thomas, on Hybridisation in fishes. Some members have had the opportunity to experiment in this field but in the majority it was a completely new subject, and therefore doubly enjoyable.

The Table Show was for Livebearers, Catfishes and Loaches and the results were as follows: Livebearers: 1, John Thomas (Red Swordtail); 2, Alan Fleming (Guppy); 3, Miss Jackie Chandler (Albino Swordtail). Cats and Loaches: 1, John Thomas (Albino Gharial); 2 and 3, Clive Walker (Ruhli Loach). New members and visitors are always welcome to the Club's meetings which are held on alternate

Wednesdays at 8 p.m. at the Community Centre, Clifton Road, Ilchester, or details can be obtained from the Secretary, Mr. Derek Woodward, 16 Ellingham Road, Henbury.

RECENT table show results held by Leamington and District A.S. were as follows: Pairs (Livebearers): 1, Mrs. J. Smith; 2, P. Underwood; 3, Master Clark; 4, P. K. Cervi. A.V. Goldwater: 1, D. G. D. Louca; 2, Mrs. J. Smith; 3, Mrs. C. Ward; 4, Mr. M. Smith. A.V. Anabantid: 1, P. Underwood; 2 and 3, Mrs. S. Underwood; 4, F. Underwood. Breeders (Guppies): 1, Mrs. C. Beard; 2, J. Morris; 3, Mrs. J. Smith; 4, F. Underwood. A.D.V. Tropical Fish: 1, Mrs. J. Smith; 2, P. Underwood; 3 and 4, T. Dobson.

ONCE again Nottingham won the Cup at the Intra-Society Show held at Burton-on-Trent.

official programme of the American Killifish Association and deals with apparatus throughout the world and is thoroughly recommended to all Societies.

The Table Show was for barbs and the appointed class was won by Mr. B. Bennett who won the first three prizes. The Junior A.O.V. was as follows: 1, Paul Kirby; 2, Mr. David Allen; 3, Mr. Peter Dickinson.

The Society meets on the first Monday of each month at the Mechanics Institute, Town Street, Hoveford, and any person interested should contact the Secretary, Mrs. B. Helm, 29 Wellington Road, Leeds 12. Telephone Leeds 2122.

THE results of the Gosport and District A.S. Open Show were as follows: Barbs: 1 and 3, Mr. Brown; 2 and 4, Mr. Coombes. Barbs: 1, Mr. Goodland; 2, Mr. Lawrence; 3, Mr. Brown; 4, Mrs. Neyley. Barbs: 1, Mr. Brown; 2, Master Perman; 3, Mrs. Stibwell; 4, Mrs. Neyley. Rainbow: 1, Mrs. Neyley; 2, Mr. Andrews; 3, Mr. Jones; 4, Master Perman. Rainbow: 1, Mr. Watson; 2, Mr. Stibwell; 3, Mr. Follington; 4, Mr. Andrews. Characin: 1, Mr. Scott Morgan; 2, Mr. Andrews; 3, Mr. Watson; 4, Mr. Pinckney. Characin: 1, Mr. Goodland; 2, Mr. Follington; 3, Mr. Scott Morgan; 4, Mr. Brown. Characin: 1, Mr. Goodland; 2, Mr. Scott Morgan; 3, Mr. Clough; 4, Master Perman. Fishers: 1, Mr. Coombes; 2 and 3, Mr. Scott Morgan; 4, Master Perman. Anabantoid: 1, Mr. Goodland; 2, Master Perman; 3, Mr. Andrews; 4, Mr. Brown. Cichlids (3-inch): 1, Mr. Follington; 2 and 3, Mrs. Neyley; 4, Master Perman. Cichlids (over 3-inch): 1, Mr. Andrews; 2, Master Perman; 3 and 4, Mr. Scott Morgan; 5, Mrs. Neyley; 6, Mr. Coombes; 7, Mr. Pinckney; 8, Mr. Follington; 9, Mr. Scott Morgan; 10, Mr. Clough; 11 and 12, Mr. Elick. Toothcarp: 1 and 3, Mr. Scott Morgan; 2, Mr. Browning; 4, Mr. Bridgen. A.O.V. Tropical: 1, Mr. Andrews (Best Fish in Show); 2, Mr. Vozary; 3, Mr. Scott Morgan; 4, Miss Corney. Novice: 1, Miss Corney; 2, Master Perman; 3, Mr. Elick. There were 194 entries in the show.

CHANGES of officials at the last Annual General Meeting of the Stockton-on-Tees A.S. were as follows: Chairman, Mr. D. Keighly; Vice-Chairman, Mr. A. Stevenson; Hon. Secretary, Mr. W. Bowman; 2 Secretaries, Mr. J. Andrews; Show Secretary, Mr. J. Chamberlain, 15 Taffing Street, Stockton-on-Tees; Committee Members: Mrs. B. Clennett, Mrs. S. Smith, Mr. B. York, Mr. D. Clarke, Mr. K. Clennett. The plaque for the "Years Points Championship" was awarded to Mr. J. Chamberlain.

A Table Show was held featuring all fish which received first and second places for the previous year. This resulted as follows: 1 and 3, Mr. and Mrs. K. Clennett; 2, Mr. W. Bowman. Membership now stands at 79 and anyone interested should contact the Secretary at the above address.

The first of this year's series of annually held interclub Table Shows between Southend A.S., Basildon A.S. and Thurrock A.S. was held recently at the Thurrock A.S. headquarters. The attendance was most encouraging amounting to over 50 enthusiasts and their families. Mr. Dodkin of the East London A.S. spoke on "Composition of Water in Fish Breeding". He lectured in his talk a number of examples and literature to add visual interest to a most informative lecture. Mr. Jenney the Chairman of the Federation of British Aquarists judged the 71 fish brought, which were in four classes, Barbs, Florida, E.L.T.C.'s and Fishers. The results were as follows: Barbs (30 fish brought): 1, Mr. Cheswright (Tiger) Southend, 79 pts; 2, Mr. Lupton (Aurife) Basildon, 78 pts; 3, Mr. Davis (Tiger) Basildon, 77 pts; 4, Mr. Edward (Shepherd) Southend, 76 pts. Florida (19 fish brought): 1, Mr. Hemble (Sunset),

79 pts; 2, Mr. Hemble (Red) Thurrock, 78 pts; 3, Mr. Durrant (Yellow Wag) Thurrock, 77 pts; 4, Mr. Nichols (Vivarium) Thurrock, 76 pts. E.L.T.C.'s (31 fish brought): 1, Mr. Durrant (Aph. Australis) Southend, 79 pts; 2, Mr. Edwards (P. Playfairi) Southend, 77 pts; 3, Mr. B. Nichols (Aph. Australis) Thurrock, 76.5 pts; 4, Mr. Wills (Aph. Callisoma) Southend, 75 pts. Fishers (11 fish brought): 1, 2, 3 and 4, with 78, 77, 76 and 75.5 pts respectively Mr. D. Durrant, Thurrock. Best Fish in Show went to Mr. D. Durrant (Red Fishers). The positions after this first leg are: 1, Thurrock, 29 pts; 2, Southend, 9 pts; 3, Basildon, 5 pts.

FOUR hundred fish were on view at Gosport A.S. last Open Show which proved an outstanding success. The full results were: Guppies: 1, D. Johnson; 2, C. Walker; 3, W. Berridge; 4, J. Burton; 5, I. Aston; 6, W. Berridge; 7, S. Woodhead; 8, I. D. Fletcher; 9, W. Berridge; 10, P. H. Crook; 11, G. Hodgkinson; 12, J. and H. Dennis; 13, Characin (small); 1, W. Booth; 2, W. Parker; 3, Mr. Woodhead; 4, Characin (large); 1, I. Robinson; 2, E. Price; 3, Mr. Mullis; 4, Corydoras Catfish; 1, J. Robinson; 2, P. Hager; 3, A. Middleton; 4, L. M. Parks; 5, G. Hodgkinson; 6, J. Johnson; 7, A.O.V. Catfish; 1, Mr. Mullis; 2, W. Parker; 3, A. Mansell; 4, B. J. Park; 5, Mr. Parkin; 6, D. Crook; 7, Barbs (small); 1, J. Norton; 2, W. Booth; 3, B. Tomkinson; 4, W. Booth; 5, G. Hammett; 6, J. Price; 7, J. Hodgkinson; 8, Miss D. Smith; 9, Guppies (A.O.V.); 1, J. and H. Dennis; 2, D. Leal; 3, B. Frensh; 4, Cichlids (Dwarf); 1, A. Mason; 2, J. and H. Dennis; 3, A. C. Bright; 4, Anguill; 1, P. Woodward; 2, G. Hodgkinson; 3, E. Davenport; 4, Cichlids (A.O.V.); 1, D. Crook; 2, M. Jones; 3, Mr. Parks; 4, J. W. Parker; 5, G. Hodgkinson; 6, G. Hammett; 7, Rabbits; 8, M. Jones and Dennis; 9, Master D. Slater; 10, J. Ingram; 11, Mr. Parks; 12, Labors; 13, Sharks and Flying Fishes; 1, Mrs. Woodhead; 2, D. Johnson; 3, Mr. Mullis; 4, Para Livebearers; 1, A. Morrow; 2, R. Priston; 3, J. Woodhead; 4, Para Livebearers; 5, G. Hammett; 6, P. Parkin; 7, Mr. and Mrs. Charlton; 8, A.O.V. Tropical; 1, W. Parker; 2, R. Tomkinson; 3, J. Woodhead; 4, A.O.V. Coldwater; 1, M. Piller; 2, Miss J. Phillipson; 3, D. Crook; 4, Miss Tank; 5, J. Ingram; 6, Mrs. H. Lomas; 7, Mr. and Mrs. Charlton; 8, Breders' Breders; 9, W. Booth; 10, P. Hager; 11, Mr. and Mrs. Charlton; 12, Breders' Livebearers; 1, J. H. Dennis; 2, R. Birch; 3, G. Hodgkinson; 4, M. Piller; 5, J. Walker. The Judges were Mr. L. McCourt and Mr. B. Moorhouse. Alderman H. Turner presented the prizes.

DURING recent weeks two inter-club Table Shows have been held by Rotherham and District A.S. the winners being as follows: 1, D. Jackson (Cardinal); 2, Mr. Drovile (Black Mollie); 3, M. Clough (Lace Gourami). In the freshwater class first place was taken by C. Turner with a Male Guppy, the second being L. Mounsey (a junior member) with a Ptery (Festival) and third J. Starr with a Male Swordtail.

An entertaining afternoon was had by several members who visited the Thorne A.S. Open Show in June. Further trips are being arranged for the future. New members and visitors are welcome at future meetings to be held at the Bridge Inn, details of dates and times obtainable from the Secretary, Mrs. J. Hall, 10 Gosborough Road, Parkgate, Rotherham.

THE Barrow and District A.S. was invited to put on an exhibition of tropical fish at the Victoria Centenary Gala in June. An island stand was erected in the position comprising at ten tables, and even the Club members were surprised at the interest shown. Miss Vickers, elected at the Gala, visited the exhibition and named the various fishes with care. She proved to be an aquarist herself, but not a member of the Club.

SEVERAL three hundred entries were brought at the third annual open show of the Llanwrthol Major A.S. The results were as follow:

Silverfish: 1, Mrs. King (Brazil); 2, Mr. Smithson (Bridgford); 3, A. Robertson (Llanwrthol); 4, A.O.V. Llanwrthol; 1, Mrs. King (Brazil); 2, Mrs. Pease (Llanwrthol); 3, J. Sanders (Llanwrthol); 4, M. J. Parry (Newport). Heterostegus: 1, A. Robertson; 2 and 4, D. R. Johns (Llanwrthol); 3, Mrs. King; 5, A.A.V. Charsain; 1 and 2, F. Hall; 3, D. Songhurst (Llanwrthol); 4, W. Gossell; A.O.V. Barbs; 1, A. Robertson; 2, A. Rogers; 3 and 4, P. Brown; Male Guppies: 1 and 3, R. Wigg; 2, H. Gossell; 4, P. Hall; Female Guppies: 1, P. Brown; 2 and 4, D. Songhurst; 3, E. Wigg; Platies: 1, A. Rogers; 2 and 4, R. Wigg; 3, T. Phipps (Barry). Swordtails: 1 and 3, L. Linton (Brazil); 2, M. J. Parry; Mullis: 1, P. Harris (Cardiff); 2 and 4, C. Barber (Bridgford); 3, C. Smithson; Catfish and Lanchins: 1, S. Nelson (Llanwrthol); 2, P. Harris; 3, P. Brown; Corydoras Catfish: 1, 3 and 4, T. Phipps; 2, P. D. Wright; Dwarf Cichlids: 1, P. D. Wright; 2, D. Songhurst; 3, C. M. Barber; A.O.V. Cichlids: 1, W. Gossell (Cardiff); 2, R. Mann (Newport); 3, P. Hall; 4, E. Wigg; Danos and Rainbow: 1 and 3, P. Hall; 2, M. M. Clark (Barry); 4, G. Louder (Bridgford); Killifish: 1, P. Brown; 2, N. Gossell; A.O.V. Fishers: 1, P. Phipps (Barry); 2, P. Harris; 3, G. Pease; A.O.V. Livebearers: 1, S. Nelson; Breders' Breders (Guppies): 1, P. Hall; 2, G. Pease; 3, Mrs. King; Breders' Livebearers: 1, R. Wigg; 2, P. Brown; 3, A. Robertson; Breders' Guppies: 1 and 2, J. Main (Newport); 3, J. Burgess; 4, R. Wigg; Parrotfish Aquaria: 1, Mrs. Burgess; 2, S. Nelson.

The former Marine Study Aquatic Society of Great Britain has changed its name to the **International Marine Study Society** due to an increase in its overseas membership. The I.M.S.S. Journal, which is available to members only, is published monthly and now contains many articles from marine aquarists overseas besides those by I.M.S.S. members in Great Britain. Following the intensification of interest in the marine aquatic field as of recent months, the I.M.S.S. also records an increase in membership, fully paid up membership now being just over 100.

The society's intended activities during the next year include the mapping of the marine littoral fauna distribution of sections of the coast around the British Isles, the introduction of photographs into the I.M.S.S. Journal and several other schemes. Membership of the I.M.S.S. is 30s. per annum in Great Britain (£7.50. in the U.S.A.). Membership fees should be sent to the General Secretary, I.M.S.S., 25 Colford Gardens, London, N.W.8, England. Enquiries concerning prospective membership should be addressed to the new Membership Secretary, Mr. K. Martin, 138 Oxford Road, Swindon, Wilts. Overseas journals are normally forwarded by air mail.

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official programme of the American Killifish Association and deals with apparatus throughout the world and is thoroughly recommended to all Societies.

The Table Show was for barbs and the appointed class was won by Mr. B. Bennett who won the first three prizes. The Junior A.O.V. was as follows: 1, Paul Kirby; 2, Mr. David Allen; 3, Mr. Peter Dickinson.

The Society meets on the first Monday of each month at the Mechanics Institute, Town Street, Hoveford, and any person interested should contact the Secretary, Mrs. B. Helm, 29 Wellington Road, Leeds 12. Telephone Leeds 2122.

THE results of the Gosport and District A.S. Open Show were as follows: Barbs: 1 and 3, Mr. Brown; 2 and 4, Mr. Coombes. Barbs: 1, Mr. Goodland; 2, Mr. Lawrence; 3, Mr. Brown; 4, Mrs. Neeson. Barbs: 1, Mr. Brown; 2, Master Perman; 3, Mrs. Stowell; 4, Mrs. Neeson. Rainbow: 1, Mrs. Neeson; 2, Mr. Andrew; 3, Mr. Jones; 4, Master Perman. Rainbow: 1, Mr. Watson; 2, Mr. Stowell; 3, Mr. Follington; 4, Mr. Andrew. Characin: 1, Mr. Scott Morgan; 2, Mr. Andrew; 3, Mr. Watson; 4, Mr. Pincher. Characin: 1, Mr. Goodland; 2, Mr. Follington; 3, Mr. Scott Morgan; 4, Mr. Brown. Characin: 1, Mr. Goodland; 2, Mr. Scott Morgan; 3, Mr. Clough; 4, Master Perman. Fishers: 1, Mr. Coombes; 2 and 3, Mr. Scott Morgan; 4, Master Perman. Anabantus: 1, Mr. Goodland; 2, Master Perman; 3, Mr. Andrew; 4, Mr. Brown. Cichlids (3-inch): 1, Mr. Follington; 2 and 3, Mrs. Neeson; 4, Master Perman. Cichlids (over 3-inch): 1, Mr. Andrew; 2, Master Perman; 3 and 4, Mr. Scott Morgan; 5, Mrs. Neeson; 6, Mr. Clough; 7 and 8, Mr. Elick. Toothcarp: 1 and 3, Mr. Scott Morgan; 2, Mr. Browning; 4, Mr. Diddon. A.O.V. Tropical: 1, Mr. Andrew (Best Fish in Show); 2, Mr. Vozary; 3, Mr. Scott Morgan; 4, Miss Corney. Novice: 1, Miss Corney; 2, Master Brown; 3, Mr. Elick. There were 194 entries in the show.

CHANGES of officials at the last Annual General Meeting of the Stockton-on-Tees A.S. were as follows: Chairman, Mr. D. Keighly; Vice-Chairman, Mr. A. Stevenson; Hon. Secretary, Mr. W. Bowman; 2 Secretaries, Clive Parfield, Stockton-on-Tees; Hon. Treasurer, Mr. J. Andrews; Show Secretary, Mr. J. Chamberlain, 15 Taffing Street, Stockton-on-Tees; Committee Members: Mrs. B. Clennett, Mrs. S. Smith, Mr. B. York, Mr. D. Clark, Mr. K. Clennett. The plaque for the "Years Points Championship" was awarded to Mr. J. Chamberlain.

A Table Show was held featuring all fish which received first and second places for the previous year. This resulted as follows: 1 and 3, Mr. and Mrs. K. Clennett; 2, Mr. W. Bowman. Membership now stands at 70 and anyone interested should contact the Secretary at the above address.

THE first of this year's series of annually held interclub Table Shows between Southend A.S., Basildon A.S. and Thurrock A.S. was held recently at the Thurrock A.S. headquarters. The attendance was most encouraging amounting to over 50 enthusiasts and their families. Mr. Dodds of the East London A.S. spoke on "Composition of Water in Fish Breeding". He included in his talk a number of examples and literature to add visual interest to a most informative lecture. Mr. Jenney the Chairman of the Federation of British Aquarists judged the 71 fish brought, which were in four classes, Barbs, Fishes, E.L.T.C.'s and Fishers. The results were as follows: Barbs (30 fish brought): 1, Mr. Cheswright (Tiger) Southend, 79 pts; 2, Mr. Lupton (Aurife) Basildon, 78 pts; 3, Mr. Davis (Tiger) Basildon, 77 pts; 4, Mr. Edward (Shepherd) Southend, 76 pts. Fishes (19 fish brought): 1, Mr. Hendle (Barnet),

79 pts; 2, Mr. Hendle (Red) Thurrock, 78 pts; 3, Mr. Durrant (Yellow Wag) Thurrock, 77 pts; 4, Mr. Nichols (Vivian) Thurrock, 76 pts. E.L.T.C.'s (31 fish brought): 1, Mr. Durrant (Aph. Australis) Southend, 79 pts; 2, Mr. Edwards (P. Playfairi) Southend, 77 pts; 3, Mr. B. Nichols (Aph. Australis) Thurrock, 76.5 pts; 4, Mr. Wills (Aph. Callisoma) Southend, 75 pts. Fishers (11 fish brought): 1, 2, 3 and 4, with 78, 77, 76 and 75.5 pts respectively Mr. D. Durrant, Thurrock. Best Fish in Show went to Mr. D. Durrant (Red Fishers). The positions after this first leg are: 1, Thurrock, 29 pts; 2, Southend, 9 pts; 3, Basildon, 5 pts.

FOUR hundred fish were on view at Gosport A.S. last Open Show which proved an outstanding success. The full results were: Groupers: 1, D. Johnson; 2, C. Walker; 3, W. Berridge; Mullus: 1, J. Burton; 2, I. Aston; 3, W. Berridge; Serranids: 1, D. Scragg; 2, I. Fletcher; 3, W. Berridge; Platies: 1, Mrs. H. Crook; 2, G. Hodgkinson; 3, J. and H. Derry; Characins (small): 1, W. Booth; 2, W. Parker; 3, Mr. Woodhead; Characins (large): 1, I. Robinson; 2, E. Price; 3, Mr. Mullis; Corydoras Catfish: 1, J. Robinson; 2, P. Fitter; 3, A. Middleton; Loaches: 1, M. Park; 2, G. Hodgkinson; 3, J. Johnson; A.O.V. Catfish: 1, Mr. Mullis; 2, W. Parker; 3, A. Mansell; Barbs (large): 1, Mr. Park; 2, Mr. Parkin; 3, D. Crook; Barbs (small): 1, J. Nelson; 2, W. Booth; 3, R. Tomkinson; Fishers: 1, W. Booth; 2, G. Hammett; 3, J. Squires; Gouramis (Dwarf): 1, E. Price; 2, J. Hodgkinson; 3, Miss D. Smith; Gouramis (A.O.V.): 1, J. and H. Derry; 2, D. Ledger; 3, B. Frewer; Cichlids (Dwarf): 1, A. Mason; 2, J. and H. Derry; A.A.C. Bright: Angelfish: 1, P. Woodward; 2, G. Hodgkinson; 3, E. Davenport; Cichlids (A.O.V.): 1, D. Crook; 2, M. Jones; 3, Mr. Park; Killies: 1, W. Parker; 2, G. Hodgkinson; 3, G. Hammett; Rainbow, Mollies and Danios: 1, Master D. Slater; 2, J. Ingram; 3, Mr. Park; Labors, Sharks and Flying Fishes: 1, Mrs. Woodhead; 2, D. Johnson; 3, Mr. Mullis; Paris Livebearers: 1, A. Morrow; 2, R. Priston; 3, J. Woodhead; Paris Livebearers: 1, W. Parker; 2, Mr. and Mrs. Charlton; A.O.V. Tropical: 1, W. Parker; 2, R. Tomkinson; 3, J. Woodhead; A.O.V. Coldwater: 1, M. Piller; 2, Miss J. Phillipson; 3, D. Crook; Mini Tanks: 1, J. Ingram; 2, Mrs. H. Lomas; 3, Mr. and Mrs. Charlton; Breeding Angelfishes: 1, W. Booth; 2, P. Fitter; 3, Mr. and Mrs. Charlton; Breeders Livebearers: 1, J. H. Dennis; 2, R. Birch; 3, G. Hodgkinson; Marine: 1, M. Piller; 2, J. Walker. The Judges were Mr. L. McCarty and Mr. B. Moorhouse. Alderman H. Turner presented the prizes.

DURING recent weeks two inter-club Table Shows have been held by **Rotherham and District A.S.** the winners being as follows: 1, D. Jackson (Cardinal); 2, Mr. Dreville (Black Mollie); 3, M. Clives (Lace Gourami). In the freshwater class first place was taken by C. Turner with a Male Guppy, the second being L. Munnery (a junior member) with a Platy (Festival) and third J. Store with a Male Swordtail.

An entertaining afternoon was had by several members who visited the Thorne A.S. Open Show in June. Further trips are being arranged for the future. New members and visitors are welcome at future meetings to be held at the Bridge Inn, details of dates and times obtainable from the Secretary, Mrs. J. Hall, 10 Gosborough Road, Parkgate, Rotherham.

THE Barrow and District A.S. was invited to put on an exhibition of tropical fish at the Victoria Centenary Gala in June. An island stand was erected in the pavilion comprising at ten tables, and even the Club members were surprised at the interest shown. Miss Vickers, elected at the Gala, visited the exhibition and named the various fishes with ease. She proved to be an aquarist herself, but not a member of the Club.

NEARLY three hundred entries were brought at the third annual open show of the Llanrwst Major A.S. The results were as follow:

Silverfish: 1, Mrs. King (Barnet); 2, Mr. Smithson (Bridgend); 3, A. Robertson (Llanrwst); A.O.V. Labyrinth: 1, Mrs. King (Barnet); 2, Mrs. Pease (Llanrwst); 3, J. Sanders (Llanrwst); 4, M. J. Pury (Newport); Heterostegus: 1, A. Robertson; 2 and 4, D. R. Johns (Llanrwst); 3, Mrs. King; A.A.V. Characin: 1 and 2, F. Hall; 3, D. Songhurst (Llanrwst); 4, W. Coombes; A.O.V. Barbs: 1, A. Robertson; 2, A. Rogers; 3 and 4, P. Brown; Male Guppies: 1 and 3, R. Wigg; 2, H. Coombes; 4, P. Hall; Female Guppies: 1, P. Brown; 2 and 4, D. Songhurst; 3, E. Wigg; Platies: 1, A. Rogers; 2 and 4, R. Wigg; 3, T. Phipps (Clary); Swordtails: 1 and 3, L. Linton (Barnet); 2, M. J. Pury; Mullus: 1, P. Harris (Cardiff); 2 and 4, C. Barber (Bridgend); 3, C. Smithson; Catfish and Loaches: 1, S. Nelson (Llanrwst); 2, P. Harris; 3, P. Brown; Corydoras Catfish: 1, 3 and 4, T. Phipps; 2, P. D. Wright; Dwarf Cichlids: 1, P. D. Wright; 2, D. Songhurst; 3, C. M. Barber; A.O.V. Cichlid: 1, W. Gorsall (Cardiff); 2, R. Mann (Newport); 3, P. Hall; 4, E. Wigg; Danios and Rainbows: 1 and 3, P. Hall; 2, M. M. Clark (Barnet); 4, G. Louder (Bridgend); Killifish: 1, P. Brown; 2, N. Coombes; A.O.V. Fishers: 1, P. Phipps (Clary); 2, P. Harris; 3, G. Pease; A.O.V. Livebearers: 1, S. Nelson; Breeder (Guppies): 1, P. Hall; 2, G. Pease; 3, Mrs. King; Breeder (Livebearers): 1, R. Wigg; 2, P. Brown; 3, A. Robertson; Breeder (Guppies): 1 and 2, J. Main (Newport); 3, J. Burgess; 4, R. Wigg; Parrotfish Aquaria: 1, Mrs. Burgess; 2, S. Nelson.

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A.O.S. Catfish: Mr. W. Low; Baiter: Mr. W. Mason; Eggspinner: Toothpaste; J. P. Jones; Brooder: L. L. Toothpaste; Mr. A. Watt; Gouramis (Cichlas): Mr. I. Henderson; Brooder's Cichlas: Mr. J. Turner; Gouramis (Trichogaster): Mr. J. Smith; Brooder's Gouramis (Trichogaster): Mr. J. Turner; Gouramis (Hilastota): Mr. J. Taylor; Stunnet Fish: Mr. A. Naiman; A.O.V. Labyrinth: Mrs. A. McGee; Dwarf Cichlas: Mr. N. Bates; Brooder's Dwarf Cichlas: Mr. E. Watson; Large Cichlas: Mr. A. Sharp; Brooder's Large Cichlas: Mr. E. Watson; A.O.V. Eggspinner: Mr. S. Naiman; Brooder's Plants: Eggspinner: S. Naiman; Special Award Winners were as follows: Mr. E. Ferguson; Characin Trophy: Mr. H. Christie; Barbs Trophy: Mr. D. Carr; Platies Trophy: Mr. J. Turner; Brooder's Trophy: Mr. E. Christie; Best Livebearer Trophy: Special Trophy; Best Fish in Show Trophy and also Superior Best Fish in Show award (Gold Pin). Mr. Rivier's swordtail will be crowned in the Champion of Champions Contest at Manchester.

THE Merseyside A.S. Open Show results were as follows: Groups: 1, W. J. O'Neil (Stafford) 61 pts.; 2, W. Bering (Stockport) 79 pts.; 3, W. J. O'Neil (Stafford) 78 pts.; 4, W. J. O'Neil (Stafford) 78 pts.; 5, W. J. O'Neil (Stafford) 78 pts.; 6, W. J. O'Neil (Stafford) 78 pts.; 7, W. J. O'Neil (Stafford) 78 pts.; 8, W. J. O'Neil (Stafford) 78 pts.; 9, W. J. O'Neil (Stafford) 78 pts.; 10, W. J. O'Neil (Stafford) 78 pts.; 11, W. J. O'Neil (Stafford) 78 pts.; 12, W. J. O'Neil (Stafford) 78 pts.; 13, W. J. O'Neil (Stafford) 78 pts.; 14, W. J. O'Neil (Stafford) 78 pts.; 15, W. J. O'Neil (Stafford) 78 pts.; 16, W. J. O'Neil (Stafford) 78 pts.; 17, W. J. O'Neil (Stafford) 78 pts.; 18, W. J. O'Neil (Stafford) 78 pts.; 19, W. J. O'Neil (Stafford) 78 pts.; 20, W. J. O'Neil (Stafford) 78 pts.; 21, W. J. O'Neil (Stafford) 78 pts.; 22, W. J. O'Neil (Stafford) 78 pts.; 23, W. J. O'Neil (Stafford) 78 pts.; 24, W. J. O'Neil (Stafford) 78 pts.; 25, W. J. O'Neil (Stafford) 78 pts.; 26, W. J. O'Neil (Stafford) 78 pts.; 27, W. J. O'Neil (Stafford) 78 pts.; 28, W. J. O'Neil (Stafford) 78 pts.; 29, W. J. O'Neil (Stafford) 78 pts.; 30, W. J. O'Neil (Stafford) 78 pts.; 31, W. J. O'Neil (Stafford) 78 pts.; 32, W. J. O'Neil (Stafford) 78 pts.; 33, W. J. O'Neil (Stafford) 78 pts.; 34, W. J. O'Neil (Stafford) 78 pts.; 35, W. J. O'Neil (Stafford) 78 pts.; 36, W. J. O'Neil (Stafford) 78 pts.; 37, W. J. O'Neil (Stafford) 78 pts.; 38, W. J. O'Neil (Stafford) 78 pts.; 39, W. J. O'Neil (Stafford) 78 pts.; 40, W. J. O'Neil (Stafford) 78 pts.; 41, W. J. O'Neil (Stafford) 78 pts.; 42, W. J. O'Neil (Stafford) 78 pts.; 43, W. J. O'Neil (Stafford) 78 pts.; 44, W. J. O'Neil (Stafford) 78 pts.; 45, W. J. O'Neil (Stafford) 78 pts.; 46, W. J. O'Neil (Stafford) 78 pts.; 47, W. J. O'Neil (Stafford) 78 pts.; 48, W. J. O'Neil (Stafford) 78 pts.; 49, W. J. O'Neil (Stafford) 78 pts.; 50, W. J. O'Neil (Stafford) 78 pts.; 51, W. J. O'Neil (Stafford) 78 pts.; 52, W. J. O'Neil (Stafford) 78 pts.; 53, W. J. O'Neil (Stafford) 78 pts.; 54, W. J. O'Neil (Stafford) 78 pts.; 55, W. J. O'Neil (Stafford) 78 pts.; 56, W. J. O'Neil (Stafford) 78 pts.; 57, W. J. O'Neil (Stafford) 78 pts.; 58, W. J. O'Neil (Stafford) 78 pts.; 59, W. J. O'Neil (Stafford) 78 pts.; 60, W. J. O'Neil (Stafford) 78 pts.; 61, W. J. O'Neil (Stafford) 78 pts.; 62, W. J. O'Neil (Stafford) 78 pts.; 63, W. J. O'Neil (Stafford) 78 pts.; 64, W. J. O'Neil (Stafford) 78 pts.; 65, W. J. O'Neil (Stafford) 78 pts.; 66, W. J. O'Neil (Stafford) 78 pts.; 67, W. J. O'Neil (Stafford) 78 pts.; 68, W. J. O'Neil (Stafford) 78 pts.; 69, W. J. O'Neil (Stafford) 78 pts.; 70, W. J. O'Neil (Stafford) 78 pts.; 71, W. J. O'Neil (Stafford) 78 pts.; 72, W. J. O'Neil (Stafford) 78 pts.; 73, W. J. O'Neil (Stafford) 78 pts.; 74, W. J. O'Neil (Stafford) 78 pts.; 75, W. J. O'Neil (Stafford) 78 pts.; 76, W. J. O'Neil (Stafford) 78 pts.; 77, W. J. O'Neil (Stafford) 78 pts.; 78, W. J. O'Neil (Stafford) 78 pts.; 79, W. J. O'Neil (Stafford) 78 pts.; 80, W. J. O'Neil (Stafford) 78 pts.; 81, W. J. O'Neil (Stafford) 78 pts.; 82, W. J. O'Neil (Stafford) 78 pts.; 83, W. J. O'Neil (Stafford) 78 pts.; 84, W. J. O'Neil (Stafford) 78 pts.; 85, W. J. O'Neil (Stafford) 78 pts.; 86, W. J. O'Neil (Stafford) 78 pts.; 87, W. J. O'Neil (Stafford) 78 pts.; 88, W. J. O'Neil (Stafford) 78 pts.; 89, W. J. O'Neil (Stafford) 78 pts.; 90, W. J. O'Neil (Stafford) 78 pts.; 91, W. J. O'Neil (Stafford) 78 pts.; 92, W. J. O'Neil (Stafford) 78 pts.; 93, W. J. O'Neil (Stafford) 78 pts.; 94, W. J. O'Neil (Stafford) 78 pts.; 95, W. J. O'Neil (Stafford) 78 pts.; 96, W. J. O'Neil (Stafford) 78 pts.; 97, W. J. O'Neil (Stafford) 78 pts.; 98, W. J. O'Neil (Stafford) 78 pts.; 99, W. J. O'Neil (Stafford) 78 pts.; 100, W. J. O'Neil (Stafford) 78 pts.

The June programme of the Blackpool & Fylde A.S. proved to be an interesting one for most members. The first meeting in the month took the form of a film show featuring a "Look at Life" production about general fishkeeping and also contained a small section on fish collection and shipping. Continuing with the current fund raising scheme to enable the Society to buy their own 16 mm projector, the second meeting brought the resident astronomer, Mr. Fred Williams to

the fore. The club is now more than half-way towards the cost of the projector. Recently the Society was asked to put on a float in a procession organised by the local Round Table. The float consisted of three ponds in a grass verge and a simulated waterfall running from each one, the crowning glory of the float being a live swordtail and her two swordtails. Meetings of the club are held bi-monthly at the Veevers Arms Hotel, Colson Street, or details can be obtained from B. Turner, Publicity Officer, 3 East Road, Blackpool, telephone 22524.

MEMBERSHIP had increased slightly and more awards had been won at Open Shows, the Annual Meeting at the **Blood and District Aquarist and Pondkeepers' Society** was held recently. With two exceptions the old committee were re-elected. Also two new committee members, Mr. and Mrs. Woodley, Officers: President, Mr. V. Price; Chairman, Mr. A. Stuchling; Secretary, Mr. B. Bush; Treasurer, Mr. M. Brill; Show Secretary, Mr. H. Rogers.

During the evening the June Table Show entries were judged and winners presented with their certificates. Goldenfish: American Comet, Black Moor, Calico Comet (all Mr. Ratham). Brooder's pair: Black Lyretail Mollie (Mr. Stuchling); Bony Barbs (Mr. Hartman); Eggspinner: Mouthbrooder (Mr. Ratham); Sunset Platies (Mr. Stuchling); Tropical Catfish: Bronze Catfish (Mr. Hartman); Corydoras Palawan (Mr. Ratham); Corydoras Julia (Mr. Brill). A SLIDE and tape show of the B.R.C.S. was viewed by the members of the **Merseyside A.S.** on its first meeting in June and was contained by the club's B.R.C.S. member J. Bowers at the second meeting. Also the members discussed the forthcoming **Staines General** and the club's entry in the hobbyist exhibition. The first table was 4 ft. x 4 ft. furnished and the judge complimented the showing members on a very good first effort. The placings were 1 and 3, Mr. Pollan; 2, Mr. MacDowell. The second competition was for Barbs and A.O.V. The results of the Barbs class was as follows: 1, P. Goswami; 2, E. Parry; 3, V. Robinson. In the A.O.V. Class the placings were: 1 and 3, P. Goswami; 2, M. Hickbottom.

NEW SOCIETY
The **Blackburn Aquarist Society** has reformed being an entirely new club. The meetings are being held at the Knowley Arms, Pockness, Blackburn on the second Wednesday of each month. New members can be assured of a warm welcome and an invitation is extended to all other clubs in the area. The Secretary is Mr. P. J. Whelan, 109 Dawson Drive, Shadsworth, Blackburn, Lancs.

FOR the first meeting in June the **Hull A.S.** entertained the York A.S. to a friendly show of fish. There were 78 entries altogether and these were judged by Mr. Cawood and Mr. Duffield. The second meeting was a full evening's entertainment. There was a very interesting and constructive lecture given by Mr. J. H. Watson on breeding of livebearers, including rearing of fry and larval showing purposes, and this was followed by a slide show "Something Different". At this meeting there were 40 members present.

AQUARISTS' CALENDAR
7th-12th August: Portsmouth A.S. Open Show.
22nd-26th August: British Killifish Association. Second International Killifish Show, Bingley Hall, Broad Street, Birmingham.
22nd-26th August: Milland Aquarist and Pond Society. Annual Open Show at Bingley Hall, Birmingham. Show schedules from Mr. J. Wynn, 120 Franklin Road, Kings Norton, Birmingham, 50.
26th-27th August: Harlow A.S. Aquatic Show. Secretary Mr. J. Duncan, 28 Lang House Rush Fair, Harlow.
26th-27th August: Otum A.S. Annual two-day Show.

2nd September: High Wycombe A.S. Annual Open Show at the Rye, High Wycombe. This will include a Guppy Show staged by the Three Counties section of the F.O.B.S. to be judged under their rules. Details for both sections from Mr. C. Pate, 16 Ashley Drive, Tylers Green, Penn, Bucks.
2nd September: Vale and District A.S. First Open Table Show. Schedules from Show Secretary, Mr. J. B. Powell, 114 Cranleigh Court Road, Vale, Glos.
2nd September: Harlepool A.S. annual show. Labour Hall, Park Road, Harlepool. Show Secretary, Mr. R. Hay, Harlepool A.S., 84 Portland Avenue, Billingham, Co. Durham.
2nd September: Rugeley and Redhill A.S. First Open Show. Secretary (Spoke) Mr. E. Bax, 106 Lee, Worcester Road, Leighton.
2nd September: Valley A.S. Second Open Show. Civic Hall, Rampton, Leicestershire. All details from the Secretary, Mr. J. Haverworth, 25 Brookside Crescent, Greenmount, Nc. Bury, Lancs.
8th-10th September: Nottingham and District A.S. Open Show at the Drill Hall, Triumph Road, Nottingham.
10th September: Huddersfield Tropical Fish Society. Fifth Open Show. Secretary, Mr. L. Kaye, 6 Totnes, Huddersfield, Huddersfield.
10th-10th September: Bristol A.S. Annual Open Show at Bishopston Parish Hall, Gloucester Road, Bristol. Hon. Secretary, Mr. W. G. Hart, 18 Imperial Road, Bristol, 4.
10th September: Newport A.S. annual Open Show. Duffryn Junior High School, Snow Hill, Newport. Show Secretary, Mr. M. J. Parry, 45 Wymant Drive, Gabailla, Cardiff.
10th September: Hounslow and District A.S. open show. Haleside School, Hounslow, Middle. Show schedules are obtainable from Mr. Derek Woodward, 18 Ellerside Road, Hounslow, Middle.
17th September: Atherton A.S. Open Show. Show Secretary, Mr. A. W. Spencer, 15 Orchard Close, Wetherley, Atherton, Warrington.
17th September: Bradford and District A.S. second Open Show at The Tuxton Hall, Westgate, Bradford, 1.
17th September: Federation of Scottish Aquarist Societies Convention. Co-operative Society, Canal Street, Perth. Secretary, Mr. D. MacIntyre (McIntyre's Aquarists).
22nd September: Bocknell & District A.S. Open Show, Victoria Hall, Bocknell, Berks. All available details from Show Secretary: Mr. B. Johnson, 18 Highfield Close, Covey, Farnborough, Hants.
24th September: Blackpool and Fylde A.S. Open Show at Harrogate Solitium, South Pennington, Blackpool.
24th September: Mowbray A.S. Open Show. St. John Fisher School, Ormskirk Street, Chairman. Schedules are obtainable from Mr. K. Brown, 5, Allison Avenue, Gillingham, Kent.
1st October: Heywood and District A.S. Open Show at Labour Club, Bridge Street (opposite Seven Stars), Heywood, Lancs.
7th October: Mid-Hants A.S. Open Show at The Pavilion Hotel, Victoria Street, St. Albans.
7th October: East London Aquarist and Pondkeepers' Association Annual Open Show. Show Schedules available from Mr. G. Green, 70 Baron Avenue, Rush Green Road, Romford, Essex.
26th-28th October: British Aquarists' Festival, held at the Zoological Gardens, Manchester. Details from Mr. G. W. Cook, Spring Grove, Field Hill, Batley, Yorks.
12th November: N.E.L. Aquarist Society. Secretary, Mr. R. Watt, 99 Warwick, East Kilbride.
18th November: Dewsbury and District A.S. Third Annual Open Show. Venue details, etc. to be announced later.
20th November: Fox, Feather and Aquaria Show organised by the Borough Council of the London Borough of Hackney, King's Hall, Lower Canon Road, E.8.
26th November: Leeds and District A.S. Open Day Show.
3rd December: Aishborough & District A.S. Annual Open Show.

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