

December 1956—January 1957

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WATER LIFE

and Aquaria World



PRINCIPAL CONTENTS

Care and Breeding of Livebearers

Characin in Festive Mood

Gold-star Tropical Aquarium

British-bred Pompadours

Points for Goldfish Fanciers

Less Common Livebearers

WATER LIFE

AND AQUARIA WORLD

FRONT
COVER



Neon Tetras (*Hyphessobrycon innesi*) are native to some waters at the source of the Amazon in Western Brazil and Eastern Peru. These fish grow to 1½ in. long and mature females are plumper than the males. An article on the species appears on page 266.

Photograph

[G. J. M. Timmerman

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The Common Bond

IT takes all sorts to make a popular hobby. That is just as true of livestock pursuits as any others. We cannot exclude fishkeepers or put them on a different level just because they share the same interests as ourselves. Our hobby embraces all sections. Some are prepared to expend endless energy in an attempt to breed a fish which exists only as a figment of their imagination. Others derive untold satisfaction by producing a profusion of Guppies or some other prolific livebearer. At the opposite end of the fish-room are the specialists pondering over the dimensions of a fish's tail fin or discussing whether eyes on stalks should be celestially or laterally inclined.

They are good folk, all of them, fitting in neatly to a complex cross-section of human nature. Take Bill Jones who sees no further than beetles or bugs. What better person is there to look through that last batch of livefood we collected? If he nets out a vicious *Dytiscus* beetle, we are both happy. Then there is Fred Smith with a flair for electricity. Would he rough out a circuit for that new aquarium? Of course he will, and he'll no doubt offer to do the job for us.

Whilst making this analysis we should not forget the services of our local trader who dispenses our weekly portion of *Daphnia* or comes to the rescue with a spare thermostat tube just when our favourite fish is about to turn keel uppermost.

At the Centre

Maybe we have looked on the rosy side of the hobby. Maybe—but at the heart of the fancy is the man or woman whose motives are good, the person who achieves no satisfaction from either getting more than a fair reward from his hobby or claiming verbally more than his experience justifies. He (or she) is the true fancier who can, on occasion, deferentially remind the person who is out of step that it is time a return was made to the pure culture of fish.

But this is the season of goodwill, a time when we can look back over the year and agree that our hobby is largely a happy one, where comradeship prevails because of a shared interest. That common bond is based on the finest of foundations, a genuine fascination in natural things. The compliments of the season to you all; we are proud to share your hobby.

COVER
FISH
SPECIAL

Characin in Festive Mood

The Peaceful Neon Tetra with its Brilliant Red and Green Colouring and Streamlined Shape

NEON TETRAS for the Christmas issue of WATER LIFE are no idle choice. Here, in 1½ in. of streamlined Characin, we have the most startling colours to be found in any tropical aquarium fish. It may seem strange to us now that 21 years ago no aquarist had seen Neons; it was not until 1936 that they became available and were named by Dr. George S. Myers as *Hyphessobrycon innesi*, in honour of the aquarium pioneer of America, W. T. Innes.

Neons came to Britain in October 1936, and what a furor they created. The pre-war WATER LIFE for November 24, 1936, waxed eloquent in its heading—"A Fish to Dream About". Maxwell Knight, the author of the article under which it appeared, wrote—"No ordinary words of praise or simile of beauty suffice to describe this lovely little fish," whilst Dr. Werner Ladiges in a German periodical, called it "A fish jewel".

Alternative popular names for it were bandied around including the Humming-bird Fish and the Coronation Fish. W. T. Innes tells us that when the Neons arrived in the States several aquarium clubs excluded them from "best fish in show" competitions because they were an automatic choice!

We have travelled a long way since then; Neon Tetras, which in 1948 sold at £2 2s. 0d. apiece, reached what was no doubt an all-time low figure in the Summer of 1956 when several traders offered them at 3/6d. But still consistent breeding successes elude British breeders whilst Germans are producing them by the thousand.

Spectacular in Shoals

Few will need a description of the Neon Tetra and, in any case, the cover picture tells its own story. It is just worth emphasising the brilliance of the green lateral line and vividness of the broad red streak below it. Although the species is commonplace in 1956, a tank of Neons is still spectacular. Neons really look better in an aquarium to themselves or at least with other Characins only.

Hyphessobrycon innesi has proved an easy fish to keep in the aquarium for, although its native waters are doubtless acid and soft in character, it will adjust itself without distress to practically any water we are likely to provide. It is inoffensive and a good adult length is 1½ in. Rather less than harsh top lighting is suggested to see the fishes' colours at their best.

Breeding Neon Tetras has proved more than a match for nearly all home aquarists. We had a German method given us but no phenomenal successes were reported from following it although others may care to try. A small (12×10×10 in.), all-glass tank is sterilized. Distilled water is added to a 4½ in. depth and stood for 14 days. A solution is then prepared in a glass or china jar by pouring distilled water over dried oak and elder bark, followed by filtering through glass wool until it is quite clear. Add this solution to the water in the breeding tank until the pH reading is 6.5. A bunch of Willow Moss (*Fontinalis*) is cleaned by immersing it for five minutes in a solution of one teaspoonful of alum to 1½ pints of distilled water. The *Fontinalis* is then rinsed and placed in the centre of the breeding tank, allowing sufficient clear areas for the fish to drive at breeding time.

A mature, well-matched Neon pair, at least nine months

old, are then transferred to the breeding tank by means of a dip tube. The breeding aquarium should have subdued light and, immediately after spawning, the fish are removed. The tank is then shaded to exclude all light for 24 hours. Brine Shrimps are given to the fry after three or four days and the breeding temperature should be 73½-74 deg.F.

L. Naylor of Birmingham has had appreciable success with Neons, but not with the regularity he had hoped. Early spawnings resulted in 86, 83 and 63 fry being reared but later attempts proved rather less successful. He concluded in an article in the August 1955, issue, that soft water with a low pH was needed although the age of the water did not seem to matter unduly. Whilst strong light did not appear to help the eggs and Mr. Naylor generally blacked out the aquarium for 48 hours after hatching, he had also had eggs hatch when the tank was unshaded. He did not regard temperature as critical but thought the middle seventies were the best.

Some Australian reports give support to the idea that extravagant preparations are not absolutely necessary,



Photograph]

[E. L. Telfer

A shoal of colourful Neon Tetras (*Hyphessobrycon innesi*).

provided the water is soft and acid and sterile spawning media are used.

To add final savour to this account mention should be made of the new Cardinal Tetra, which, from published accounts, appears to be the Neon's larger and more colourful brother. The new fish has two scientific names, *Chirodon axelrodi* and *Hyphessobrycon cardinalis* at present, and the question of which one has priority is being tackled by the International Commission of Zoological Nomenclature.* Descriptions of the new fish† are glowing. It is referred to on page 272.

* Bull. Zool. Nomencl. Vol. 12, Part 6, August 1956.

† WATER LIFE, p. 80, April 1956; p. 135, June 1956; p. 189, August 1956.

Roy and Gwen Skipper (Hendon A.S.) Give

More News about the British-bred Pompadours

READERS will recall that in the article where we gave details of our breeding of Pompadours (*Symphysodon discus*) in the June 1956 issue, we mentioned that young specimens had been sent to a scientist at Nottingham University for micro-analysis of the stomach contents. The scientist was Mr. G. R. Fish, B.Sc., who is a specialist on the digestive organs of fishes.

Mr. Fish wrote: "I examined the young fish immediately and am glad to say that they were in good condition. The gut contents were mostly unrecognisable. Large numbers of living bacteria, mostly motile short and long rods, were present. Also there were filaments of green algae, not in quantity but present in all the fish. Some of the cells had contents but the majority were empty although the cell walls did not seem to be damaged.

"The alga was an unbranched filament with a pointed tip cell. The chloroplast shape was similar to that found in *Oedogonium* species. If, as I think likely, this forms part of the diet of the fish, it is consistent with the pulling and jerking [from the adults' bodies] you noticed."

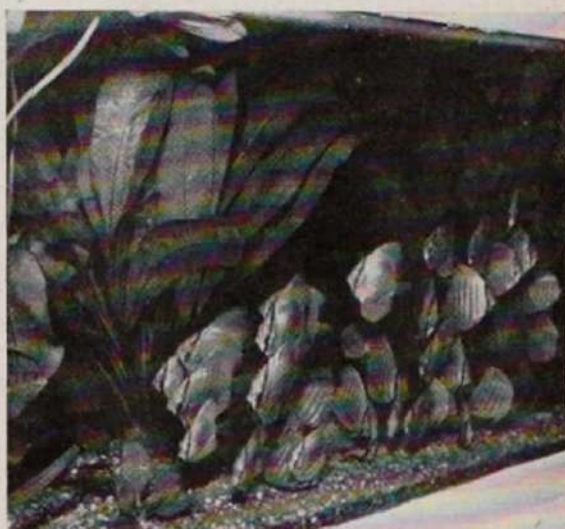
Feeding on Bacteria

Because of the complicated work with the microscope that bacteriology entails, we decided to discount the bacterial angle although it has been proved that some Cichlids actually digest huge quantities of bacteria ("The Food of *Tilapia* in E. Africa"—G. R. Fish, 1955).

We thought it likely that the *Oedogonium* alga was the most likely answer. Pure cultures were obtained and we proceeded to grow it in quantity. The curator of the Culture Collection of Algae and Protozoa at Cambridge University informed us that at certain stages and under certain conditions the algae became free-swimming as zoospores and he gave us instructions to enable us to produce this stage artificially.

Thus armed, we proceeded to map out the order for the next experiments. We decided to introduce the algae in three ways: (1) in its epiphytic stage; (2) as zoospores; (3) on "hosts", or foster parents.

The third experiment was the outcome of certain theories we had formed. If the food the young fry found on the bodies



Photograph

[R. Skipper

A group of the author's Pompadours at six months of age.

of the parents was present in the water at some stage, it seemed possible for this same mysterious "something" to attach itself to another fish. We now looked round for a willing "hosts" and settled on a *Plecostomus* Catfish and an *Ampullaria* snail. These were introduced into a tank containing the same water as our breeding tanks, and to this was added the *Oedogonium*.

We did not have long to wait for another spawning of Pompadours which was quickly removed and subsequently hatched. As soon as the fry became free-swimming we introduced some of the *Oedogonium* culture; firstly the epiphytic stage and then the free-swimming spore stage. Alas, both of these were totally ignored.

Introduction of "Foster Parents"

Undaunted, we caught up the *Plecostomus* and dropped it into one of the nursery tanks; at the same time the *Ampullaria* snail was introduced into another similar aquarium, the spawning having been divided into two.

Things did look a little promising at first as several of the fry seemed to nose around the hosts, but our high hopes were short-lived because the fry soon ignored the foster parents completely and spent their time aimlessly searching for the "something".

At this point some of the fry were removed by pipette and placed in the tanks with the parents. In no time at all they were at the adults' sides, feeding hungrily. However, the parent fish were most indignant and whipped round in fury to eat the young fish. The same procedure was tried

(Continued next page.)



Photographs

[C. van Duijn and J. Clegg

Left, Desmobacteria (magnified). Right, Vorticella (magnified). Either might prove to be the first food of Pompadour Fish fry which they take from the parent fishes' bodies.

Water—the Basis of Fishkeeping

Natural Waters—Increased Acidity May Cure White Spot—
Vigorous Plant Growth—Poisonous Metals—Water Hardness

By WATER LIFE Analyst

AS this is the final contribution in the series it will be as well, perhaps, to reiterate briefly some of the more important points that have been made in previous articles.

It has been stated that water running off hard, impervious rocks into mountain lakes retains the physical characteristics of the original rain. These lake waters are not only very soft (rarely exceeding 5 parts per million of calcium carbonate) but, due to the high content of dissolved carbon dioxide, are acid in nature. Such waters are of a very high order of organic purity and are also well oxygenated but, because of the low content of calcium salts, will only support a very sparse and limited variety of animal and vegetable life.

Water draining from moorlands also retains its softness but acquires a high degree of acidity by the leaching of organic acids from peat. Many waters of this kind are virtually sterile and will not support any kind of aquatic life except that of a very specialized nature. Waters from moorlands are always very heavily contaminated by organic matter of vegetable origin.

Effect of Chalk Sub-soil

Rain water draining through chalk sub-soil is neutralised of its dissolved carbon dioxide acquiring a calcium carbonate content. It is hard in character having a calcium carbonate content ranging from 100 to 300 parts per million (even more in some instances). Water of this type may be regarded as being capable of giving maximum productivity in relation to plant and fish life. It will be remembered that hard waters may be treated with phosphoric acid in order to still further increase their productivity.

In passing, and as a point of interest, it can be mentioned that on two occasions I had obtained tropical fishes (Neon Tetras and Harlequins) which were heavily infected with White Spot disease. Each time this disease was eliminated from the fishes in four days by increasing the acidity of the water in heavily planted tanks to a pH value of 6.0 with phosphoric acid. The water was maintained at this degree of acidity for a further week and a hundred per cent cure was effected on 30 Harlequins and 20 Neons. The plants were quite unaffected by this treatment.

Comment has been made with regard to the importance

British-bred Pompadours

(Continued from previous page.)

with two other adult pairs and in each case the fry made a bee-line for the adult fishes' sides and proceeded to feed prior to being eaten themselves.

We are now interested in the chapter from C. van Duijn's book, "Diseases of Fishes" that deals with "Harmless Organisms of the Skin". Here the author states that the Infusoria, *Vorticella* and also *Desmobacteria* are sometimes found on slow-moving fishes.

We believe it possible that the young fish take *Desmobacteria* as their initial food but, nevertheless, we plan to try *Vorticella* on the next batch of baby Pompadours; it is plentiful right now and we anxiously await a spawning from the Discus.

of plant life for the maintenance of a high concentration of dissolved oxygen and, relative to this, it will be remembered that super-saturation may occur during the hours of daylight when algal growths are allowed to develop.

Vigorous growth of rooted plant life in a tank will supply the constant demand made for dissolved oxygen and under these circumstances a high population of aerobic bacteria will be maintained which is necessary for the complete breakdown of polluting organic matter into harmless inorganic end-products. I believe this biological oxidation of organic matter is the only satisfactory way in which pollution in static water may be kept to a minimum and the dissolved oxygen content at a maximum concentration.

Harmful Metals

Metallic contamination of water and the metals which are known to be definitely toxic to fish life in low concentration have been discussed in some of the previous articles of this series. Copper and its alloy brass are known to be deadly in extremely minute quantities. A concentration of only 0.5 parts per million of copper is usually fatal to Carp within a few hours. It has been pointed out that concentrations of this order have been found to be present in domestic supplies where copper tubing has been used in the plumbing system. Zinc poisoning of fishes has been a subject of much recent research and it would appear that, whilst 1 part per million is toxic to adult freshwater fishes, much smaller concentrations will kill the ova.

This series of articles has, of necessity, trespassed into many fields of science and has lightly touched upon those of biology, botany, bacteriology, chemistry and the physiology of fishes. I hope readers have found something of interest and that a desire to experiment has been stimulated so that there will be an endeavour to maintain even more beautiful aquaria; it will then be found that water is indeed the basis of fishkeeping.

Relation of Water Hardness Expressions

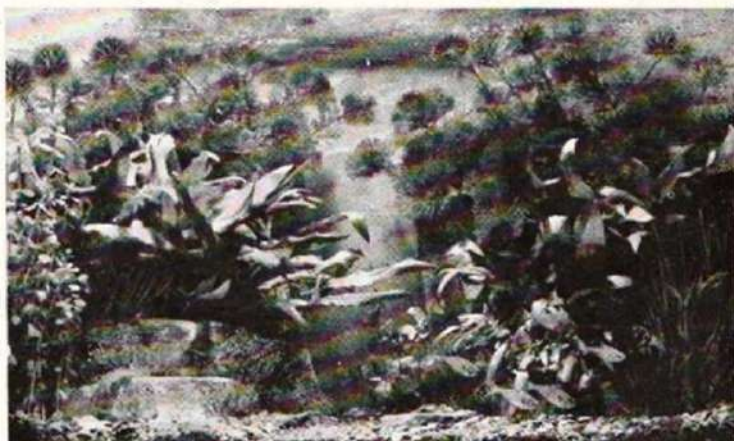
Finally, and by request, I give a conversion table for hardness.

CONVERSION TABLE FOR HARDNESS

	PARTS PER MILLION	GRAINS PER GALLON	PARTS PER 100,000	GERMAN DEGREES	PER CENT
Parts per Million as CaCO ₃ (Chalk)	1.0	0.07	0.10	0.056	0.0001
Grains per Gallon (Degrees Clark) as CaCO ₃ ..	14.3	1.00	1.43	0.80	0.00143
Parts per 100,000 as CaCO ₃ ..	10.0	0.70	1.00	0.56	0.0010
German Degrees. Parts per 100,000 as CaO (Lime) ..	17.8	1.24	1.78	1.00	0.00178

Gold-star Tropical Aquarium

CONSIDERABLE interest was shown in the superb tropical furnished aquarium set up by A. Baldock for the Hendon society at Stoke Newington's Autumn Show. It gained an F.B.A.S. Gold Star with 91 points out of 100 and the exhibitor here gives details of the plants, fish and layout he employed.



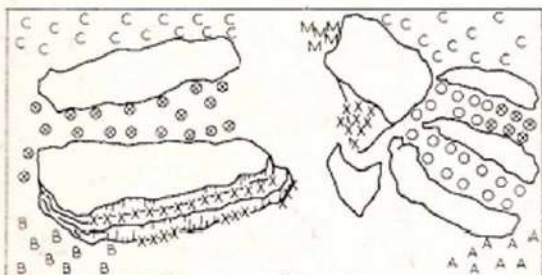
IN sorting out the grey Devon rock, veined with white quartz, for this set-up I found two pieces with very similar frontal contours which, when placed one upon the other, formed a ledged rock with a crevice suitable for a planting of tropical Willow Moss (*Fontinalis gracilis*). This forms the left foreground of the aquarium.

The right-hand side of the tank is made up of rocks of increasing height, providing troughs of deep compost (grey)—ideal situations for the deep rooting *Cryptocoryne beckettii* and *C. cordata*. Similar conditions were provided for the *C. cordata* on the left-hand side which is backed by a taller slab of rock overhung with *Cabomba*.

Achieving Height

The large rock in the right-centre background gives height to the setting, and is planted at the base with *Fontinalis gracilis* and *Macuillamia rotundifolia*. To complete the picture the left and right front corners are planted with "*Bacopa*" (*Hydrotrida*) and *Acorus*, respectively.

The fish are a colourful collection of Characins, being three *Hyphessobrycon* species—Neon Tetras (*H. innesi*), Lemon Tetras (*H. pulchripinnis*) and Serpae Tetras (*H. serpa*).



C - CABOMBA
O - CRYPTOCORYNE BECKETTII
B - "BACOPA" (HYDROTRIDA)
XXX - FONTINALIS GRACILIS
M - MACUILLAMIA ROTUNDIFOLIA
A - ACORUS

Plan of the prizewinning tropical aquarium shown in the Roy Skipper photograph at the head of this page and described by A. Baldock. Maximum plant contrast is achieved whilst adequate swim space is allowed for the Characin species it contains. The clear centre gives a good impression of depth.

Fragrant Water Mint

A Hardy Plant for the Pondsides

By Joan Craxford

THE Water Mint (*Mentha aquatica*) is so typically a mint that it is easy to recognize. But, if ever you are in doubt, just roughly handle the dark green leaves that grow in pairs all the way up its sturdy stem for nobody could mistake the perfume that the bruised leaves give off into the air. It is a heavy, sickly scent, but not at all unpleasant in small doses.

The places to look for this aquatic are on soft, boggy ground, or actually in the water itself. It often raises its head among Water Forget-me-nots that have colonized a stretch of partially submerged bank.

Doubtful Value in Aquaria

Victorian writers on fishkeeping used to recommend Water Mint, or Fish Mint as it is sometimes called, as a valuable plant for the aquarium. They said it helped to keep the water pure. But what they did not explain was that it needed a rich growing medium such as meadow loam or leaf mould, and very shallow water.

In addition to these requirements, Water Mint also requires plenty of unshaded daylight, and as much direct sunlight as possible. As an aquarium plant, therefore, its uses are extremely limited and it is more suited to the garden pond, or bog garden. In both these places it should flourish and provide aromatic foliage and attractive lilac-coloured flowers to enhance the Summer days.

Summer Season

The plant is at its best about the middle of June, but keeps in character until September, when it dies down until the following Spring. It may be increased by division of the roots or by setting cuttings. Apart from its use as a decorative plant for the water's edge, the leaves of the Water Mint may be dried and used to impart fragrance to herbal tobacco or herbal sachets. Unlike so many of the mints, it is of no culinary value in the kitchen.

Diary of a Pondkeeper

Northern Trial Grounds—Effect of Weather on Floating Plants—a Choice of Ornamental Grasses

I SPENT an extremely interesting half day during the early part of the Summer at Harlow Car which is the trial centre of the Northern Horticultural Society and is situated one mile from Harrogate and 14 miles from Leeds. Started some eight years ago, it is already proving the useful purpose it can serve to northern horticulturists and nurserymen.

My visit was prompted by hearing that alpine and water garden sections were included, although the latter is comparatively new. Part of the alpine garden is very well established while work on its new extension was commenced just over a year ago. A considerable amount has been completed although, at the time of my visit, the parts which had been planted were naturally not thoroughly established.

Outcrops of Rock

In the older section the principle employed, in the main, is outcropping on sloping ground but in the newer part I like the way in which large rocks have been placed so that the general planting areas are raised. This will make the examination of the plants, particularly the smaller-growing species, much easier for visitors. Although the older section is quite attractive, I believe this new part, when thoroughly established, will look even better.

Unfortunately I was unable to visit Harlow when the season for alpine was at its height and much of the bloom associated with the Spring in the alpine garden was finished. Nevertheless, a number of subjects still in flower were obviously doing well. I was impressed by the attractive varieties of Broom to be seen and also the selection of small conifers.

Pond in the Rock Garden

In the lower part of the rock garden a pond is situated and I noticed several Water-lilies were growing in it, but I was unable to find any name plates for them. The pond is more or less circular in shape and of the ground level, informal type with quite a pleasing surround set with alpine and other rock plants. Several conifers were in close proximity to give some height to the scene.

Lower down in the grounds is a stream along the banks of which marsh areas are set with appropriate subjects.



Photographs

View of a lily pond in the alpine section of the Northern Horticultural Society's trial gardens at Harlow Car, Yorks.

By J. Stott

The stream garden at Harlow Car where the left-hand bank is used as a trial area for *Astilbes*, *Primulas* and marsh *Irises*.



There was a nice display of *Trollius* (Orange Queen variety) making a splash of golden colour. Over the other side were *Primulas*, *Irises*, *Spiracas* and *Astilbe* while, along the path edge at the side of the stream, carpeting plants such as *Thymus serpyllum* and the like were planted.

There is much to interest the gardener at Harlow Car and I can strongly recommend a visit. Those aquarists societies within travelling distance would find it a good venue for a day's coach outing especially if the membership included pond and water garden enthusiasts.

Results of High Rainfall

In many parts of the country, and mine was one of them, during last Summer the overflow pipes from the ponds were kept constantly in use due to the excessive rain. The torrential downpours and lack of sunshine failed to produce maximum results from Water-lilies but the Water-Hawthorn (*Aponogeton distachyus*) which never seems to be daunted, attempted a brave show. Last Summer did prove beyond doubt that time spent on sound construction and the provision of adequate drainage for those areas of the surround where alpine are planted is time well spent. Also, it illustrated the importance of having a surface dressing which will ensure excessive water quickly soaking away.

Ornamental grasses and rushes should be chosen with care when they are intended for planting by a small pond. I was talking to a pondkeeper the other day who made a wrong choice when he planted his small pond about two years ago and is now regretting it in no small measure. So much so, in fact, that he now intends to carry out a complete replanting in the Spring. My suggestion to him was to try the Lesser Reed Mace (*Typha minima*), which grows to a height of some 18 in. A clump of the Corkscrew Rush (*Juncus effusus* var. *spiralis*), which has a peculiar charm and reaches a height of about 20 in., and one or two patches of Cotton Grass (*Eriophorum angustifolium*), providing splashes of silky-white in the marsh surround, complete a trio of plants that are easy to keep under control. Care in selection is necessary because some of these grasses and rushes are rampant growers when they find conditions to their liking, and they will soon crowd out some of the choicer subjects in a small set-up.

Where space is less restricted, *Typha angustifolia*, *T. gracilis* and *T. latifolia* can be considered. *Scirpus lacustris*, *S. tabernaemontani* var. *zebrinus* and the attractive *Cyperus longus* are three further subjects coming within the 3-5 ft. range.

Marine Aquarium Keeping (5)

British Shore Animals and their Suitability for Aquariums

By J. S. Vinden

A BRIEF survey of the types of animals likely to be encountered when collecting on British shores may be acceptable. In later articles details will be given of species specially suitable for the home aquarium, and on their feeding and general care.

Probably the most common animals of the seashore are those invisible to the naked eye, the *Protozoa*, a group of animals differing from the others, the *Metazoa*, in consisting of one single cell only. This type of animal, as every freshwater aquarist knows, is to be found everywhere, in the sea, fresh water, on the land, and in the form of internal parasites. While protozoans will not be sought for aquarium purposes they will appear very soon in any established tank.

British Sponges

Higher in the Animal Kingdom are the sponges, essentially simple animals that can be found on nearly all rocky coasts. Our British sponges are useless from the commercial point of view, and also for the novice marine aquarist, so we may pass to the next large division of marine animals, the radially symmetrical *Cœlenterates*, a large group of animals containing the hydroids, jelly-fish, corals, sea anemones, and also the familiar freshwater *Hydra*. The *Cœlenterates* are all built up on a rather simple plan; they have little in the way of a nervous system, no blood system, and but a single opening into their bodies that serves both as mouth and vent. Most of them possess batteries of stinging cells (nematocysts) with which they paralyse their prey. Any bather who has come in contact with certain jelly-fish can testify as to their stinging ability. The hydroids are small and easily overlooked, but viewed under a lens or microscope are very beautiful objects indeed. They are too small however for ordinary aquarium purposes but may be kept for study in cabinet tanks.

The life history of some of the hydroids is of exceptional interest. They are all fixed, flower-like animals, but it was discovered during the last century that in some of them there is an alternation of generations, for during the Summer they produce minute jelly-fish or medusæ which are budded off from the parent hydroid. These little medusæ swim like the familiar jelly-fish by contractions of the bell-like body, and when adult they discharge eggs into the water which develop into hydroids like the medusa's parent.

Jelly-fishes are not animals suited for life in small aquaria, but sea anemones are perhaps the best of all our shore animals for the beginner. With the commoner anemones at least, he can hardly go wrong.

Collecting Anemones

There are few animals or plants more beautiful than an expanded sea anemone. The commoner species are usually easy to collect on rocky shores, they are no trouble to feed, they live a long time (nobody yet knows how long), and many of them will reward their owner with broods of young ones.

True corals are rare on the British coasts, we have but two species, and these have a fairly restricted habitat. To the same group belong the soft corals and sea-pens, the *Alcyonarians*. None of these will normally be encountered

between the tide marks, but occasionally masses of a soft coral *Alcyonium digitatum*, or "dead man's fingers", may be found stranded on the beach.

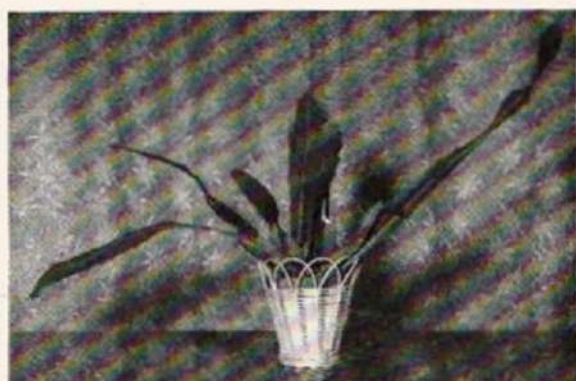
Next, in ascending order, we come to the worms, an enormous group of animals of very diverse form and colouring. Many marine worms are both useful and attractive animals in an aquarium. While the word worm conjures up visions of slimy garden worms many of the sea worms are extraordinarily beautiful and flower-like, and give the most squeamish spectator no feeling of revulsion whatsoever.

The simplest marine worms are the flatworms, some of which are parasitic. Flatworms have no decorative use in

(Continued next page.)

Plants for the Aquarium Surround

Epiphyllums



WHILST some cacti show a distaste for partly shaded indoor positions, the *Epiphyllums* are rather more tolerant although they must receive a fairly generous water allowance, including overhead spraying occasionally. Being epiphytic by nature, they need a rich soil, consisting of equal parts of loam and peat or leaf mould, with the addition of some coarse sand and a small amount of well-rotted manure. A few months in a partly shaded cold frame during the Summer benefits them considerably.

Epiphyllums are a bold, dark green in colour and the growth above ground is either flat or three-angled, especially at the base. The shoots have small depressions on their edges which occasionally bear spines. Beautiful flowers are produced freely by some strains, particularly those from hybrid stock. The individual blossoms may be a variety of colours ranging from white to yellow, red or mauve.

Even if flowers are not produced the succulent and free-growing form of *Epiphyllums* makes them desirable tank associates.

the aquarium, but sooner or later will probably make their appearance having been introduced on weed or rock. The largest of them is scarcely $\frac{1}{2}$ in. long. The threadworms are common and inconspicuous, and once more are of no use as an aquarium ornament, but a near relative, the Red-line Worm (*Lineus ruber*) can be kept if its appetite for bristle worms can be accommodated. Within the same Genus is the so-called Bootlace Worm. Whilst you cannot keep this animal, *Lineus longissimus*, in the aquarium it is of interest owing to its size which causes it to be called the Sea-snake by some people. When stretched out to its full length it may measure as much as 15 ft. It is not likely to be encountered on the beach, however.

Worms of the Shore

Most of the shore worms are related to the familiar Earthworm of our gardens and belong to the *Annelida* (segmented or ringed worms). These are considerably higher in the scale of life than the flat- and threadworms, for they have a well defined nervous system, a blood system and other anatomical features that show them to be more highly developed. Some of them have eyes, and the group as a whole are evolutionarily very successful. They vary considerably both in form and habit and include *Nereis* (the ragworms), *Sabella* (the peacock worm, a very beautiful and hardy aquarium animal), and *Serpula* (another handsome, if small, tube-dwelling worm).

The next group of animals we meet as we ascend the evolutionary scale are the *Crustacea* which includes the familiar shrimps, crabs, prawns and lobsters, and also the less typical forms, the *Cirripedia*, or barnacles. The crustaceans form part of the largest group of animals in the Animal Kingdom, the Arthropods, which include not only the *Crustacea*, but all "jointed animals" such as insects, spiders, and the inconspicuous Sea-spider, *Pycnogonum*, and the very conspicuous marine "living fossil", the King Crab or *Limulus* of the American and Japanese coasts. Some of the smaller crustaceans, the Copepods, exist in countless millions in the surface waters of the oceans, and are the most important ingredient of the animal plankton for they form the food of herrings and other economic food fishes. Copepods may be caught in nets of fine silk, nylon, or organdie and, if obtainable, should always be taken home as food for the aquarium population. Some, if kept by themselves, may breed and provide a small but regular supply of livefood for your stock.

Molluscs as Tank Inmates

After the crustaceans come the molluscs or "shell-fish". Many of these are familiar to everybody for the group not only includes the gourmet's delight, the oyster, and the gardener's horror, the slug, but also the periwinkle of the London costers' barrows. Perhaps not everybody realizes that the intelligent and highly organized Octopus is also a "shell-fish". Many molluscs are useful and pretty aquarium animals, but some must be avoided for one reason or another. Marine molluscs are divided into several groups, the marine snails or univalves typified by the Common Periwinkle, and including the limpets, are too well known to warrant description.

The Sea-slugs are a branch in which the shell has been reduced or is entirely wanting, and the coat-of-mail shells, or Chitons, which bear a superficial resemblance to woodlice (a crustacean) are common on rocks. The bivalves, another familiar group, include oysters, mussels and cockles, and are distinguished as their name implies, by having two shells. The last group of molluscs that concern us are the Cephalopods which include the octopuses, sepia, and cuttle fishes.

The Echinoderms are the next large group of marine animals; they include the interesting sea-urchins, star-fishes, brittle stars, sea-cucumbers and sea-lilies. Their

embryology links them with the same stock that gave rise to the highest group of all the vertebrates. Many of the echinoderms make good aquarium exhibits.

The *Tunicata*, or sea-squirts, the next animals we meet, are of great zoological interest, for in the early stages of their life they have a notochord, a sort of primitive backbone, and they lead a free-swimming existence. Later, as they grow, they change into sedentary animals and lose their comparatively advanced characteristics; they become little more than animated jelly-like bags. Some of these, though not particularly interesting to look at, may be kept in aquaria.

The highest group of all animals is the *Vertebrata* with true back-bones. This group includes fishes, amphibians, reptiles, birds, and mammals, with man himself at the top. The only vertebrates that interest the home aquarium keeper are the fishes, although large public marine aquaria often show turtles, penguins, seals, and, in the past, dolphins and whales.

Shore fishes are for the most part the only ones suitable for home aquaria, and they include such diverse forms as the Fifteen-spined Stickleback and the Cornish Sucker-fish.

It can be seen from this somewhat sketchy résumé of shore life that the marine aquarist need never lack variety in his tanks. Hundreds of species of animals may be kept during the course of years, some of them breed, and much can be learnt from their behaviour.

Cardinal Tetras

By H. J. Marlton

(Durban, South Africa)

WE managed to purchase one dozen Cardinal Tetras (*Hyphessobrycon cardinalis* or *Cheirodon axelrodi*) early this year. When we received them they were approximately $\frac{1}{2}$ in. long and in full colour. After feeding them for some months on Brine Shrimp, they more than doubled their size, reaching a length of approximately $1\frac{1}{2}$ in. and, at this stage, we endeavoured to sex them in the same way as we do Neon Tetras. In this we found we were correct and, fortunately, we obtained five pairs out of the 12 fish.

After many attempts at spawning the Cardinals without success, we eventually were rewarded by seeing one lonely youngster in a breeding tank. Unfortunately the actual spawning had not been noticed and we do feel that possibly most of the eggs had been eaten. However, the parents were removed immediately and, approximately three weeks after the first youngster was observed, we drained off the water and took out the spawning medium when we found that there were actually three young fish which, up to date, are doing very well indeed.

At this stage it should be mentioned that the water in Durban is particularly soft and is ideal for spawning most species of tropical fish. The spawning tank was partially shaded and the temperature was 72 deg.F. We generally stand the water for a week before introducing the fish for spawning.

Unfortunately, although a second pair of Cardinal Tetras spawned their eggs did not hatch and since then we have had no further spawnings whatsoever. Nevertheless, we are hoping that we will be lucky enough to raise more youngsters and thereby establish an aquarium strain. Incidentally, our fish hatchery is managed by Mr. Reinhardt, formerly of Hamburg.

Show Points for Goldfish Fanciers

WITH many years of exhibiting and judging Goldfish behind me I do consider that far too many exhibitors are ignorant of the necessary basic requirements for judging fishes. It is knowledge of the seemingly unimportant things that really matters and lack of it results in adverse criticism of judges, usually unjustifiable. There are several excellent judges' panels operating in various parts of the country, all of whom are doing a great service to the hobby by imparting knowledge to their members.

One of the more difficult tasks of these panels is the overcoming of the human element, i.e., individual likes and dislikes. This human element shows itself in large exhibitions, at which more than one judge is required, by lack of co-ordination between those appointed. For example, judge A. has deducted three points from an exhibit with a hard gill plate, while judge B. has deducted two points from an exhibit with an exactly similar fault. Both judges are capable men and certain in their own minds that they have acted correctly. The result is, of course, misleading to the less experienced exhibitor who eventually concludes that "old so-and-so does not know what he's doing"!

Background and Co-ordination

The object of this article, which will be continued in the next issue, is to provide the essential background for prospective exhibitors, as well as pupil judges, and to endeavour to create co-ordination between judges when operating as panels at shows.

Unfortunately we have in operation at the present time three distinct show standards for Goldfish, all created by bodies of knowledgeable and experienced aquarists. However, the originators of these standards all had one object in view and that was the development of the perfect fish. Therefore a close study of these standards reveals a simi-



Photograph

R. Skipper

WATER LIFE Trophy winning aquarium at the 1956 Olympia show. In his article Mr. Dodge tells what to look for when assessing coldwater furnished aquarium exhibits.

larity of desired characteristics and, allowing for slight modifications to comply with local standards, a really good Goldfish is capable of winning in any part of the country.

Coldwater fish breeding is a long-term policy and one cannot reasonably expect a comparative newcomer to the hobby to attain immediate and continued success in open shows. It is this challenge to one's initiative and patience that creates an enthralling interest for the coldwater enthusiast. The newcomer must be prepared for hard work and endeavour over several years before joining the ranks of the consistently successful few. A case in mind is a

● T. L. Dodge Opens a Two-part Feature for Prospective Coldwater Exhibitors and Judges by Emphasizing the Need for Linebreeding and a Simplified Show Pointing System

certain Midland aquarist, well known for his excellent Shubunkins who, despite starting with good-quality stock, took five years to build them up into one of the best strains in the country, as evidenced by his continued success at leading open shows.

Limiting One's Approach

The average aquarist possesses limited accommodation; limited by reason of the size of his pocket, the size of his garden or fishhouse, and the amount of time he is able to devote to the hobby. Perhaps the best method for him is to study the standards local to him and so decide upon the type of fishes to which he will devote his attention. In this I would advise strict concentration on one particular variety and not risk falling by the wayside as so many aquarists do, by trying to breed too many Goldfish types at once.

The next step is to acquire a pair, or trio (two males and one female), of the best fishes he is able to buy. Breed from those fishes only and never be tempted to introduce fresh blood, however good it appears. Remember, many good specimens arise from commonplace parents but the majority of those same fish invariably throw back to their parents, and the previous hard work of the breeder can be brought to nothing.

It is also a fact that, in spite of actual show standards, specimens will gradually veer from that ideal but will still find favour in open shows. Sooner or later someone realizes that the breeders are deviating from the true course and brings them suddenly back to earth by eliminating the exhibits from the awards and reverting to the true standard. This is one of the circumstances one must guard against, but it requires careful concentration on the true standard—and a great deal of will-power.

Evidence of such deviation with Shubunkins and Calico Veiltails was apparent for four or five years prior to the commencement of the big open shows in 1955. Winning fishes during this period were invariably heavily scaled and showing an abundance of dark brown and black colouring. The sudden reversion to the true standards resulted in disappointment to many formerly successful exhibitors, who blamed the judges for inconsistency. I feel their criticism was justified inasmuch as the same judges were previously responsible for giving premier awards to off-standard exhibits.

Pursuing the Ideals

By breeding rigidly to show standards and scrupulously eliminating all deviations, the breeder will, by careful selection, sooner or later have a strain of fishes of which he can be proud. Premier awards will automatically follow with a consequent reward for his hard work and patience.

It is my considered opinion that if the general features peculiar to various types of fishes are thoroughly learned by the judges then the method of pointing can be kept to a minimum. In all fairness to the viewing public at shows the pointing system should be displayed on all tanks containing winning exhibits. Such a procedure indicates to the less experienced exhibitor the good and not-so-good features of his entries and also educates the public into appreciating

how fishes are judged. The former, moreover, would know exactly what features to eradicate and those to persevere with when making a selection from young fish for future breeding.

The judges' panel of the Midland Association of Aquarists' Societies (M.A.A.S.), for instance, point their fishes as follows: type and colour, 50 points; body, 20 points; finnage, 20 points; and deportment, 10 points. The judges are at the same time conversant with required local features. Compare this method with the old-type one (still in use in some areas) of pointing ten distinct features. It is surely much easier to remember four divisions of points than it is to memorise 10.

Additionally, if the method of pointing is to be displayed to the paying public, as I have suggested, it becomes obvious what it is all about. Conversely, if the obsolete method of pointing is adopted and still displayed to the paying public, the fact that dorsal, caudal, pectoral, pelvic and anal fins were each allotted a certain number of points, conveys nothing to them; they do not know what and where these fins are on the fishes.

Whether the M.A.A.S. judges are pointing single fishes, pairs of fishes, breeders' classes or decorative aquariums, the number of points is still divided into four with, of course, adjustments for varying features peculiar to the particular exhibit. With decorative aquariums, for example, 25 points are allotted to each of the following features: design, technique, fish and plants.

In justification of this method perhaps it would be an advantage to explain it in more detail. Let us take the first characteristics, i.e., "type and colour, 50 points" (25 points are allocated for each). The word "type" covers a very wide field and is primarily intended as an encouragement to selective breeding. It is agreed that a highly developed, man-made Goldfish, the result of years of selective breeding and research, is worthy of higher pointing than, say, the Common Goldfish, excellent specimens of which can often be obtained by the novice from the rag-and-bone man.

Effective in the Midlands

This may not be the perfect answer to the particular problem but it works well in the Midlands and, although not necessarily admitted by certain persons in the fancy, is certainly operative at all the big open shows. How else can one explain why Veiltails, Orandas, etc., which are by no means representative of the show standards, always take premier awards over Common Goldfish which are more or less natural fish and invariably identical to the standards? Therefore, when pointing for "type," the biologically highly developed man-made fish is given more points.

In the case of a Calico fish the 25 points for colour is divided between the six colour shades required and totalled according to their value. With Scaled fishes the points are decided according to the development and quality of that colour. The points labels on the tanks, however, only show the total percentages of points gained for these two main characteristics.

The body (20 points) is judged on its general shape, outline and rotundity. Finnacle (20 points) has three, four or five sub-divisions, depending on the type of fish judged. Again, the points labels show only the percentage of points gained under the general heading "finnacle."

Deportment (10 points) explains itself but caution must be exercised when deciding between, say, a highly developed Lionhead and a Shubunkin. With crested types of fishes, Lionheads, Orandas, etc., and abnormally eyed varieties (Moors, Bubble-eyes, etc.) these characteristics are synonymous with "type."

Regardless of what set of show standards is used and the method of pointing, the placing of the fish will invariably be the same, which fact makes the need for national standards and pointing system even more obvious.

Let us assume then that a pupil or learner judge has been assigned to his first show and is confronted with a coldwater

Fish Philately Atlantic Trout



PRINTED in black against a background of vivid blue, this 100-dinar stamp is one of an animal series issued in 1954 by the government of Yugoslavia. In a series which is notable for restrained elegance of design this stamp is outstanding. It depicts the Atlantic Trout (*Salmo trutta*), a species belonging to one of the most economically important families, *Salmonidae*. Other species in this Genus

include the Atlantic Salmon (*S. salar*) and that highly successful American immigrant to Britain, the Rainbow Trout (*S. irideus*).

The Atlantic Trout has both migratory and purely freshwater forms. It is closely allied to the Atlantic Salmon, but does not die after spawning and does not stop feeding on its return to fresh water. There is still no universal agreement among ichthyologists on the question of the marine or freshwater origins of the *Salmonidae*, but there is a good deal of evidence to suggest they began as freshwater fish. All the Genera, for instance, have freshwater forms, but not one has a purely marine form; all breed only in fresh water, their eggs cannot be fertilised in the sea, nor can fertilised eggs develop; and salmon parr will die if put in sea water.

Apart from their economic importance—they have even been a cause of war between Russia and Japan!—the *Salmo* species are among the most highly prized of sporting fish.

John Wakefield

decorative aquarium. Among the features he must look for is the suitability of the plants to the rockwork, and the relation of both to the design or scheme of things. The fishes must also suit both the plants and the rocks, whilst the plants themselves should, of course, be localized. That is to say, deep water and shallow water plants should not be contained in the same tank, neither should plants from still water be used with those from a fast-flowing stream.

It is quite common to see small pieces of tropical plants in coldwater aquariums and also small portions of garden plants. These little decorative touches may delight the paying visitor but must be down-pointed. The quality of the plants has to be considered as also has the standard of the fishes and it is a sad fact that many otherwise excellently decorated aquariums have failed to gain premier awards because of the poor quality of the fishes in them. Keeping to one particular type of fish is a good policy and will always gain more points than the aquarium housing both pond and aquarium fishes.

Technique is an important consideration and odd bits of dead foliage here and there, roots showing above the compost, fine sand where coarse sand should be used, etc., are all features contrary to what one would expect to find in Nature and must therefore lose points.

Jordanella floridae

An Egg-laying Tooth-carp with Instincts and Intelligence Similar to Cichlids

By R. W. Andrews

THE Tooth-carp *Jordanella floridae*, or Flag Fish as it is popularly called, is, in my opinion, one of the most interesting and satisfying of the smaller oviparous fishes.

I would recommend any beginner who feels the urge to breed egg-layers to try a pair of Flag Fish, for they possess nearly all of the attributes that an aquarist normally asks for i.e., colour, hardiness and no elaborate arrangements needed to achieve a successful spawning. There is just one point which may be held against the species, it is not a good community fish and should have a tank of its own to show at its best.

The male fish is the more colourful of the sexes, having an olive-brown back which merges into yellowish underparts. Nearly the whole of this background is speckled with series of bright green-gold and red scales. A largish gleaming green spot adorns the centre of the side. The finnage, in general, is yellow tinged and marked with red bars and spots.

Drab Colouring in Female

The female displays no outstanding tints, her overall coloration being olive-brown overlaid with an irregular pattern of dark markings. Her dorsal-fin has a prominent dark spot. This duller colouring of the female is a perfect foil to the male's bright hues. Both sexes seem to attain the same size and, although not fully grown until just over 2 in. in body length, they appear to be mature enough for breeding at 1½ in.

Although the Flag Fish belongs to the Egg-laying Tooth-carp Family, it seems to possess certain characteristics which resemble the Cichlids, one of these being the male fish's preferential behaviour in selecting his mate, when faced with a number of females. No doubt spawnings are achieved by just placing a sexed pair of Flag Fish together, but, with a true mated pair, the only trouble likely to arise is how to stop them spawning!

Strong Breeding Instinct

To substantiate my contention, may I digress a little and refer to a mated pair of Angel Fish which inhabit a community tank along with several other Angels and fishes of different species. This mated pair of Angels have spawned on four occasions during the past five months and each time caused much confusion in the tank by their chasing and herding of the other fishes into a corner. On two of the occasions the eggs were deposited on a *Cryptocoryne* leaf, close against the front glass, and during one of these spawnings—as the tank is in my living room—a large audience of noisy humans stood close up and watched the unconcerned Angels carrying out their breeding.

Returning to *J. floridae*, the normal method used to obtain a mated pair is to acquire half-a-dozen young fish, then, when any pair are observed to keep close company and most likely claim a certain area as their own territory—they are the mated pair.

My favoured method for breeding Flag Fish is to use an already well-established tank of 18×10×10 in. or upwards in size, but if a tank has to be specially set up, I first compost

the bottom with a mixture of sand and grit, the entire back half of the tank being planted with clumps of rooted plants. The intervening spaces are filled in with fine-leaved plants so that a thicket is formed.

To fill the tank, it is preferable to transfer water from a previously well-matured aquarium. Where it is necessary to use the domestic supply the tank should be allowed a maturing period of two to three weeks. With an average temperature of 75 deg. F., all is ready for the fish and nothing further need be done except, of course, for routine maintenance and feeding the fish on a good all-round diet of dried and livefoods. The Flag Fish also require plenty of green food to remain in top condition, so if algae form in the tank this is all to the good; otherwise the presence of fine-leaved plants, such as *Nitella*, is essential.

Close Watch on the Fishes

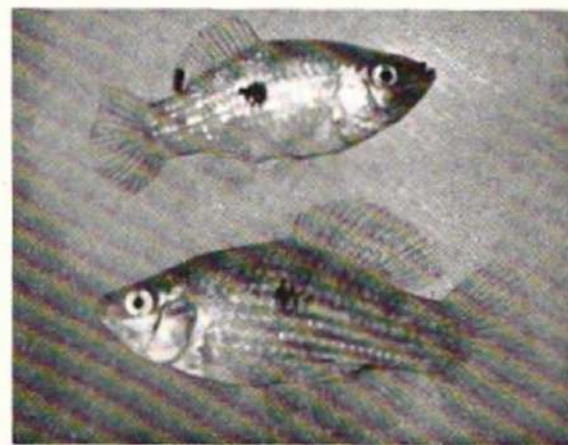
Once the breeding pair of fish are in the tank a watch should be kept for any departure from normal behaviour, which usually consists of both fish remaining for long periods out in the open front area, quietly swimming around. The first sign of an impending spawning shows itself when both fish spend most of the time within the planted area, the male energetically nosing over the bottom, with the female in close attendance. All being well the male will eventually work a depression in the compost, into which the eggs are deposited.

With luck, the actual spawning may be observed, if not, it may be considered as a sign that such an event has taken place when the male remains over or near one spot amidst the plant bases, whilst the female returns to normal activities in the open water. It is the male alone which tends and guards the eggs during the six to seven incubation days. He continues his care after hatching, looking after the fry until they become free-swimming, at which time he loses all interest and rejoins the female.

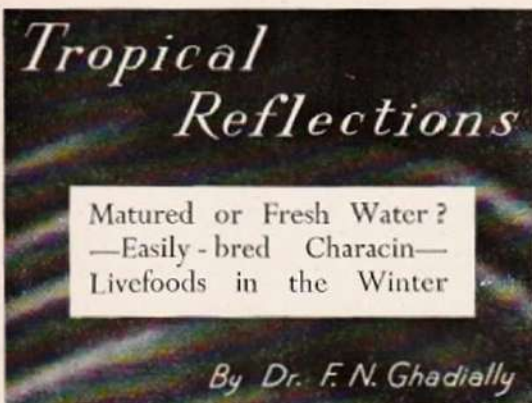
This is the moment to commence feeding the fry with the large size Infusorians, powder-fine dried food and, if obtainable, a little green water is of great value. Once the fry are able to take Mikro-worm their growth will be noticeable. It is not necessary to remove the adult fish from the fry, as they do not normally molest them.

In conclusion, I would like to refer to an incident which I observed with a mated pair of Flag Fish. One day I noticed that the male fish was resting on the bottom compost, near the front glass. It was evident that this fish was in trouble of some kind, but close-as-possible examination failed to reveal any external reason so the fish was left undisturbed

(Continued on page 277.)



Flag Fish (*Jordanella floridae*). The upper fish is a female showing a dark spot in the rear section of her dorsal fin.

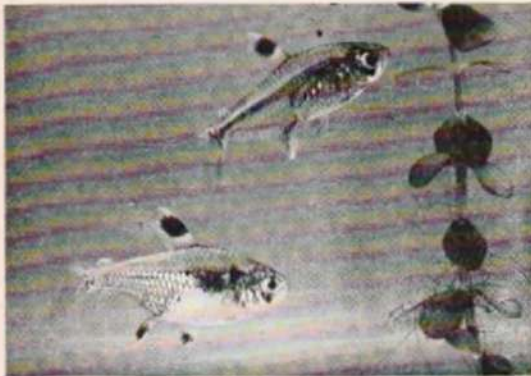


FOR a long time now many aquarists have come to regard the water in an established tank as something extremely precious. Some go to extreme lengths not to lose even a single drop of this valuable medium. Recently I met an old-timer who was a firm believer in the "old, mature water" idea. He did not mind parting with a fish from his tank which I wanted but he was very reluctant to give me sufficient water from the aquarium to carry the fish away. We got talking on this point and he told me that he never removed any water from the aquarium. He even put back after filtering through a piece of cloth the water drawn off when he siphoned the mulm from the bottom of the tank.

Change in Ideas

This would have been considered sound aquarium practice a few years ago but I do not think many people would care to go to such lengths today. As a matter of fact many aquarists, including myself, believe that it is a good idea to remove about a quarter to a third of the water from the tank at least every month, or preferably every fortnight, and replace with fresh. The best way is to combine this operation with the job of removing the mulm and sediment from the bottom.

There are many good reasons why partial replacement of water is beneficial. (1) It retards to a large extent the process of water going too hard from evaporation and replacement over a prolonged period of time. (2) It helps to remove organic waste and soluble break-down products resulting



Photograph] (G. J. M. Timmerman)
Pristella riddlei pair. Female is the lower, plumper fish.

from this material. (3) It replaces any trace elements or other essential factors which may have been used up by growing fish and plants. Laziness sometimes prevents me from practising what I preach, but whenever I have followed this procedure both plants and fishes have benefited from the fresh water.

Starting to Breed Characins?

I think it would be true to say that, with a few exceptions, Characins are more difficult to breed than, say, Danios or Barbs. Most people start off with livebearers, then breed a few Danios and Barbs but are afraid to tackle the members of the Characin Family. At this stage it is best to attempt some of the Characins that are not too difficult to propagate. Opinions might differ on which is the easiest Characin for a beginner but I personally feel that it is worth trying *Pristella*. They are not unduly choosy about water conditions, are readily sexed and are easy to induce to spawn. The fry and adults are quite hardy, in fact more so than many livebearers, and can be reared in the usual manner.

Pristella riddlei is an adhesive egglayer and may be spawned on plants or preferably on an artificial spawning medium, such as willow root or nylon scouring pads. Details on how these media can be used will be found in my previous articles (WATER LIFE, February, 1953, and December, 1955).

I have bred *Pristella*s on numerous occasions in both acid and alkaline waters, pH 6.5 to 7.5 (hardness 30 to 80 p.p.m.). The main factor to bear in mind is to obtain a few young fish and grow them up yourself on plenty of

WINTER LIVEFOOD

Glassworms of Ghost Larva (*Chaoborus larva*) are quite plentiful in the Winter when supplies of *Daphnia* are rather limited.

Photograph] (Dr. F. N. Ghadially)



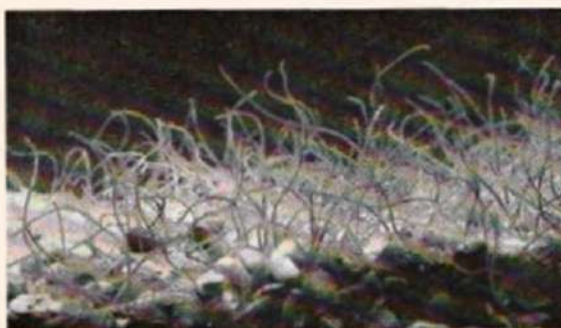
livefoods. Breed them when they are young, i.e. during the first year. It is much more difficult to breed with these fish when they are over two years old. I have reared 450 young from a single spawning but the usual number to expect is about 200.

Seasonal Supply of Livefoods

In spite of the fact that we had a rather poor Summer this year, there has been no shortage of *Daphnia* and other livefoods but the supply is now beginning to dwindle and we must turn our attention to other forms, such as Glassworms (Ghost Larvae) and *Tubifex*. These are available right through the Winter months but they must be used with caution and in moderation.

Glassworms, Ghost Larvae or *Chaoborus larva* are almost completely transparent creatures approximately $\frac{1}{4}$ in. long. They are the larvae of a plumed gnat. In the Spring and Summer these larvae are transformed into pupae from which the insect emerges. The larvae are sometimes found in small ponds with *Daphnia* and other creatures or in greater numbers in larger pools or lakes. They are not very common in this country but large numbers of them are imported from the Continent and can be bought in aquarists' shops. They can tolerate low temperatures amazingly well and may be collected in mid-winter from frozen ponds after breaking the ice on the surface.

The method of collection is with a sweep-net similar to that used for collecting *Daphnia*. The creatures look like a mass of wriggling jelly when a number are caught in a net.



Photograph [Dr. F. N. Ghadially]
Tubifex worms established in the gravel on an aquarium base. These worms are widely used for winter feeding of fishes.

They stand overcrowding very well and large numbers can be stored for many weeks in jars or small aquaria. When stored in this manner for future use they should be kept in a cool place.

Opinion varies as to the value of Glassworms as fish food, some consider them superior to *Daphnia* whilst others place them at the bottom of the list of livefoods. Being rather large and tough (in spite of their fragile appearance), they are really only suitable for feeding fish over 1½ to 2 in. long. These larvae have been known to eat fish spawn and fry and hence should be excluded from breeding tanks or tanks containing small fry. This is not surprising when it is considered that in Nature they feed on creatures such as Rotifers and *Daphnia*.

Tubifex are fine, thread-like, red worms approximately, 1-1½ in. long and can be purchased quite cheaply in unlimited quantities all the year round at aquarists' shops. Collecting *Tubifex* is really a job for the professional. Though they may be found in small numbers inhabiting the mud at the side of *Daphnia* ponds it is rarely worth the bother of attempting to collect them from such sites as successful collection is only feasible when they occur in really large numbers.

Where the Worms Are Found

It is along the banks and flats of streams carrying sewage about half-a-mile to a mile below the point where it is discharged into the stream that *Tubifex* occur in numbers sufficient to warrant collection. Here the professional collector scoops out the surface mud containing the worms with the aid of a shovel. This is then placed on wire mesh trays and a stream of water is played on the mud which washes most of the mud away leaving behind huge masses of red worms and also a fair amount of mud. The partially cleaned worms are then further cleaned by placing them in cold running water. Colossal quantities are collected daily and distributed to retail shops all over the country.

Tubifex dig a tube-like hole in the mud, hence their name. The head end is hidden in the hole while the tail waves about in the water. They swallow the mud in the depths of the tube and throw it out at their tail end, at the same time removing large numbers of bacteria from the mud for their food.

It is for this reason that some aquarists consider it a good thing to let *Tubifex* worms establish themselves on the aquarium floor. They withdraw into their tubes very rapidly at the least sign of danger and most aquarium fishes find it difficult to catch them once they are established in this manner, nor do they relish them when they do occasionally catch them. In time, therefore, when conditions are favourable, the bottom of the aquarium becomes a swaying carpet of worms. Then there arises the danger that large numbers may suddenly die and really foul the gravel and pollute the water. Before this happens a few catfish or

loaches should be introduced for they soon root the worms out of the gravel. Failing this, one has to strip down the aquarium and set it up again after washing and boiling the gravel.

The worms as purchased should not be fed directly to fish. Their gut can still contain a lot of the foul material which may upset the digestion of any fish that gorges on them. They should first be placed in a flat dish under a small stream of water from the tap. The live worms will collect in a mass and any that are dead will be washed away. If the mass of worms is turned over some hours later you will find a fair quantity of foul debris which has been excreted by the worms. The mass of worms should be broken up every now and again and washing continued for at least a day, and preferably two days, before feeding is commenced. When really cold water is available these worms can be kept alive for about 10 to 15 days but, in the Summer months, it is difficult to keep them alive for more than a day or two.

Doubtful Dangers

Today *Tubifex* do not enjoy the popularity they had some time ago. They are looked upon with suspicion by many aquarists. Some of the dangers attributed to them are quite untrue and belong purely to the realm of fancy, others are difficult to prove or disprove. These worms are not intermediate or definite hosts to either the White Spot or Velvet parasites and, coming as they do from waters too polluted to support fish life, they are unlikely to meet these parasites in the wild. But the water containing the *Tubifex* could become contaminated with the parasites if a net that had been dipped into an infected tank was used to remove them (see WATER LIFE, April, 1956, page 71). Washing under running water will tend to wash away the parasites and this will minimize the risk of transferring them to your tank but it cannot eliminate all danger. But in this case, of course, one can hardly blame the worms, for the same objections can be levelled at every livefood in the wet state, e.g. *Daphnia* and Glassworms.

The other complaint frequently made is that after a while fish eat them very reluctantly and do not grow well on them. Some even believe that feeding these worms can cause wasting, particularly in livebearers. A number of these troubles may be due to feeding unclean worms. Another point to bear in mind is that fish get tired of any food, even *Daphnia*, if they are fed on it almost exclusively. Because these worms are so cheap and easy to obtain there is usually a tendency to feed them continually.

In contrast to livefoods such as *Daphnia* or insect larvae which contain a lot of roughage, *Tubifex* are almost "pure meat" and if fish are forced to live very nearly entirely on such a rich but unbalanced diet it is little wonder that it has untoward effects.

I use *Tubifex* worms for feeding truly carnivorous fishes such as Fighters, Gouramies and Angels but I do not like giving them to livebearers.

Jordaniella floridae

(Continued from page 275.)

and a watch kept for any further behaviour indicating the cause of the trouble. However, during the course of the next three days, it hardly moved from its position.

During this period the female aroused my full interest by displaying a wonderful sense of solicitude towards her stricken mate, for she stayed close by him practically the whole time as if sensing something was wrong. The few times I saw her move away occurred when I dropped a little food in the tank. Only then did she leave, to take a quick look at the food, and immediately swim back to the male, whom she nudged with her head as if to encourage him to go and take the food. Not once did I see her take food herself. On the morning of the fifth day I was pleased to see the male moving around a little and within another few days both fish had resumed normal activities.

Sprightly Pygmy Sunfish

A Diminutive Species Gay in Colour and Bold by Nature

By Walter Bertholdt (Germany)

IT is a pity that the Pygmy Sunfish (*Elassoma evergladei*) is so seldom seen in the tanks of fish fanciers. To watch fish of this species in a densely planted 20-gallon tank, as I did in the prizewinning exhibit of a friend in Hanover, is a sight to remember. Deep jungles of *Myriophyllum*, Hair-grass and Broad-leaved Water Fern were the bottom plants and a layer of floating plants, mainly *Riccia* and Floating Fern, filtered the bright top light. The soft and slightly acid matured water was constantly passed through a peat filter, giving it a slight amber tint.

The highlight of this aquarium was five pairs of the Pygmy Sunfish. Each pair regarded a section of the tank entirely as their own and furiously defended it against the attacks of any intruder. I recall watching a pair spawning in a bunch of Willow Moss growing out of the twisted wooden rootlets of a dried honeysuckle. The male of the adjacent area became jealous; he approached the breeding pair and tried



Photograph

[G. J. M. Timmerman

The tiny Pygmy Sunfish (*Elassoma evergladei*).

to chase away the male. A furious scuffle began as the two intrepid males rushed at each other. Their deep velvet black colouring became overlaid with emerald green diamonds, giving a glittering appearance to their bodies.

The duel lasted for at least three minutes, both fish fighting with courage, but the female seemingly remained disinterested. At the conclusion the intruder beat a retreat and the original male returned to its mate. Neither fish was hurt in the fight, except for slight damage to the defeated specimen's dorsal fin.

The reason why this little fish is so seldom seen in dealers' and in hobbyists' tanks is because it only eats livefood. It is impossible to accustom the Pygmy Sunfish to prepared food and it will starve rather than touch dried preparations. It is therefore important to feed livefood, preferably White Worms, *Daphnia*, *Cyclops* and Brine Shrimps. White Worms are particularly appreciated. Furthermore, this is not a fish for the community tank. When kept together with other, even small, fish it becomes timid, and remains hidden in the plants, losing its bright coloration.

Due to its small size (1-1½ in.) a 2-gallon tank is adequate for one pair but, in order to see the full beauty of the velvet black colouring with golden and blue-green flecking on the males, several pairs should be kept together in a 5-20 gallon tank. Then harmless quarrels between rival males result in their colours showing to the full. Unfortunately, only the males have the lovely glistening flecks and the females are of a dull grey-brown coloration.

The home of the Pygmy Sunfish is Florida where it lives in soft, slightly acid waters. It would, therefore, be futile to try keeping this fish in hard and alkaline tank water; under such conditions it would lose its vitality and fighting characteristics and look pale and listless.

It does very well in clear and well aged soft water. A level teaspoonful of salt to 10 litres (2.2 gallons) of water is very beneficial. I prefer sea-salt to ordinary block salt. In order to avoid any pollution of the water it is best to use pure gravel for the bottom of the tank, without any addition of loam or earth. The Pygmy Sunfish shows off much better if the gravel is dark in colour. Fine leaved plants make a better decoration for it than sturdy aquatics.

The Pygmy Sunfish even does well in a Winter temperature of 50 deg.F. and I have bred it at such a low temperature. It does not like temperatures exceeding 82 deg.F. and thrives between 60-68 deg.F. Best breeding temperature lies between 68-75 deg.F. The species is extremely sensitive to water changes and care is therefore necessary when replacing part of the tank water. Use only well matured soft and slightly acid water of the same chemical composition as that being replaced. When the tank water is clear and biologically well balanced with the aquatic plants growing well, it is very seldom necessary to replace any of the old water.

The Sunfish is very susceptible to Fungus, especially when moved from one tank to another containing a different type of water. If the fish is attacked by a Fungus it should be immediately bathed in salt water. In this case ordinary block salt is used; one heaped teaspoonful to 1 litre (0.22 gallons) of water. A bath for 15 minutes in such a solution will generally cure the fish, provided the Fungus has not developed too far. Dimly lit tanks suit the species best.

The spawning of the Pygmy Sunfish is most characteristic. The male, sparkling with colour, swims around the female with fluttering movements like a butterfly, the pectorals moving in pendulum fashion. In contrast to the vibrating activity of the male, the female seems listless and disinterested but finally she follows her mate into the jungle of the plants where the tiny transparent eggs are scattered.

Regular Spawning

When kept together, the pairs spawn practically throughout the whole year and, when well fed, 5-6 eggs are laid almost every day by one female. As the parents touch neither eggs nor fry they may be kept together with the youngsters, but a better result will be obtained if the sexes are separated until the females are well filled with spawn. The breeders are then put together for one or two weeks. During this time about 100 to 125 eggs per pair will be obtained. After removing the parents a watch can be kept for the fry. The young fish are just as transparent as the eggs, and it is not easy to see them, particularly as they are very tiny. As soon as the yolk sac is consumed they hide.

At this stage the finest newly-hatched *Cyclops* nauplii should be fed. The nauplii are caught by means of a plankton net. If no nauplii are obtainable Infusoria may be given. After one week newly-hatched Brine Shrimp nauplii can be taken. With a magnifying glass watch the youngsters feeding; if they spit out the food, tinier nauplii or Infusoria should be offered. Make sure that the bellies of the babies are always well rounded, as otherwise there will be dwarfing of growth. Later on sifted *Cyclops*, *Daphnia* and finely chopped White Worms may be fed.

When the youngsters have reached a size of ½ in. they lose their shyness and can be seen swimming in the open areas of the tank. After three months the males begin to turn dark brown and the sexes are distinguishable.

Herpetologist's Notebook

Chameleons—Curiosities among Lizards

By Alfred Leutscher, B.Sc.

TO most people the name chameleon is far more familiar than the animal itself. This animal curiosity is really a lizard whose anatomy is unique in the reptile world. The Family of about 80 known species, called the *Chameleontidae*, is put into a special division of lizards—the *Rhoptoglossa*. This name means "a throwing tongue" from the chameleon's way of catching its food, mainly insects.

The ancient Greeks first named this harmless little animal, and compared it to a "miniature lion" (Greek: *camia*—ground, and *leon*—lion). They believed that it lived on air alone which idea probably comes from the chameleon's habit of swelling up its body when angered or alarmed. Needless to say, it requires both food and water to live.

Well over three-quarters of the species belong to the Genus *Chameleo*. A feature is the narrowness of the head, large size in many species, and the adornments of curious hoods, shields and horns found especially in the males. One can roughly divide them into Eared Chameleons, Helmeted Chameleons and Horned Chameleons, as they are popularly named. The Eared Chameleons possess a



Photograph [Fox] The three-horned Jackson's Chameleon (*Chameleo jacksoni*) from Africa, one of the most grotesque Chameleon species.

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for the Fishkeeping Enthusiast

kind of hood of horny plates, called a casque, which covers the top of the head and may extend down the sides to resemble superficially a pair of ears. The Common Chameleon (*Chameleo chameleon*) shows this characteristic. It is about four inches long, and lives in North Africa, countries of the Middle East and South Spain. In cultivated areas, it frequently turns up in orange and olive groves. This little animal mates towards the end of Summer, and lays up to 20 eggs in the soil in Autumn about six weeks later. Incubation may take from 4-18 months.

A much larger species is the Eared or Flap-necked Chameleon (*C. dilepis*) of Tropical Africa. It grows to about six inches and has a well developed casque extending alongside the back of the head as two flaps or "ears". It is a handsome species and colours up to a bright green in suitable surroundings. It is an egg-layer, and may produce up to 50 eggs.

The most striking species are those with horns. Meller's Chameleon (*C. melleri*) is a large, impressive species from East Central Africa, but of all chameleons it is possibly Jackson's Chameleon (*C. jacksoni*) of Kenya and neighbourhood which has the most fearsome appearance. It has three horns, one on the end of the snout and one near each eye. To look at it one can well understand how some people fear chameleons, saying that they are poisonous.

The so-called Pygmy or Dwarf Chameleons belong to separate Genera. A well-known example is the three-inch midget, *Microsauria pumila*. There are good reports of its thriving in vivariums. It is a livebearer, and gestation of about six months is followed by a family of up to 12 young. The colouring of *M. pumila* is green with a brick red lateral band interrupted by patches of blue.

The short life of a chameleon, even in the wild, coupled with its slow movements and harmless nature are to some extent compensated by its remarkable camouflage properties. Not only does it look like a leaf, both in shape and colour, but "acts" like one. As each grasping foot is carefully placed in front of the other to take the next step, there is a pause, and the body rocks to and fro like a leaf swinging in the wind.

The colour range is due to the ebb and flow of pigment within the special chromatophores, or skin-cells. This

works through the nervous system, but the stimuli can be most varied. Light probably plays the most important role, followed by changes in temperature and humidity, but emotional disturbances will also cause a change. Without being too unscientific, it can be said that a chameleon will turn pale with fright and black with anger.

A chameleon's tongue is another unique feature. It can extend to the length of the body, and rarely misses its aim. The club-shaped, sticky tip adheres to anything which it strikes. Those most extraordinary objects, the eyes, focus on to the prey, but at other times may wander about in all directions. Each is set into a conical pouch with a slit-like tip through which the eye-ball peeps. When the creature is asleep the slit is closed.

Sometimes a Chameleon will deliberately try to hide, by placing its body behind a branch, rather like a squirrel does when disturbed. The tail helps to give it extra support, but it will be curled up when not in use, unless the chameleon is unwell, when it tends to hang loose.

Chameleons in vivariums should be given a feeling of freedom, even though they do not move about much. Also, since they quarrel a lot, they are best kept singly. A four- to six-inch specimen should be given a cage no less than 2 ft. high with 18 in. of floor space. The cage should be made of window glass set into a frame of wood or angle iron. The kind of display cabinet seen in shop windows or on counters would make an excellent substitute.

One glass side should be fitted into a separate frame to act as a doorway. Ventilation is through the roof, made of wire netting or perforated zinc. A sliding roof placed over this will help to control the heating. Heating comes from below, and should be maintained at about 75 deg.F. The glass case, which has an open base, is placed on a shallow wooden tray which is waterproofed in some way. Part of it is sectioned off with a screen of perforated zinc. Inside, a light socket is fixed to the side with a flex leading off to the nearest point. The socket takes an ordinary domestic light bulb of 60 or 75 watts. When switched on the heat from it will rise into the cage, and it is surprising how much warmth is generated.

Plant Decorations

The rest of the tray is filled with small stones into which are sunk some pots containing plants that enjoy warmth and humidity. A local florist could supply these. The purpose of live plants is to give the chameleon some cover and to overcome the bare look of the cage. A few dead branches fitted among the plants will give the pet something on which to cling.

It is a good idea to add a dish of fresh water to the cage, which must be topped up daily. The evaporation will provide an air humidity which is natural to the closed-in surroundings of bushes and trees where chameleons normally live. The chameleon does not drink in the usual way from the ground, but licks off moisture from leaves, such as rain or dew drops. This may be provided by spraying the leaves occasionally with fresh water.

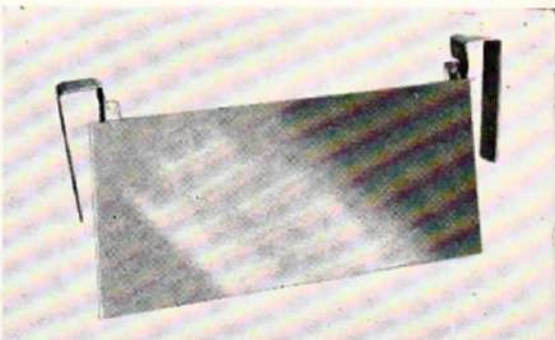
Chameleons sometimes lay eggs in vivariums. In Nature they descend to the ground, excavate a burrow to lay their eggs, then cover it up. A tin box containing some slightly moistened, loamy soil should be placed in the cage. If eggs are laid in this, the box can be removed without upsetting them, and placed in a warm place until they hatch.

In attempting to hatch out chameleon eggs, the reader is reminded that they can take quite a while to develop, and that some patience is necessary. Up to 18 months is not uncommon. A tropical aquarium makes an ideal incubator. The chameleon eggs are left in moss inside a glass jar which is simply floated in the aquarium.

Artificial heating is not always necessary during the Summer, should the outside temperature be high enough. In Winter some other source of heating, such as a fire or radiator can be brought into use.

Finally, a certain amount of natural sunlight is beneficial.

Gadget to Prevent Bubble-nest Damage

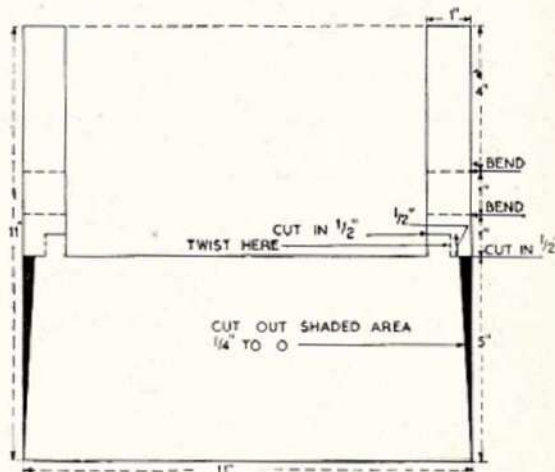


Divider to go across the breeding tank. Sketch below shows construction.

IN an attempt to breed Siamese Fighters (*Betta splendens*) I found that it was a tricky operation removing the female after the spawning, without breaking or disturbing the bubble-nest. I therefore designed from an 11 in. square sheet of 1/32 in. gauge aluminium the divider illustrated.

A 24 x 12 x 12 in. tank was prepared for the spawning attempt. Once the male started making his nest of bubbles the divider was placed just over half-way along the length of the tank, leaving ample room for the nest. The two hooks clip over the top angle of the tank. The water at 75-80 deg.F. was dropped to 1/4 in. above the bottom of the divider. The male ducked under the partition quite happily when it wished to do so.

While nest building was in progress I inserted a sheet of glass under the metal so that a complete partition was formed. The female was placed in the side away from the bubble-nest. After the fifth day the glass was removed and



the pair spawned. When this was completed I removed the female without disturbing the nest, while she was in the end away from the bubble-nest. The metal sheet projecting just below the water surface prevented surface movement of the water breaking up the nest. The result was a successful spawning of Fighters.—W. House (Tonypany A.S.).

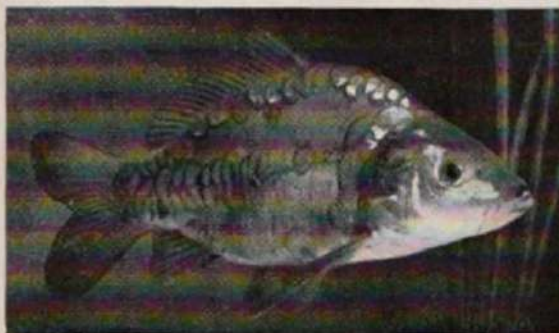
Coldwater Fishes

Common Carp

By R. J. Affleck, M.Sc.

WHEN people in Britain talk about a Carp they are referring to *Cyprinus carpio*—the Common Carp—but in some other parts of the world the word "Carp" refers to other fish. It is thought that Carp originated in the region of the Black Sea but they have been introduced to other regions, particularly the rivers of Europe and N. America. In olden days monks cultivated Carp in ponds for food and even today large numbers are eaten on the Continent of Europe.

The Common Carp (*C. carpio*) may be readily distin-



Photograph] (W. S. Pitt)
A fine Mirror Carp with glistening scales on its sides.



Photograph] (L. E. Perkins)
The bottom-dwelling Common Carp (*Cyprinus carpio*).

guished from the Crucian Carp (*Carassius carassius*) and the Goldfish (*C. auratus*) by the presence of four barbels around its mouth and by its dorsal fin (17-22 branched rays) which is longer than those of the two other species.

The wild-type fish lives at the bottom of ponds or slow-flowing rivers and feeds on both plants and animals. The habit of digging in the mud with its snout makes it not very suitable for small ponds but, in aquaria, where the water can be kept clean, the Common Carp is an interesting fish.

Two Variations

Besides the normal fish there are two varieties which are of interest; the Leather Carp, with no scales and a skin with a leathery appearance, and the Mirror Carp, so named because it has a few, large, shiny, irregular scales.

Carp breed readily. The spawning behaviour and development of the eggs and alevins are very similar to those of Goldfish.

Aquatic Plants

Bog-bean

(*Menyanthes trifoliata*)

THE Bog-bean, Buck-bean or Marsh Trefoil (*Menyanthes trifoliata*) has a wide distribution over northern temperate regions of the world but is rather localized in Great Britain. Its leaves are tri-lobed and have a shape reminiscent of those of the bean, hence the popular naming. They are olive-green in colour and particularly smooth, providing a helpful decorative feature at the edge of an ornamental pond.

Marshy or Shallow-water Situation

The plant is versatile, thriving in marshy situations and in water up to 4 in. deep. Flowers, though small, are highly decorative. They are borne on a stem in clusters. Each blossom is white inside and pink outside with the red stamens providing a vigorous contrast. The petals have fringed edges giving the flowers an appearance of fragility.

Bog-beans can be set in the pond surround in the Spring using pieces of rootstock about a foot long and possessing a growing tip. Because of the plant's adaptability a close watch should be kept to ensure it does not smother other less strongly-growing subjects in the marsh and shallows.

Bog-bean, Buck-bean or Marsh Trefoil (*Menyanthes trifoliata*) flowering in shallow water. The leaves help to set off the dainty spike of bloom. This plant is quite popular for the perimeter of garden pools. Photograph taken by L. E. Perkins.



M. trifoliata has medicinal qualities which were exploited in years gone by for the relief of scurvy, gout and fevers. The infusion of the rootstock which was used had a particularly bitter taste. The plant has also been employed in Scandinavian countries for making a form of beer.

There are two main types of trap. The first consists of a rectangular container, the bottom of which contains a number of circular rods, usually of glass, with a small gap between each. The second type consists of two pieces of glass which are sloping to form a V in the tank. At the bottom of the V a space is left, small enough to prevent the parent fish from getting through. In either of these methods the fry can drop through the space at the bottom and thus fall into the tank. They are then free from the attentions of the adult. The advantages of the trap method of breeding are that several traps may be used in a single tank and the fry reared together, thus saving considerably on aquarium space.

Qu. How do I know if my fish are of prizewinning quality?

A. As previously stated, a very good indication can be obtained by consulting the published standards for the particular fish. Once you feel that the fish are roughly of the shape and colour required, enter them in either a club table show or any open show when the opinion of a qualified judge may be obtained. You will also have the opportunity of comparing your fish with others of the same type.

Qu. Is there any objection to cross-breeding different varieties—say, Wagtail and Moon Platies?

A. Unless you are endeavouring to produce show fishes there is no objection to cross-breeding two different varieties

Useful Publicity

An entirely new "Fishkeeping is Fascinating" leaflet has just been issued by this journal. Apart from giving a complete list of WATER LIFE publications it contains hints on starting an aquarium and building a garden pool. A copy will be sent free on request. Club secretaries who would like to have supplies for new members or for distribution at their exhibitions should write to The Editor, WATER LIFE, Dorset House, Stamford Street, London, S.E.1.

for the Hobby

and, in fact, some very beautifully coloured fish are produced by this method. However, before doing so, some thought should be given to the matter, as the female used for the mating will produce several broods and all will be crosses.

Qu. Is it best to buy adult fish or would you recommend getting young stock and growing them to maturity?

A. It is always better to purchase young fish and this is particularly true in the case of livebearers as, with adult females, there is the definite chance that they have already been fertilized by a male fish and you will be unable to work out your own breeding methods. Even if breeding is not your main object, adult fish are less likely to settle into new conditions than youngsters.

Qu. At what age should young fish be segregated in the sexes to prevent interbreeding?

A. The young male fish must be removed from the tank at the first sign of the development of a gonopodium. Constant observation is essential as this development can take place over quite a long period in some species, such as Swordtails and Mollies. Never try to separate the female fishes, always remove the males.

Qu. Do you advise inbreeding or would you recommend mating unrelated fishes?

A. In order to produce strains of fish conforming to a standard it is essential for a certain amount of inbreeding to take place. However, every endeavour should be made to introduce outside stock into the strain in the fourth or fifth generation otherwise the strain can become weak and subject to diseases which would not normally affect it.

READERS' HINTS AND TIPS

TO AVOID DISTURBING PLANTS

WHEN trying to catch fish in a tank containing trailing plants such as *Cabomba* and *Ambulia* (*Linnophila*), it is a good idea to hang the plants over the top edge of the tank. The fish are more easily seen and, since the plants do not become entangled with the net, they are not broken or uprooted. A bowl or jam jar can be used to collect the water dripping from the plant tips.—(Mrs. B. FORD, Lincoln.)

DECORATIVE BACKGROUND

RECENTLY I set up a tropical tank with rockwork, plants, etc., but I wondered what to use to decorate the back and sides. First I painted the outside glass light blue; when the paint dried, putty was applied and shaped, to give the effect of distant coral and rockwork. The natural light shows up the putty as black against blue and the general effect is most pleasing when the lights of the aquarium are switched off.—(R. CLATWORTHY, Cardiff.)

CLEANING CHOPPED WORMS

FOR cleaning chopped worms, I use a honey jar with a screw-on tin lid. I cut the centre of the lid away, leaving about $\frac{1}{8}$ in. all round, and then solder a piece of metal gauze to the inside of the lid.

After chopping worms to the required size I place them in the jar, screw the lid on, and play the tap hard through the lid. The pieces are considerably muffled and, after a few seconds, are perfectly clean so that no dirt or slime finds its way into my tanks. I use $\frac{1}{8}$ in. gauze. It is not essential to solder the gauze, but it does make a better job if you do.—(F. PARSONS, Farnborough, Hants.)



AQUARIUM BASE

NO doubt many aquarists have at least one aquarium on a polished surface and the polish is not improved as a result. To overcome this difficulty I obtained a piece of coloured felt, such as is used for carpet surrounds, and had it cut a half-inch longer each way than the base of the tank. When the aquarium stands on the felt any drips of water can be easily wiped off. The overlapping half-inch of felt can also be lifted and a further wipe then completes the operation.

I have had this idea in use for some years and there is not a mark on the polished wood. A clothes brush easily removes dust or bits of food from the felt. Various shades of felt are available and the dark brown which I use tones well with the mahogany cabinet on which the tank stands.—(F. C. HODGSON, Bradford, Yorks.)

Readers are invited to send details of hints and tips they have found helpful in their fish-keeping. 10s. 6d. is paid for each one published.



Female Mosquito Fish.

UNUSUAL livebearers? Not really; just not seen sufficiently often on the show bench to advertise themselves, or in the dealer's tanks—and do not blame the trader. He cannot stock fish without vivid colours in any quantity, when the demand for them is not large. My small collection has come from various sources.

Experiences with the Species

The first one to interest me was the Mosquito Fish (*Heterandria formosa*), our smallest livebearer which, when kept alone or with young fish of other species, is by no means shy. It is brown in colour, with dark patterns on its body and a red patch in both dorsal and anal fins. I have found that these red patches can be lost with continuous in-breeding. Mosquito Fish appear best when in shoals. Kept in unheated small tanks, they have, over the years survived temperatures ranging from 42 deg. F. to 95 deg. F. This has not caused sterility, indeed one three-year-old female, after wintering entirely alone for five months, produced a brood of 14 over the course of ten days. I have recorded females up to the age of 4½ years and males up to three years.

Wide Temperature Range

I kept *Gambusia affinis* for only two years and unfortunately, could not replace them. They were not prolific, although quite happy in temperatures ranging from 65-80 deg. F. Their silvery bodies are overlaid with a mauvish tone, either clear or speckled with black to a greater or lesser extent. They offered infinite variety, but did not prove really good as community fish owing to shyness, sometimes offset by spasms of fin nipping.

G. nobilis, the golden cousin of the previous species, unfortunately never came my way, and the young Blue Gambusias (*G. punctata*) I obtained failed to reach maturity.



Photographs]

[G. J. M. Timmerman

A pair of *Gambusia punctata*; male is the upper fish. The iris of the eye is blue and there is a blue suffusion over the body and fins, hence the popular naming of Blue Gambusia.

Less Common Livebearers

Neglected Species with an Appeal of their Own

By
A. J. Holloway

I still have *Girardinus metallicus*, some over 3½ years old, but I generally find females outliving their mates at 2½ years. They are golden brown in colour with vertically slanting silver bars. The fins are clear except for a black area at the base of the dorsal. The metallic green spots about the head (especially on the gill plates), seem all the brighter against this colour pattern. In some lights, a pale mauve overtone may be seen. *G. metallicus* is quite happy in community tanks at temperatures of 65-82 deg. F., as is *Glaridichthys falcatus* the "Blue Eyes" to us but known to U.S. fanciers as "Yellow Belly", both names being truly descriptive. I find *G. falcatus* the most prolific species of all, with two rather distinctive features. The gonopodium of the male



The Hump-backed *Limia* (*Limia nigrofasciata*). Male is the lower fish. The hump only begins to develop on the back of the male fish when it reaches maturity and, as it becomes more pronounced, the dorsal fin grows much larger and more colourful, taking on a black edge with yellow ground colour.

extends beyond the caudal peduncle and the female, when heavily gravid, takes on a body shape similar to that of the Hatchet Fishes. The silver body is very clean-looking, the fins are clear and there are no other colours than those suggested by the common names. Thriving at 68-85 deg. F., they succumbed to Fungus within two days at 62 deg. F.

Of the *Limias* I have only *L. nigrofasciata* to date. Again, this species has quiet colours, brown over yellow with dark markings, the only distinctive features being the clear-cut pattern of black on the yellow dorsal of the adult male, which sex also assumes a humped back at maturity. This in no way decreases his speed when the net appears. Contented at 70-82 deg. F. for a span of approximately 2½ years they are prolific, breeding best at 75 deg.

Merry Widows

My favourite species in this group, so far, is the Merry Widow (*Phallichthys amates*), perhaps because from the first brood grew a pair that were awarded "Best of Show" over 400 exhibits. I mention this only to indicate that our neglected friends must have "something". This species is very merry indeed. It is always moving and makes a good community aquarium occupant. The drab body colour (an effective foil for brighter fellows) is only relieved by a slight metallic blue-green about the gill-covers and a narrow edging of blue-white to the dorsal. Merry Widows are not prolific but breed steadily the year round and, like all the foregoing species, will eat practically everything devised by their keeper. They live for 2½-3 years at 70-82 deg. F.

Know Your Fishes

No. 48

Yellow Rasbora (*Rasbora elegans*)

Photograph

[J. E. Perkins]

AMONG the larger Rasboras, which are generally of unspectacular colour, the Yellow or Elegant Rasbora stands apart. Whilst not startlingly shaded the elusive tints it does show make it a fish of significance. And it grows to an appreciable length—up to five inches in aquariums. Distinguishing features are a dark mark on the centre of the side beneath the forepart of the dorsal fin, another more roundish dark area at the tail base

and, on the body at the anal fin base, a thin, black line.

The body is a matt grey basically with the back reddish-purple and the sides mauvish-yellow. Individual scales, particularly on the upper two-thirds of the body, are lightly edged with charcoal grey. No colour is particularly brilliant so that the general effect is pastel suffusion.

Fins are clear of colour except for the base of the dorsal which is brownish-yellow, the tips of the tail

fin lobes which are touched with black and the anal fin which is yellow in male specimens. This colouring in the anal fin is a fairly reliable sex distinction but some authors record another indication in that male fish have a longer lower lobe to the caudal fin.

The fish is peaceful but, if there is any show of temperament, it is in the female which may occasionally become belligerent. Its safe temperature range is 70-80 deg. F., with 78-80 deg. desirable for a breeding attempt. Spawning are only rarely achieved in aquariums and largish tanks are required freely set with fine-leaved plants, such as *Myriophyllum*. Spawning procedure is similar to that of the Barbs.

The species is found in streams on the Malay Peninsula and nearby islands (including Borneo) where its numbers are large. Feeding *Rasbora elegans* presents no problems; it will take dried preparations but should have periodic feeds of livefood such as *Daphnia* and also access to reasonable supplies of algae.

The species' two common names, Yellow Rasbora and Elegant Rasbora, are rarely used and it is generally sold under its scientific title. Class: Pisces. Order: Ostariophysi. Family: Cyprinidae. Genus: *Rasbora*. Species: *R. elegans*.

African Hinged Tortoises

Easily-cared-for Pets in the *Cinixys* Genus

By Audrey Noël-Hume, B.Sc.

FOR the herpetologist interested in tortoises but possessing only a moderately sized garden and an income to match, the three members of the *Cinixys* Genus, known popularly as the African Hinged Tortoises, are an ideal choice. These creatures are moderate in size, cheap to maintain and relatively easy to obtain. Many specimens are imported annually by dealers but it is also possible to obtain them direct from professional animal collectors who work in Africa. Prices vary around £3 but really first-class specimens may be slightly more.

Comparison with New World Species

These tortoises are distinguished from the American Hinged or Box Tortoises by the presence of a strip of ligament between the seventh and eighth marginals and not, as in the American species, across the plastron. The African Hinged Tortoises can thus only enclose the tail and the hind legs, whereas their American counterparts can enclose head and fore-legs as well. In fact the *Cinixys* seem to make little use of this defensive weapon and both in specimens kept by me and in others in the collection of the

Zoological Society of London the hinge would appear to have become rigid and incapable of being used.

The maximum shell length attained by any *Cinixys* tortoises is about 14 in. but such specimens are exceptional and the average adult size is between 8-10 in. The problem of sex determination in land tortoises would seem to need more attention than it has hitherto received, but until this is done the rule of a long tail in male examples and a short tail in females must be accepted.

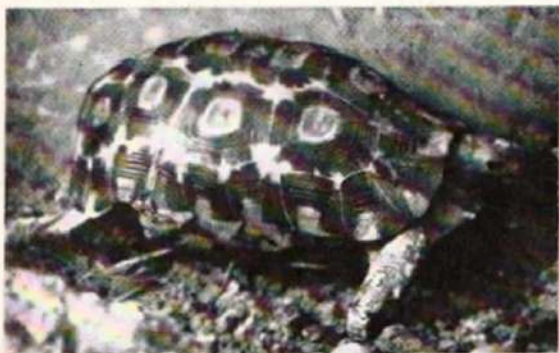
The most common and, in my opinion, the most attractive members of this group is *Cinixys erosa*, the Eroded *Cinixys*, also known as Schweigger's Hinged Tortoise. It is to be found in all the hot rain forests of West Africa from Gambia in the north to the Belgian Congo in the south, but it is possible that the distribution is much wider than these limits would suggest. It is easily distinguished from the other two members of the Genus by the shape of its carapace, which is flatter in appearance, by marginals which are "flared" at the head and tail and by a forked projection on the plastron. The latter provides both a rest for the head and a fine offensive weapon against other tortoises; when

pushed under the plastron of an antagonist it acts as a perfect lever for turning the offender over. Unfortunately my *Cinixys erosa* uses it with complete lack of discretion and frequently tries to overturn my Leopard Tortoise whose weight exceeds 30 pounds.

The shell coloration is generally a dark brown in adults but may be considerably lighter in young specimens. One of the most outstanding features of the Eroded *Cinixys* is the attractive colour of the skin of the body and the head. This is a pale whitish-yellow and forms a perfect contrast for the large and almost human blue eyes present in most specimens. These eyes are very expressive and are capable of clear vision at comparatively great distances. All the *Cinixys* have long, lean legs and walk in the jerky manner associated with clockwork toys but nevertheless they can outstrip most tortoises of a similar size should they wish to do so.

Bell's Hinged Tortoise

The second member of the *Cinixys* Genus, *Cinixys belliana*, or Bell's Hinged Tortoise, lives in areas not covered by dense tropical forest in a belt of land stretching right across Africa from Abyssinia to Gambia and as far to the south as Natal and Angola. Unlike the Eroded *Cinixys*, this tortoise has an extremely narrow carapace with almost vertical marginals and the projection of the plastron, though still present, is blunt ended and not forked. The shell colourings are extremely varied and range from a uniform dull brown to elaborate striped and blotched patterns on a dingy yellow ground. The skin is generally a dull shade of brown, while the eyes are similar in tone but



lack the almost human appearance of those of the Eroded *Cinixys*.

The third and the most uncommon member of the *Cinixys* group, *Cinixys homeana*, Home's Hinged Tortoise, is believed to come from the same areas as the Eroded *Cinixys*. It is very dull in colouring and it may be that the difficulty in seeing it is the main reason for the scarcity of specimens. It is easily recognized by its silhouette which resembles that of an upturned rowing boat. Both shell and skin are brown in colour and the head is less pointed in shape than in the other members of this Genus.

During the Summer months when the air temperature exceeds 65 deg.F. the *Cinixys* can safely be given the run of a well-fenced garden. They will not attack plants and are content to spend much of their time sleeping in a shady spot. Although I would never advise allowing tropical tortoises to sleep out-of-doors as a regular practice, I have, on exceptionally hot, dry nights allowed mine to share the chalet-type houses used by the Mediterranean tortoises.

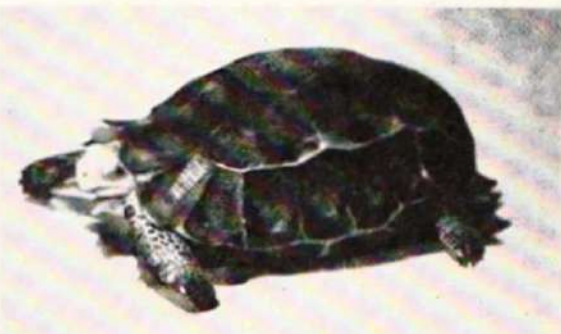
During the Winter these *Cinixys* need a minimum temperature of 65 deg.F. and full protection from draughts. In periods of extreme cold my specimens only leave their

quarters by a hot water storage cylinder for a daily meal and a session under a sun-ray lamp and, unlike the larger tortoises, these species need little room for exercise when indoors.

I have always found the *Cinixys* very easy to feed and with the aid of a friendly greengrocer this can be a fairly inexpensive matter even in the depths of Winter. Over-ripe tomatoes and bananas, unfit for human consumption, are certain favourites and, together with a few lettuce leaves, a grated carrot and any scraps of tinned fruit, will form an acceptable and nourishing diet for them. Like all tortoises from tropical areas, these reptiles drink a relatively large amount of water each day and it is essential that a clean bowl of it should always be kept within their reach.

The *Cinixys* seem to have outstandingly good memories and, if water and food are always put in the same place, they soon learn where to find them. My *Cinixys belliana* lives entirely in the garden and on the ground floor of the house from May to September each year but as soon as she is transferred to her Winter quarters on the first floor she goes at once to her regular feeding place. The best time for feeding in the Summer seems to be in the early morning and again just before dusk for the *Cinixys* retire to sleep later than the temperate species of land tortoise.

Some of the older books on tortoises refer to the *Cinixys* in general, and to *Cinixys erosa* in particular, as being particularly shy and stupid reptiles. At least so far as my own specimens are concerned these accusations could not be substantiated for they are very friendly and quite unafraid



Photographs: (I. Noel-Hume)
Left, female Bell's Hinged Tortoise (*Cinixys belliana*) with carapace length of 9½ in. Above, male Eroded *Cinixys*.

of humans or other animals. Whilst one is loath to apply the adjective "stupid" to any creature, I think there are many species of tortoise which have a better claim to this description than the *Cinixys*.

Displays of Temper

The main fault of African Hinged Tortoises is an unfailing bad temper and lack of patience. Should another tortoise knock against them, take their place at the hot water cylinder or fancy a bite or two of their food they will attack the offender with surprising fury. Many times I have had to intervene in such contests to avoid damage to limbs or shields and the clash of shells sometimes re-echoes round the neighbourhood when the garden is the battle field. On the occasion when my Brazilian Giant Tortoise sprayed the *Cinixys erosa* with two jets of water from his nostrils, the latter chased him around for nearly an hour!

Although the *Cinixys* are relatively hardy, I have found that they are all liable to minor eye troubles, most of which are quickly remedied by bathing with a five per cent solution of Protargol.



The Editor is not responsible for the opinions expressed by correspondents.

BUMBLE BEES

SIR.—Some months ago I bought two Bumble Bee Fish (*Brachyobius*). One is smaller than the other and I think the small fish is the male. When looking at the flank of the larger fish I can see a sac covered with black speckles which are increasing in size and number. These speckles are tightly packed and are not to be confused with the speckles on the scales of the fish. The smaller fish has no interior speckles.

One week ago I noticed behaviour on the part of the smaller fish which I think is part of the breeding pattern. The male fish stirs the water with his pectoral fins and increases the movement so that the dorsal and caudal fins and the whole of the body, with the exception of the head, are involved in a wagging action. This movement lasts about one second but is repeated at intervals throughout the day. Two days after the male started this behaviour the female began to reply in the same manner.

I have placed a flower pot on the compost and until now the female has not visited it. The flower pot has been placed in the male's territory and she seems to regard it as a risky business to venture from her own side of the tank. Other owners of these fish may have noticed that although one Bumble Bee is very much aware of another Bumble Bee, their relationship could not be described as a warm one. The other inhabitants of this 30 in. tank are two breeding Angels which never rear their own young because the eggs are attacked by Fungus. I am running a filter through carbon and cotton wool and the water is clear, but the tank is not clean enough to risk leaving the Bumble Bee spawn in it if I am lucky enough to get any.

I should like to know anything relevant to the spawning of these fish; nothing further may happen unless I can give them that extra encouragement. I am raising the temperature very slowly from 74 deg. F. to 79 deg. F.

MRS. D. SMYTHIES

The following is an extract from Bryner's "Guide to Tropical Fishkeeping" concerning Bumble Bee Fish: "It has rarely been spawned but, if this is attempted, four inches of water and an overturned flower-pot should be provided. Spawning is made on the roof of the interior. Up to 150 ova are deposited at a spawning and these hatch in five to seven days at temperatures of 75 to 80 deg. F., respectively. The ova are tended and fanned by the male fish, although Mr. H. C. Wells of Australia has recorded that the female assumed these duties when he induced the species to breed. Mr. S. G. Tiller, of Bedfordshire, who has successfully bred the species, records that the male becomes black all

over when in breeding condition. In the spawning which Mr. Tiller induced, the eggs were laid on the outside of the flower-pot. The eggs hatched in eight days at 80 deg. F. The fry adhered by their tails before becoming free-swimming. They showed characteristic bands within a few days, although only faintly at first. The fry require green water for the first few days and then a plentiful supply of Mikro-worms and Brine Shrimps." Details of readers' breeding attempts with this fish will be welcomed.—ED.

VENTURESOME BEETLE

SIR.—A rather curious incident occurred with a Great Diving Beetle (*Dytiscus marginalis*) which I kept. This beetle, by the way, was the only one I have ever seen or heard of in these islands (Shetland) and, consequently, I have always thought it must have been a stray one, driven by wind, or carried with some goods, but they may be more common than I realize.

The jar containing the beetle was standing on a window ledge and it got overturned with the result that the beetle disappeared. One day shortly afterwards, I heard my wife calling, and went downstairs to see what was the matter. Apparently when she was lifting a mat she exposed the missing beetle which was making for the open front door. It had either crawled or fled down two flights of stairs from the room in which it had been kept.

Needless to say I soon recaptured it, and placed it in another jar, where it lived for another year or so, apparently none the worse for its strange experience. Reawick, Shetland.

REV. C. E. ALLEN

Dytiscus beetles do occasionally fly quite appreciable distances at night during the Summer months and it is likely that this was the method used here.—ED.

CRYPTOCORYNE TROUBLE

SIR.—In the October issue (p. 221), Dr. F. N. Ghadially mentions he had some trouble with *Cryptocoryne hartellana*. I might be able to offer an explanation. Some six or more years ago I had a tank (36 in. long) full of *C. cordata*. One evening I noticed a leaf looking rather unhealthy. Three days later most of the leaves were on the bottom of the tank.

At this stage I panicked and borrowed a microscope (about x20) to examine the dying(?) leaves. They seemed to decay from the tips in a V shape, the outer skin being left and the inner tissues appearing to be removed. What I found on examination of unaffected parts of the leaf were

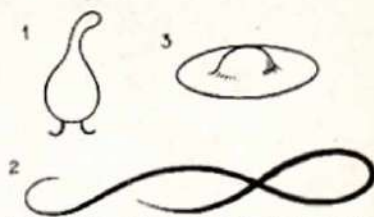
some "things"—for want of a better name—of the shape shown at 1 in the diagram. They appeared about $\frac{1}{2}$ in. long under the microscope and the long "head" could be extended and withdrawn; this action was present all the time they were being observed.

Also seen in the dead leaf tissue was a creature of the shape shown at 2. Its worm-like shape is indicated and to traverse its full length the leaf had to be moved to bring it into the field of view. Also in the same area in the dead tissue was an object which resembled a Chinaman's hat (3) which was much smaller than 1. It appeared raised in the centre and was brown in colour. This I took to be an egg capsule. Here again, it was only a guess.

Having seen these bodies, I got in touch with two biologists but only got hazy guesses. I contacted a fellow worker also interested in fish, etc. Still there was no clue, then out of the blue a copy of "Nature" was produced, with an article on eel worms, showing the female as a "flask shaped creature", and the male 10 to 20 times longer and worm-like. I thought there seemed a definite resemblance to the creatures that were present in my *Cryptocorynes*.

Now, the cure. This, I am afraid, was drastic. All the leaves were removed under running, fairly hot tap water, except the small shoot in the crown. The remains were then soaked in warm but strong permanganate of potash solution for about half an hour. I then passed them through a strong salt solution—not very scientific, but I was desperate. The crowns were then planted in three separate 24 x 12 x 12 in. tanks to rally or die and I am pleased to say all but one rallied. The survivors were in the four-leaves-to-a-plant stage nine months after treatment and are in my tanks to this day. About five dozen *C. cordata* were affected but no other *Cryptocorynes*.

Now, the cause. Of my two show tanks the affected one (3 ft. long) was filtered continuously at a minimum rate of 12



Enlarged diagrams to show the shape of the objects Mr. F. Elliott found on decaying *Cryptocoryne* leaves in his aquarium.

gallons an hour. I like clear water in the tanks and so, it seems, do the fish. Sediment is removed weekly and the only addition to the tank at the time was *Daphnia*. This I blame for the trouble—not really the *Daphnia* but something carried in by the water with them. I no longer feed *Daphnia* and I have never lost another *Cryptocoryne* which does not mean my assumption is correct, of course.

My procedure now is to remove any leaf that shows signs of not being 100 per cent healthy. I do this by running the planting stick down the stem until I reach the bottom and give a sharp dig into the gravel; this removes the entire leaf stem

(Continued next page.)

In and Around the Aquaria World

By

L. W. Ashdown

Asbestos Tanks

"DO you use asbestos cement in Britain for tanks?" asks Henry A. Nichols of California. He recalls that when in South Africa during 1951 he saw a number of moulded asbestos tanks in and around Johannesburg. The asbestos bottom, sides and front angle were in one piece and a glass panel was glazed in the front. The finished product had the advantage of comparative lightness and the surface was readily paintable. Those that Mr. Nichols saw were "beautiful jobs". Naturally they required maturing before the fish were introduced but, after that, there seemed to be no harmful effects.

I recall that when glass was hard to come by in the early post-war years some aquarists in Britain did glaze their angle-iron tanks with asbestos panels but I have not heard of moulded asbestos aquariums being produced here.

Hendon's Enterprising Year

CONGRATULATIONS, Hendon A.S. This is certainly a peak year for the society and the ripples of its successes spread into the hobby at large, both nationally and internationally. The first resounding 1956 triumph was Roy and Gwen Skipper's successful spawning of Pompadour Fish (*Symphysodon discus*) recorded fully in the June issue and brought up-to-date by a further article on pages 267-268. Then came Hendon's enthusiastic support of provincial shows, Corby and Portsmouth among them.

A fitting Autumn climax was a visit from Mr. M. Carels and Mr. C. H. Wante, two Belgian aquarists of Ghent, where Mr. Carels is chairman, and Mr. Wante is a specialist in aquarium cine-photography. Mr. Carels is a witty and authoritative speaker on fishy matters, and the two of them are lifelong friends—a happy combination.

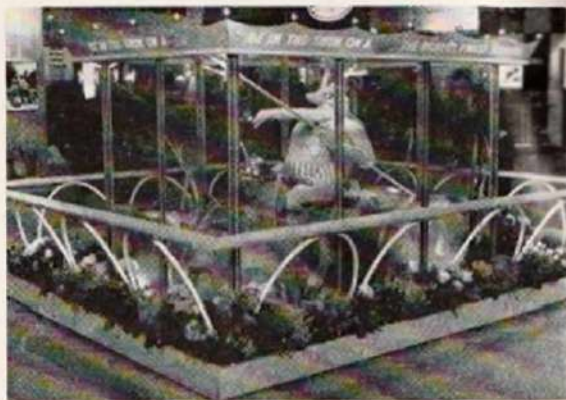
It was no unpremeditated circumstance that Messrs. Wante and Carels came to Hendon. Bob Calrow, the club's livewire

KING NEPTUNE

A modern King Neptune travels by motor scooter in a huge aquarium (8 ft. long x 5 ft. wide x 6 ft. deep) at the recent Earls Court Motor Cycle Exhibition. Supplying and setting up the tank was Mr. A. Rous of the Queensborough Fisheries.

Photograph]

[WATER LIFE



publicity officer, put advertisements in Continental journals asking for lecturers to contact him. The two Belgians responded and generously agreed to cooperate by coming to Britain on an expenses-only basis. The result was that Hendon was able, with its customary efficiency, to hire a modern hall seating approximately 800, to price the seats at a modest shilling, and fling wide the doors for aquarium hobbyists. All tickets were sold well before the showing, on October 20 and, apart from individuals, groups of aquarists from 39 societies were present. They came from as far afield as Nottingham, Portsmouth and Corby. Hobby in the doldrums? Not on your life, when you see 800 fishkeepers together on such an occasion as this.

Early Reception

THE showing was preceded by a delightful afternoon reception at Roy and Gwen Skipper's home. Need I say that crocodiles of the distinguished guests formed a full audience for Mr. Skipper's home-bred Pompadours in the fishhouse throughout

the afternoon? Among those present to meet Mr. Carels and his colleague were Mr. and Mrs. B. Meadows, Mr. and Mrs. R. O. B. List, Mr. and Mrs. E. Riddle, Mr. and Mrs. H. R. Holland, Mr. and Mrs. W. G. Phillips, Mr. R. G. Mealand, Mr. J. Carnell, Mr. J. McInerney and Mr. D. S. Campkin, together with Hendon's own officials.

Let me dispel any idea that Mr. Carels was in language difficulties. His command of English went so far that he could clown with abandon and was able to lace his film commentary with subtle humour. All the more surprising this, when I learnt that his last visit to Britain was in the late 1940's for a N. Herts A.S. meeting, and, before that, some 30 years ago.

Films of Quality

THE films were something special. Mr. Wante achieves beautiful definition and colour faithfulness on 8 mm. spools. Goldfish, tropicals, we saw them all in infinite variety, sometimes breeding, sometimes feeding and, occasionally, fighting. Among up-to-the-minute subjects were Black Fighters, well developed and certainly denser in colour shade than we have seen here. A touch of brown in the tail region but, that apart, fully black. Also half-black Angels. The tail and rear part of the body was black, with the remaining part of the fish, normal. The strain had been developed some years previously but

Readers' Views

(Continued from previous page.)

and does not damage the plant. Also, it seems to promote new growth. I hope my observations may throw some light on the subject, but should any aquarist get this trouble and can get hold of a low-power microscope he may be able to forward more detailed information so that the trouble can be fully understood.
West Hartlepool, F. ELLIOTT
Co. Durham.



AUTUMN RENDEZVOUS

Messrs. Carels and Wante who travelled from Belgium to give a film show in North London under the auspices of Hendon A.S. It was a three-hour programme of consistently high quality films and it was attended by aquarists from widely separated parts of Great Britain.

Photographs] [R. Skipper

IN THE AQUARIA WORLD

(continued.)

WERE YOU THERE . . .

for the Continental film show put on by Hendon A.S. in October? This Roy Skipper photograph shows just a section of the large audience.



the black rear half did not show through fully until four months of age—hardly an economic proposition for professional breeders. Some of these fish had been exported to America. Could it be that the recently released all-black American Angels had come from them? Mr. Carels believed it likely.

The shots of fishes breeding were of particular interest but, for the cine photographer, it was Mr. Wante's second film, in black and white, that was most admired: photomicrographs of *Amoeba* and *Hydra* feeding, and *Volvox* releasing its young—such shots test the calibre and patience of any photographer. Mr. Wante emerged triumphant. Then we had another spool of tropicals and finally a selection of marine fishes, including a fine array of Puffer species (*Tetraodon*) one of which buried itself in the sand but two evil eyes sorted out Wagtails which were eaten in



Some members of Amersham Grove A.C. at their annual show. Left to right: E. Pearce, K. D. Owen (secretary), T. Asquith, P. Wilson, R. Catmull and S. Upton.

one vicious snap. The three-hour programme of a consistently high standard was pure delight for all fishkeepers present.

Overheated!

DON R. ABEL, writing from Cincinnati, Ohio, made me distinctly wistful. Memories of our deplorable Summer were highlighted when I heard from Mr. Abel that temperatures reached 97 deg. F. on July 27 in Cincinnati, whilst Kansas had 107 deg. The same evening the thermometer dropped to the lower fifties but, says Mr. Abel, few lost their outdoor tropicals. He adds, "I do trust that those of your readers with tropicals outdoors for the Summer have not experienced such high

temperatures as we here". No fear of that, Mr. Abel, I doubt whether many folk dared risk their tropicals outside this year, even in experiments.

The International Federation of Aquarium Societies, a North American group for which Mr. Abel is publicity chairman, now numbers 60 societies with many regional councils being formed in both the U.S.A. and Canada. If five societies in an area belong to T.I.F.A.S. a regional charter is issued to the group and the local associations are in a position to arrange special area meetings and exchange speakers, etc.

Parthenogenesis

PARTHENOGENESIS is a subject that has hit the headlines under its more popular name of virgin birth in recent months. *WATER LIFE* modestly stole a march on most of the stories by its reporting of parthenogenesis in Guppies (April 1953 issue) and a number of readers immediately came forward to say just how easy it was to think there was a valid case of virgin birth in livebearing fish when, in fact, a close examination of the aquarium technique revealed loopholes.

But we should not forget that the instant of parthenogenesis reported came from a scientist, Dr. Helen Spurway: a person accustomed to dealing with aquatic animals under experimental conditions. It is now postulated that virgin birth can occur in higher animals, too. The chances are very, very small and the whole topic appears to be in the realm of controversy. Still, it is intriguing to think that our humble Guppy helped to awaken all the interest.

Olympia Show

MANY exhibitors responded early after receiving schedules for the Aquaria Section of the National Exhibition of Cage Birds and Aquaria, to be put on in January at Olympia, London, and there was every indication of an encouraging total by the closing date on December 4. Of the entries received several weeks before the final day a significant percentage came from societies and individuals well outside the London area. This fact, combined with entries being made by many new exhibitors, suggests that old-stagers will be facing competition of an unknown standard and will have to be on their mettle.

In 1956 the *WATER LIFE* Trophy for the best club aquarium went to a London

society—Stoke Newington—but the Portsmouth club headed the 28 entries in the club tropical class and ran Stoke Newington close for trophy honours. With provincial representation better than ever for 1957 the placings, especially in the club furnished aquaria classes, will be of more than usual interest.

The schools entering in their own furnished aquarium class will, as in 1955, be able to compete for the F.B.A.S. Junior Trophy which goes to the first prizewinner. Strong support has come for the breeders' classes—particularly those for tropicals—and exhibits here will be studied seriously by fish breeders.

The Goldfish Society, the Guppy Federation, the F.B.A.S. and the British Herpetological Society are now well advanced in preparing their special displays.

Collectively, the show will hold much to interest both the experienced aquarist and the novice. In addition, there will be many thousands of bird exhibits, including budgerigars, canaries and foreign species.

A Convention programme arranged by the National Council of Aviculture will be held on each of the three days the show is open and visitors will be able to attend film shows, illustrated lectures, etc., covering all aspects of our sister hobby free of charge. Make your visit to Olympia a family outing; there will be something to interest them all.

Good Wishes

MEMBERS of the hobby and trade will be sorry to hear that illness has recently afflicted Mr. O. L. Carrington of the Liquefy Company Ltd. and will join us in wishing him a speedy and complete return to good health. Meantime the business is being managed by Mr. Carrington's son, Neville, who has always been associated with the company as a technical adviser.

WATER ANALYSIS SERVICE

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

PROBLEMS ANSWERED

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

Community in a Small Tank

I have a tropical community aquarium and wish to set up another. Would one of 14x8x8 in. dimensions prove satisfactory for a few tropicals? What heating and lighting would be needed?—(J. K. S., Christchurch, New Zealand.)

A tank 14x8x8 in. can be used quite successfully for keeping tropicals provided care is taken in the choice of fish. An excellent selection of fish which would live peacefully together, and would also look attractive, would be one pair of Dwarf Gouramis, a pair of Checker Barbs (*Barbus oligolepis*) and one pair of Zebra Fish (*Brachydanio*). The best type of heating for a small tank would be electrical, either by means of a coil under the tank controlled by a thermostat if the tank itself, or by an immersion heater, thermostatically controlled.

A 60-watt heater would be sufficient. Although we have suggested three pairs of fish this community can be varied and other suitable fish for a small tank are Platies, Guppies, White Cloud Mountain Minnows, Harlequins and Neon Tetras. The main object should always be to prevent the tank becoming overcrowded.

Foreign Coldwater Fish

I have an aquarium measuring 18x10x10 in. Could you recommend some foreign coldwater fishes with which to stock it?—(F.J.L., London, E.C.3.)

Your 18x10x10 in. aquarium is not really large enough for coldwater fishes unless they are young specimens which would in time outgrow the tank. However, young Sunfish, Peacock-eyed Bass and Bitterling are available and would be suitable for a time. Their description has appeared in WATER LIFE from time to time and also their habits. Remember, however, that they must be fed on living foods such as tiny Earthworms, *Daphnia*, mosquito larvae, Enchytrae, etc., if they are to thrive.

Eggs from Green Lizards

Two of my newly-imported Green Lizards have laid 20 eggs and a third specimen is about to lay a batch as well. Could you give me some advice on hatching them? I have put one lot in a jar and lightly covered the eggs with sand. The evening temperature is 70 deg.F. and the day temperature 80 deg.F. The mouth of the jar is partially blocked with a wet lettuce leaf to maintain a degree of humidity. The second batch of eggs has been left in the lizard cage as they were laid and then covered up.—(H.L.J., Burford.)

We shall be interested to hear which hatching method is the most successful—incubation in the more natural surroundings in which they were laid, or incubation in the jar. Knowing the vagaries of our

climate, with its fluctuating daily temperature, we prefer to remove the eggs to a tin or jar, placing them on top of some sand or moss and then covering them with a further layer of moss. By not burying the eggs, they can be inspected daily. The moss is kept slightly damp.

The chief failure in egg incubation of this kind is due to fungus from over-wetting the eggs. On the other hand, they can so easily dry out, so that a constant watch is necessary.

Light Required

Would you inform me of the correct lighting required for a 24x10x8 in. coldwater aquarium? I have a light hood with fittings for two bulbs and the plants are *Sagittaria* and *Vallisneria*. Also, what would be the lighting requirements for a 36x12x12 in. coldwater tank?—(W. F., Highbury, London, N.5.)

It is difficult to give adequate light to keep the plants growing in a relatively small coldwater aquarium as the small volume of water tends to get too hot for the fishes. Insufficient wattage lamps will cause the plants to die down and algae (usually Blue-green) to form. For the 24x10x8 in. tank you could experiment to see whether two 25-watt bulbs would be sufficient. If not, try two 40-watt. Should the water get too warm move the

For Your Bookshelf

Aquatic Bugs*

DR. T. T. MACAN'S new publication replaces the same author's two keys, one dealing with the Lesser Water Boatmen (*Corixidae*), issued in 1939, and the other with the rest of the water bugs which appeared in 1941. The exhaustion of the stocks of these two valuable scientific publications of the Freshwater Biological Association has provided Dr. Macan with an opportunity not only of combining the two keys into one volume but also of introducing improvements and corrections which experience of the use of the keys has shown to be necessary. The nomenclature, too, has been brought up to date, as for instance by the relegation of the Genus *Sigara* to the status of a subgenus so that the species of Lesser Water Boatmen included under *Sigara* in the earlier key now appear under *Corixa*. Some of the figures have been re-drawn and others re-arranged in relation to the text. The instructions for mounting specimens for examination now accord with modern methods and the notes on ecology and the bibliography have been brought right up-to-date.

The key, as it now stands, will long

* "A Revised Key to the British Water Bugs," by T. T. Macan. 74 pages. Illustrated by diagrams. Freshwater Biological Association, 4/-.

aquarium near to a high wattage room light. Two 40-watt lamps may do for the 36x12x12 in., again depending on whether the room light is strong enough, otherwise it will have to be 60-watt lamps. You could experiment with one relatively strong lamp with the plants grouped underneath, leaving the other end of the aquarium without a lamp.

Spots on Angels

One of my Angel Fish has developed white pimples near its eye. Farther white spots are developing and another Angel is now affected. In both cases the spots are confined to the head region.—(H.S., Dewsbury, Yorks.)

It appears possible that your fish are infected with White Spot disease. This is a parasite disease which must have been introduced from some external source and will attack the fish in increasingly large numbers. It is highly infectious and the following treatment is suggested. Obtain from your chemist a solution consisting of 15 grains of methylene blue dissolved in 100 c.c. of water. 3 c.c. of this solution should be added for every gallon of water in the tank. Best results are obtained if the quantity is added in two equal doses at 24-hour intervals.

The water will be a deep blue colour and this colour will gradually clear over a period of about two weeks. Before adding the methylene blue the tank should be siphoned out and as much of the dirt and muck as possible cleared from the bottom, the temperature being maintained at 80-85 degrees.

When all spots have disappeared from the fish they should be left for a further seven days and, if no more spots are seen, the water can then be changed and the infection can be considered at an end. This disease is extremely infectious and should not be allowed to spread.

remain the standard reference work on the identification of the British species of water bugs and is essential to all those who are interested in the study of these insects. It places us still further in the debt of the author and of the Association of which he is Deputy Director; the long list of keys to freshwater animals which have appeared in recent years under the imprint of the Freshwater Biological Association have enabled us all to identify our pond-life finds with accuracy and with a surprising lack of strain on our pockets!

—JOHN CLEGG.

Water*

IN "The World of Water" Dr. J. Gordon Cook has written a book packed with a wealth of scientific data from the water world. Its presentation is extremely readable and the scope of the information ranges from the virgin seas of millions of years ago to the present-day problems caused by synthetic products finding their way into drinking water supplies, with possible effects upon the health of the community. Although this book is primarily written for "everyman", aquarists both freshwater and marine, will find a great deal of useful information in it.—E.L.T.

* "The World of Water" (Science for Everyman series), by J. Gordon Cook, Ph.D., F.R.I.C. 192 pages plus eight black-and-white page plates. George G. Harrap & Co. Ltd., price 12/6.

WATER LIFE'S JANUARY AQUARIA EXHIBITION

National Hall, Olympia, London, W.14, on January 10, 11 and 12

Strong Entry in Furnished Aquaria and Breeders' Classes—Two Trophies up for Competition

FROM January 10-12, 1957, the National Hall, Olympia, London, W.14, will house the National Exhibition of Cage Birds and Aquaria when thousands of tropical birds, budgerigars and canaries will be on show and also a large number of furnished aquaria and breeders' teams of fishes.

Wider Classification

The aquaria classification for the 1957 show has been widened and includes five classes for set-up aquariums and four for breeders' entries. At the time of going to press entries were coming in well and a highly satisfactory total was expected by the closing date on December 4. The WATER LIFE Trophy will be competed for in the Club Furnished Aquaria classes and the F.B.A.S. Junior Trophy in the section for dressed tanks set up by schools.

The following judges will officiate: Capt. L. C. Betts (Classes A2 and A9), Mr. A. Boarder (A4, A5 and A9), Mr. C. W. G. Creed (A5 and A6), Mr. J. H. Gloyn (A1 and reserve), Mr. S. Harker (A6 and A7), Mr. H. R. Holland (A1 and A4), Mr. R. G.

Mealand (A3 and A7), Mr. B. Meadows (A3 and A8) and Mr. C. J. Saunders, B.Sc. (A2 and A8).

In addition to the competitive classes there will be special displays by the Federation of British Aquatic Societies, the Federation of Guppy Breeders' Societies, the British Herpetological Society (London Group) and the Goldfish Society of Gt. Britain.

Special Features

The F.B.A.S. will tell the story of aquaria in hospitals on their exhibit and they also hope to have on show the automatic fish location map made by Chelsea A.S. Furnished Guppy tanks entered by its various Sections will comprise the main theme of the Guppy Federation's display whilst the B.H.S., will stage tropical reptiles and amphibians. The Goldfish Society of Gt. Britain plans a decorative garden pond.

The Aquaria Section, occupying 6,000 sq. ft. in the Gallery, will contain much to interest the experienced fancier and the lay viewer. Make a

point of visiting the show during its three days duration. Times of opening and admission charges are: Thursday, January 10, 2.30 p.m.-9 p.m. (5/- up to 5 p.m., 3/- after 5 p.m.), Friday, January 11, 10 a.m.-9 p.m., and Saturday, January 12, 10 a.m.-8 p.m. (both days, 4/- up to 5 p.m., 3/- after 5 p.m.)

Children under 14 are admitted half-price at all times and parties of 12 or more children, accompanied by a teacher, from schools exhibiting in Class A5 are admitted at the reduced rate of 1/6d. per child. Three-day season admission tickets (price 10/-) are obtainable from the Show Manager, Dorset House, Stamford Street, London, S.E.1.

Offers of Help

Experienced aquarists in the London area who would be prepared to steward at the show are invited to write to the Section Organiser, WATER LIFE Display, Dorset House, Stamford Street, London, S.E.1. Out-of-pocket expenses will be paid on the usual scale.

Visit this Premier Winter Event

Current Research

Studying Fishes' Feeding Habits

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

THERE is a very considerable field for study in the nutrition and nutritional problems of fish maintained in captivity. Much may be learned from a study of the feeding habits of fish in their natural surroundings, even though the application of such information is not always a straightforward matter.

Dr. W. W. Macdonald, until recently a member of the East African Fisheries Research Organisation and now at the Institute for Medical Research at Kuala Lumpur, Malaya, has published in the current issue of the *Journal of Animal Ecology* (Vol. 25, 1956, pp. 36-53) his observations on the feeding habits of the Elephant-snout Fish (*Mormyrus kannume* Forsk.). This fish, so named from its long snout or rostrum, is widely distributed in East African lakes and in the Nile system.

Relatively little appears to be known concerning its habits, or eggs and young, although it probably has an annual breeding cycle. It is a bottom living fish, feeding principally on the early stages of insects, such as the larvae of *Chironomidae* and *Trichoptera*, and the nymphs of *Odonata* and *Ephemeroptera*. Prawns are stated to be, sometimes at least, an important item of food.

The primary study by Macdonald, on the bottom fauna of Lake Victoria in relation to the feeding habits of fish, led to a whole series of important observations on the biology of Chaoborids and Chironomids which are embodied in the above-mentioned paper. It became clear that certain events, such as the emergence of

the adult insects and the appearance of pupae in fish stomachs, occurred at regularly monthly intervals.

Elephant-snout Fish were netted at weekly intervals throughout the study, within a matter of hours of the time at which bottom samples had been taken. The stomachs of the fish contained mainly three species of larvae, viz. *Tanytus guttipennis*, *Procladius umbrosus* and *Chironomus* larvae of the *plumosus* type. A few other Genera were present in unimportant numbers.

Methods Not Standardised

There is no standard method for the assessment of the food of fish. As Macdonald puts it, the method used depends to a large extent upon the feeding habits of the fish, the degree of accuracy required, and on personal preference. In the case of the specimens of Elephant-snout Fish it was found convenient to examine only a fraction of the total stomach contents, since one stomach might contain the remains of several thousand larvae. The contents were mixed with water and a random sample was removed with a pipette. Since the head capsules could be easily identified, each was regarded as representative of one larva, although often the head was detached from the body.

Between four and eight stomachs were examined each week, 100 larvae being identified from each stomach. The average number of larvae of each species present in the samples was then converted to a percentage for the stomach contents as a

whole. A note was also taken of the number and species of pupae in the samples. In addition, an estimate was made of the total stomach contents, numbers from 0 to 5 being used to express the range from empty to very full stomachs (these details are recorded here to indicate the type of information that might be expected in studies on other species).

Adequate Food

Owing to the presence of two populations of larvae separated in time, there was, in fact, evidence of a constant and abundant food supply in the area of study, no doubt in excess of requirements. Since a number of species pupate and emerge at about the same time, there would be a period when there were few or no larvae in the mud, were it not for the fact that a second population replaces that which emerges. As a result of this there were no regular variations in the estimates of total stomach contents, the stomachs ranging usually from half full to full. There was a slight but not highly significant suggestion that the stomachs were nearer to being full when *Chironomus* larvae were the principal food.

One type of larvae, those of the Genus *Chaoborus*, was the most common found in the mud in the area examined. Despite this, it was never present in large numbers in the stomach contents of the fish. The probable explanation lies in the fact that these larvae have the habit of making vertical migrations at night from the mud into the open water. Elephant-snout Fish, which feed at night, thus miss a valuable food supply. Of the species forming the main constituents of the diet, however, there was a regular fluctuation in the stomach contents that was correlated closely with the fluctuations in the numbers of the same species in the mud.

Exhibition Round-up

Smaller Entry for Annual Guppy Show



Photograph]

[J. H. Gibbons

At the Guppy Federation's Autumn Show in the London Zoo Pavilion Cafeteria. Front row (left to right)—W. G. Phillips, Mrs. J. D. Smith, G. F. Smith, P. C. Fovitt, A. R. Wooding, R. Foster, T. Sandys, P. Redzull, C. R. Looker, and D. Johnson. Middle row (left to right)—E. L. Matthews, P. S. Campkin, G. F. Elverson, J. Wilson, E. H. Riddle, H. S. White, A. Littlewood, B.Sc., W. Layzell and A. J. Holloway. Back row (left to right)—H. Esterbrook, R. Rawlinson, W. Howe, R. Forest-Jones, B.Sc., L. Stevens, H. Pearson and R. Alley. With the exception of the F.G.B.S. general secretary, A. J. Holloway, and P. S. Campkin, chairman of the F.B.A.S. Judges' and Standards Committee, all those shown are Guppy Federation judges.

A DROP in entry of 150 yet still the highest total of any show held so far in 1956 can be the proud boast of the FEDERATION OF GUPPY BREEDERS' SOCIETIES for its annual cup show at London Zoo in September. The number of entries was 503 with high quality in many classes. Some of the Veiltail males impressed us and especially Mr. G. Tansley's exhibit (Eastern Counties) showing strong colour and good finnage, to win its owner the prizes for

best fish in show, best members' fish and best members' male, with 85 points.

A beautiful Gold female from Mr. A. Maher (Cheltenham and Gloucester) gave its exhibitor the best female in show trophy. Provincial members (i.e. those unattached to any Section) put up a remarkably fine showing, and came third in the inter-section competition with 49 points where South London (76 points) unseated Eastern Counties (72 points) from premier position.

Outstanding Aquarium at Stoke Newington

NEAR the close of the main show season there was a number of exhibitions providing exceptional interest. One was the second annual show of STOKES NEWINGTON A.S. with well over 350 exhibits. The show was so laid out that it gave an air of intimacy without any suggestion of overcrowding.

The first prizewinning tank in the club tropical class drew considerable attention. It was a first-class exhibit, gaining 91 points for Hendon A.S. and the aquarist responsible, Mr. A. Baldock, gives the design on page 269 of this issue. Second in the strong class was Bethnal Green's 88-point aquarium, beautifully arranged to allow ample swim space. Stoke Newington were first in the club coldwater furnished with a pleasing tank, followed by Hendon. There were nine individual furnished aquaria led by Mrs. F. Barry with an attractive design in a small aquarium. Mr. J. Franklin was second.

Coldwater Classes

Mr. W. F. Patrick's Scaled Fantail won its class with Mr. P. R. H. Franklin, second. Veiltails had Mr. F. Barry's fish in first and second places. In a smallish Moor class Mr. F. Barry's Fantail won with Mr. H. Tisbury, runner-up. Mr. P. R. H. Franklin repeated his success at several other shows in the area this year by taking first two places in the Shubunkins. Mr. H. Tisbury's Oranda with lovely headgear, led the A.O.V. Goldfish whilst Mr. D. E. Goodbody's Common, failing a little on colour, was second.

There were 26 Swordtails headed by Mr. W. Wiegold's well developed Red. Second was a Red-eyed Red from Mr. P. Woodford. Sunsets took first two places in the Platies, with Mr. R. Elsdon's fish the leader and Mr. W. Snaith's, second. Mr. J. Morrice's well developed and coloured Velifera led the Mollies. Mr. A. Elderfield's Black of strong colour was second. Male Guppies had Mr. G. S. Rutt's Pintail in first place with Mrs. H. R. Penton's Veiltail.

second. Blue Limias took all the awards in the A.O.S. Livebearers; first and second being shown by Mr. W. Snaith.

Mr. V. Sones' leading Blue Fighter had nice finnage and Mr. C. Louden's Blue was not far behind. A Kissing Gourami, lovely size and condition, was first in the 26 A.O.S. Labyrinths for Mr. F. Tegmere, whilst Mr. L. F. Clements' beautifully coloured Combtail was second.

A Pearl Danio, good shape and particularly fine colouring, won its class for Mr. W. Snaith with Mr. G. S. Rutt's Pearl, not quite the colouring, runner-up. There was a magnificent entry of 43 in the Barb class where *Barbus schwanenfeldi*, nice depth of body and colour, won for Mr. Horrex. A beautifully shaded Nigger was second (Mr. P. Whitworth). A very fine Hatchet Fish led for Mr. W. Snaith in the Characins and Mr. A. Baldock was second with *Prochilodus insignis*.

Mr. L. G. Coombs' well-known Marbled Cichlid headed its class with Mr. L. Coatman's Texas Cichlid second. The *Pelmatochromis kribbenis* which won the Dwarf Cichlids for Mr.

Best provincial members' fish came, a 78-point Grey female, from Mr. G. Russel. Largest class was that for Coloured females where Mr. H. Esterbrook (E. Midlands) led the 52 entries with an 80-point exhibit. Open classes were reasonably well supported with Mrs. Tye taking the main award. Mr. A. V. Taylor (Portsmouth) headed the breeders' teams with beautiful Gold females. The International class was not so representative this time. Wales came first, Germany second and England, third.

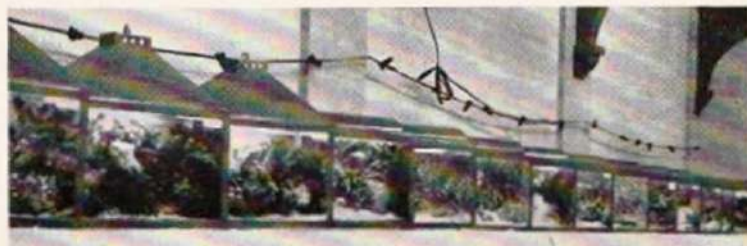
Staging in the attractive venue was pleasingly arranged although it was a pity there were no competitive furnished aquaria classes this year. One furnished aquarium from Mr. E. B. Lee, in the unusual dimensions of 24 x 18 x 12 in. was well laid out. This year's show secretary was Mr. J. Wilson, and the show organiser was Mr. H. S. White. Mr. R. Forest-Jones, B.Sc., presented the prizes.

Main awards went as follows: Cofertails: 1, R. Forest-Jones; 2, R. Alley. Scarftails: 1, G. Russel; 2, D. Nicholls. Robson Males: 1, T. Sandys; 2, R. A. Foster. Veiltails: 1, G. Tansley; 2, L. Stevens. Roundtails: 1, W. G. Layzell; 2, J. C. Wilson. Speartails: 1, F. W. Humpidge; 2, F. Kaliszewski. Pintails: 1, P. A. Jenkinson; 2, W. Howe. Doubleswords: 1, G. M. Davis; 2, A. Littlewood. Lyretails: 1, A. L. Matthews; 2, A. Littlewood. Bottomswords: 1, P. H. Jenkinson; 2 (tie), W. E. Cox and R. Forest-Jones. Topswords: 1, W. H. Locke-Bowers; 2, Mrs. I. D. Smith. Grey Females: 1, G. Russel; 2, R. Alley. Gold Females: 1, A. Maher; 2, H. S. White. Gold-laced Females: 1, J. C. Wilson; 2, W. Howe. Robson Females: 1, J. C. Wilson; 2, T. Sandys. Coloured Females: 1, H. Esterbrook; 2, P. Pavitt. Breeders' Males: 1, P. Pavitt; 2, E. S. Roach. Breeders' Females: 1, A. V. Taylor; 2, A. Littlewood. Gold-laced Males: 1 and 2, W. Howe. Gold Males: 1, A. Maher; 2, M. Welch. Open Short-tails: 1 and 2, F. Schanainer (Germany). Open Females: 1 and 2, W. Wakeling. Open Scarftails or Veiltails: 1, Miss J. Forest-Jones; 2, Mrs. Tye. Open Swordtails: 1, Mrs. Tye; 2, S. Priesing (Germany). Open Breeders' Males: 1 and 2, S. Priesing. Open Breeders' Females: 1, W. Wakeling.

J. Brand had lovely fin colouring and a large sized *A. ramirezi* was second for Mr. G. Mills. *Aplocheilichthys lineatus* took all the places in the class for Egg-laying Tooth-carp. First and second were Mr. J. Brand's fish. An unusual Catfish species won its class for Mr. P. Delira and Mr. A. J. Wainwright's more familiar *C. paleatus* was second.

Unusual exhibits in the A.O.S. Tropicals were a number of Snakeheads but it was a very large Scat that won the class for Mr. C. Hedges with a beautifully coloured Black Shark second for Mr. T. V. Hill. Black Swordtails led the breeders' livebearers for Mr. E. W. Bartlett. Mr. J. Morrice's Velifera were in second place. A well coloured team of Lyretails (WATER LIFE Diploma for best tropical breeders) won the Breeders' Egg-layers (Mr. J. Piacenti) and Mr. W. Snaith came second. Mr. H. Tisbury's Moors were first (WATER LIFE Diploma) in the Breeders' Coldwater and Mr. F. Barry gained second place with Veiltails.

In the inter-club points competition between Bethnal Green, Hornsey, Stoke Newington and Tottenham the home society won with 42 points to runner-up Hornsey's 12. Show secretary was Mr. W. H. Snaith, Mrs. Meadows, Mr. A. Boarder and Mr. J. H. Gloyne were the judges.



Part of the splendid array of set-up tanks at Stoke Newington show.

Quality in the Reduced Bristol A.S. Total

BRISTOL AQUARISTS' SOCIETY, one of the very few to have among its members aquarists who can look back to their club's beginnings 27 years ago, staged its open show in mid-September. There have been larger Bristol exhibitions but this one reached the heights for presentation. The new venue, Wills' Recreation Hall, Bedminster Bridge, helped, for it is a beautifully designed building and Bristol officials took maximum advantage of it in setting out the show. A floral display and exotic birds placed around the stage on which the trophies were shown provided a perfect foil to the neatly arranged exhibits.

The somewhat reduced entry, although still exceeding 300 excluding the 129 fish in the Guppy Federation's Bristol and Bath Section's classes, gave the effect of more variety for the casual viewer. Eighty entries in a Shubunkin class is enthralling for the Goldfish specialist but for the unconverted it can prove deadly dull. This year things were more manageable but still the Bristol Shubunkin classes had 31, 25 and 30 entries apiece. The Bristol area maintains its reputation as the Shubunkin stronghold and quality did not appear to have receded with the reduction in numbers.

Leading the Common Goldfish (Butler Coronation Cup) was Mr. H. T. Jago with Mr. W. Ham's rather smaller fish second. Strongest class of the show was that for 3 in. Bristol Shus., with 31 exhibits. Worthy winner of the Mid-Somerset A.S. Cup here was Mr. L. G. Emery's well-developed and coloured fish followed by Mr. G. Harper with an exhibit that did not have the same strength of blue. T. Thornton Stone won the 5 in. Shus. went to Mr. H. R. Stone with a shapely specimen. Second was Mr. W. Hicks. Midland exhibitors took the leading places in the Veiltails; first and I. J. Spencer Trophy winner being Mr. C. D. Roe and second, Mr. E. A. Mason.

Moors were a good lot with Mr. C. S. C. Whiteford gaining the A. D. J. Brooks Cup and a WATER LIFE Diploma. Second was Mr. T. L. Dodge. Mr. E. A. Mason's magnificent Oranda shared the best in show honours with Texas Cichlids in the tropical section, taking the Mabel Davis Trophy (shared) and the Eric Butler Cup. Second to Mr. Mason's exceptional fish in its class was another Oranda shown by Mr. W. Butler. The competition for Nymphs and Comets was led by Mr. H. C. B. Thomas with a Seale Comet of commendable standard. Second was another Comet from Mr. L. G. Emery. It was a pleasure to see this variety present on the show bench and winning.

Good Scaled Fantail

Mr. A. W. Rudge showed a Scaled Fantail which was worthily adjudged second best coldwater fish in show, and winner of the B. T. Child Challenge Shield and A. W. Rudge Cup. The second Fan. was also shown by Mr. Rudge. B.A.S. Cup for Calico Fantails went to Mr. W. H. Ellis' well contoured fish in a small class. Second was Mr. F. Chappell.

Mr. D. D. Headford showed the first two fish in the A.O.S. Coldwater, both nicely conditioned Perch, the leader winning on deportment. 1956 Shus. had Mr. L. G. Emery's fish in first two positions and he won the Mrs. E. R. Blunsden Cup over 30 entries. Current-year Moors were led by Mr. T. L. Dodge's finely developed and sized fish. He won the C. F. Whitehead Cup and also took second place. Mr. C. D. Roe's Calico Veils, very finely developed for their age, were first (R. G. Watson Cup) and second in the 1956 A.O.V. Goldfish.

Breeders' teams of Shus., Comets or Commons had Mr. L. G. Emery's even sextet in first place and Mr. W. Hicks', second. Mr. C. D. Roe took the first two places and S. J. Davis Trophy in the A.O.V. Goldfish Breeders' teams with beautifully grown Veils, having good bodies.

There was a single entry in the coldwater furnished aquaria which won the Zenas Webb Cup for Miss M. Gould. The best individual tropical furnished tank (J. S. Warry Crystal Trophy) was that of Mr. L. E. J. Challenger having an interesting design that rather lacked in plant contrast. Second was Mr. P. C. Hull. The club furnished aquarium class had six

entries. Bristol A.S. won with a pleasing set-up having an attractive bottom layer, but here, too, there was something lacking in plant variety. Second were the Keynsham Branch of Bristol A.S. Beryl Hill Cup winner in the furnished vivaria was Mr. M. S. Bellis. Twisted Vallisneria, evenly grown and clean, led the plants for Mr. L. E. J. Challenger. Second was Mr. C. D. Roe.

Mr. H. G. Rundle came all the way from Bagshot in Surrey to take several prizes in the tropical section, including the Lowell Baldwin Cup for the best Fighters. Second here was Mr. W. H. Webb. A good pair of Kissing Gouramis won the J. F. Robinson Cup (A.O.S. Labyrinth) for Mr. and Mrs. Jefferies with a pair of well developed but smallish Leeris second for Mr. W. H. Webb. The Dunckeri Barbs of Mr. H. G. Rundle, evenly matched and nicely conditioned, won the J. H. King Cup, beating a pair of well grown Tigers (Mr. R. Cockram) into second place.

Mrs. Dobson's large *Metymnis schreiniulleri* were the best Characins (O. F. Organ Cup) but Mr. W. H. Webb's *Leporinus* were not far behind. The Cichlids were a class of quality, the leading Texas (Mr. W. H. Webb who won a WATER LIFE Diploma and the H. J. Shepherd Cup) sharing best in show honours with an Oranda. Second were two superbly coloured *Pelmatochromis* from Mr. R. James.

Two quality Botias won the A.O.S. Egglayers for Mr. W. H. Webb with Black Sharks from the same exhibitor in second place. These latter were of magnificent colouring and size but slightly torn fins lost points. Mr. W. H. Webb's nicely shaped Blachs won the Molliés with the same exhibitor's *Veliferas* second. An interest-

Highly Pointed Fish at Peterborough Show

FIVE entries in the 1956 open show of PETERBOROUGH A.S. received 90 points and over. They were Mr. D. R. Hunt's fish in the Characins, Mr. D. Coulter's and Mr. H. Thompson's exhibits in the Cichlids, and the first and second prizewinners in the A.O.S. Labyrinth, shown by Mr. Coveney and Mr. G. Stockdale.

Winner of the society's Challenge Cup for the best tropical furnished aquarium was Mr. S. Simons, and a similar trophy for the best coldwater furnished aquarium went to Mr. D. Atkins. Mr. B. Smith took the Vivaria Cup. Best fish in show was entered by Mr. D. Coveney and WATER LIFE Diploma winners for the best tropical and coldwater teams, respectively, were Messrs. D. Wright and W. Hailstone. The Peterborough society took the Interclub Plaque for most points and Mrs. C. Wright the Points Cup, open to Peterborough members only. Mr. and Mrs. B. Meadows were the judges.

Other first prizewinners were: B. Abrahams (Guppies); S. Bean (Platies); H. Thompson (Swordtails); Mrs. Coveney (Molliés); D. Worthing (Fighters); D. Newson (Catfish or Loach); Mrs. S. Bean (Barbs); C. Hanchard (Carps and Minnows); S. Bean (A.O.S. Tropicals); Mrs. C. Wright (Goldfish); W. Watson (Shubunkins); H. Thompson (Veiltails, Fantails or Moors); R. Pope (A.O.S. Coldwater); G. Stockdale (Plants).

Coventry's Exhibition

THE COVENTRY P. & A.S. staged its fourth annual aquarium exhibition as a four-day event. The opening ceremony was performed by the Lord Mayor of Coventry, Alderman W. I. Inomson.

Best furnished aquarium was shown by Mr. G. Glover who took the Hogarth Cup, and also the society cup and WATER LIFE Diploma for the best coldwater furnished aquarium. Mrs. L. Court showed the best tropical furnished aquarium and won the G. E. Stone Cup. She also exhibited the best team of livebearers and took the Society Cup.

ing entry was a pair of Liberties from Mr. H. G. Rundle. There were four open Guppy classes, Mr. R. Forest-Jones, B.Sc., taking first in the Shorttails and second in the Longtails, Miss M. Hill second in the Shorttails, first in the Longtails and second in the females and Mr. L. E. J. Challenger, first in the females.

Mr. R. Cockram's Reds, nicely developed but their colour could have been stronger, were first in the Swords (Keynsham Cup) with Mr. L. Littleton's interesting Green Wagtails second. Soregrov Cup winner in the Platies and winner of the Percy Gibbs Cup were a particularly fine pair of Red Wagtails from Mr. R. James. Mr. L. Littleton's Variatus were second. The well-coloured team of Liberty Molliés shown by Mr. H. G. Rundle (R. James Cup) were first in the livebearer breeders (second was Mr. W. H. Webb with nicely developed *Veliferas*) whilst Mr. R. Cockram was first in the egglayer breeders with an even team of Tiger Barbs (Mrs. Dobson was second with White Clouds). Mr. W. H. Webb won the F. G. Denman Cup for highest number of points in the show.

Judges in the coldwater section were from the Bristol society's panel, plus Messrs. W. Butler and Z. Webb from the Midlands. Mr. A. J. Elliott officiated for the herpetological exhibits and Mr. H. S. White for the tropical entries. Mr. H. S. White also judged the F.G.B.S. Bristol and Bath Section's show at the same event where there were 129 entries, attractively staged. This was only the Section's second show and the entry received was 150 per cent up on their first competitive display at Bath, two weeks earlier. First prizewinners were Mr. F. W. Humpidge (Shorttail males), Mr. D. Nicholls (Scarf-tail males), Mr. P. Pavitt (Veiltail males, Doublesword males, and breeders' males), Mr. W. E. Cox (Bottomsword males), Mr. R. Forest-Jones (Lyretail and Topsword males) and Mr. A. V. Taylor (females and breeders' females).

Master A. Court won the Bradbury Cup for best fish in show, the W. Dymond Cup for best coldwater fish and the Moore Cup for best junior coldwater aquarium. The Essam Bowl for the best team of six egglayers was presented to Mr. C. J. Grant. The best junior tropical aquarium award went to Master A. Copson, whilst Mr. E. Page won the Farren Plaque for the best tropical furnished aquarium in the senior section. Clarke Plaque for the best Guppy went to Mr. G. Stock.

First prizewinners were: G. Glover (Coldwater Furnished); Mrs. M. D. Bradbury (Common Goldfish); G. Bengel (Shubunkins); G. Bengel (Twintails, other than Moors); Master A. Court (Moors); F. Dean (A.O.V. Coldwater); Mrs. L. Court (Tropical Furnished Aquaria); R. G. Stock (Guppies); Mrs. L. Court (A.O.S. Livebearers); Mrs. L. Court (Characins); F. Randall (Barbs); F. Dean (A.O.S. Egglayers); C. J. Grant (Breeders' Egglayers); Mrs. L. Court (Breeders' Livebearers); Master A. Court (Junior Coldwater Furnished) and Master A. Copson (Junior Tropical Furnished).

Hampstead Tops 100

MRS. W. M. MEADOWS and Mr. C. W. G. Creed judged the 102 exhibits in the fifth annual show of HAMPSTEAD A.S. held in conjunction with Hampstead Horticultural Show. Mr. Lester Coatman's *Pimelodella* Catfish was the best fish in show.

First prizewinners were: R. O. B. List (Common Goldfish), W. Adams (Fancy Goldfish); L. G. Lawrence (Shubunkins); L. G. Lawrence (British Coldwater); L. G. Lawrence (Foreign Coldwater); P. B. Utton (Hyphessobrycon or *Hemigrammus*); L. Coatman (A.O.S. Characin); W. Adams (Barbs); R. O. B. List (A.O.S. Cyprinid); R. O. B. List (Loaches); R. O. B. List (*Corydoras*); L. Coatman (A.O.S. Tropical Catfish); A. H. Brown (Egglaying Tooth-curps); P. B. Utton (Male Guppies); P. B. Utton (Female Guppies); L. Coatman (Molliés); P. B. Utton (Platies); P. B. Utton (Swordtails); W. Adams (Fighters); K. J. A. Pye (A.O.S. Labyrinth); P. B. Utton (Angel Fish) and L. Coatman (A.O.S. Cichlids).

Promoting Club Shows Best Tank at Blackpool

COUNCILLOR CROSS Trophy for the best club furnished aquarium went to Blackpool & Fylde A.S. at that society's sixth annual show held on October 26-28. Best individual coldwater aquarium was shown by Mr. G. N. Hadley and the Blackpool Corporation Challenge Trophy for the best individual tropical aquarium also went to Mr. Hadley. Premier award in the section for ornamental aquaria went to Mr. V. Stevenson. Blackpool Tower Company Trophy for best fish in show was awarded to Mr. B. Norris and Peck Trophy for the best member's fish, other than a trophy winner, was presented to Mr. G. Gower. Winner of the Newton Trophy for the member with the most awards was Mr. G. N. Hadley. The interschools trophy was won by Claremont Junior Boys and the class for individual schools aquaria, by Mr. G. Fletcher.

First prizewinners were Mrs. M. Jones (Common Goldfish); S. Walsh (Shubunkins); S. Walsh (Fancy Goldfish); W. Leigh (Swordtails); G. Gower (Platies); F. Taylor (Mollies); D. Hammond (Guppies); J. Hodgetts (Characins); D. Talbot (Dwarf Gouramies); A. Taylor (Leeri Gouramies); J. Haworth (A.O.S.); J. Simpson (Fighters); W. J. Cook (Minnos and Barbs); B. Norris (Dwarf Cichlids); D. Chapman (Catfish); C. N. Wilkinson (Breeders' Coldwater); F. Taylor (Breeders' Livebearers); C. A. Blake (Breeders' Egglayers).

Other trophy winners were Mr. S. Walsh (Jackson Trophy); M. F. Taylor (Blackpool and Fylde A.S. Trophy); J. Hodgetts (Robinson Trophy); J. Simpson (Hadley Trophy); E. J. Cook (Partington Trophy); B. Norris (Ethington Trophy); J. Hodgetts (Lyndene Trophy) and C. A. Blake (Fylde Cinemas Rose Bowl).

Kirkcaldy's Increased Entry

KIRKCALDY A.S. had an increased entry of 140 for its 1956 Exhibition, judged by Messrs. M. Kerr and J. Wilson. The two most successful exhibitors were Mr. P. Low of Kirkcaldy and Mr. H. Kerr of Edinburgh. Mr. Low took the WATER LIFE Diploma for best furnished aquarium and Mr. H. Kerr, a similar Diploma for best fish in show, with a Guppy.

First prizewinners were: Tropical Furnished Aquaria, P. Low; Coldwater Furnished Aquaria, D. Henderson; Breeders' Livebearers, E. Headley; Breeders' Egglayers, G. Henderson; Male Guppies, A. Robertson; Singletail Coldwater Fish, W. Carter; A.O.V. Coldwater Fish, D. Henderson; Livebearers, A. Cross; Characins, P. Low; Rasboras, P. Low; Danios, W. Carter; Barbs, H. Kerr; Labyrinths, E. Headley; Catfish, P. Low; Cichlids, E. Headley; A.O.S. Tropicals, P. Low.

Copeina Wins in Three Counties Event

A COPEINA ARNOLDI, shown by Mr. R. Keeping of Basingstoke, won the Diploma and High Wycombe Trophy for best fish in show at the Three Counties Aquaria Exhibition staged this year at High Wycombe, and organised by HIGH WYCOMBE AQUARIUM SOCIETY. The show manager was Mr. S. Frayne and the show secretary, Mr. K. Palmer. Judging the 254 entries were Mr. and Mrs. B. Meadows and Mr. C. W. G. Creed, who awarded 12 F.B.A.S. Gold Stars.

The best individual furnished aquarium was exhibited by Mr. F. H. Watts of High Wycombe and he received a Diploma and the Reading Cup. The Wendy Cup for the best individual coldwater aquarium went to Mrs. Steele whilst of the two club furnished aquaria trophies, the Reading Shield went to High Wycombe A.S. and the Oxford Shield to Reading A.S.

First prizewinners were: L. Franklin (Common Goldfish); E. J. Steele (Shubunkins); A. Shaw (Fantails or Veiltails); A. W. Smith

(A.O.V. Coldwater); E. H. Chatfield (Swordtails); E. H. Chatfield (Platies); I. G. Flintham (Mollies); W. H. Locke-Bowers (Male Guppies); F. H. Watts (Fighters); S. Frayne (A.O.S. Labyrinths); B. A. Ling (Danios, Rasboras and Minnows); B. A. Ling (Barbs); J. R. Thompson (Catfish); F. H. Watts (Hyphessobrycon); R. A. Keeping (A.O.S. Characins); W. R. Dolton (Cichlids); A. Ainsworth (A.O.S. Tropicals); High Wycombe society (Club Tropical Furn.); Reading A.S. (Club Coldwater Furn.); F. H. Watts (Individual Tropical Furn.); Mrs. Steele (Individ. Coldwater Furn.); J. G. Flintham (Breeders' Livebearers); L. Franklin (Breeders' Egglayers) and M. Gibbs (Breeders' Coldwater).

Welsh National Show

BEST fish in show and best tropical fish at the Welsh National Show organised by WELSH NATIONAL A.S., Cardiff, was shown by Mr. W. H. Webb. The best coldwater fish was entered by Mr. H. V. Jenkins, and the best furnished aquarium by Mr. S. Jenkins. WATER LIFE Diplomas went to Miss C. Lewis and S. Jenkins in the coldwater and tropical furnished

aquaria classes, respectively. The best aggregate points by a Welsh National A.S. member were gained by Mr. W. H. Webb. Premier position in the Guppy entries went to the Misses J. and J. Brotherton.

Class Winners

First prizewinners were: Miss M. Jenkins (Common Goldfish); H. V. Jenkins (Shubunkins); H. V. Jenkins (A.O.V. Goldfish); J. Amesbury (A.O.V. Coldwater); Misses J. & J. Brotherton (Longtail Male Guppies); R. S. Wigg (Shorttail Male Guppies); Miss M. Hill (Female Guppies); W. H. Webb (Male Mollies); Miss B. House (Female Mollies); R. S. Wigg (Male Platies); R. S. Wigg (Female Platies); W. H. Webb (Male Swordtails); J. Amesbury (Female Swordtails); W. H. Webb (Male Fighters); W. H. Webb (A.O.V. Male Labyrinths); Miss B. House (Female Labyrinths); W. H. Webb (Male Barbs); R. S. Wigg (Female Barbs); W. H. Webb (Characins); W. H. Webb (Cichlids); W. J. Wear (Male Minnows); R. B. Kennedy (Female Minnows); W. H. Webb (A.O.S. Tropical Fish); H. V. Jenkins (Breeders' Coldwater); W. H. Webb (Breeders' Tropical); Inter-society contest: 1. Llantwit Major A.S.; 2. Tonypany A.S.

Clubs Stage Novel Displays at Manchester

Prize for the most artistic set-up went to Burnley A.S. with this exhibit, entitled "The Galleries."



THE distinctive British Aquarists' Festival (Manchester) was staged by the FEDERATION OF NORTHERN AQUARIUM SOCIETIES in early October when affiliated societies once again entered their exhibits in novel and eye-catching displays. This year the most artistic set-up was decided by public ballot and it was Burnley A.S. that gained the Hammond Trophy with a design titled "The Galleries". Framed aquaria were set into panelled walls and the area around was decorated with swords, plaques, a spinning wheel and duelling pistols.

From the traditional to the frankly modern came Wombwell A.S. to take second prize with a contemporary room setting. Third prize,

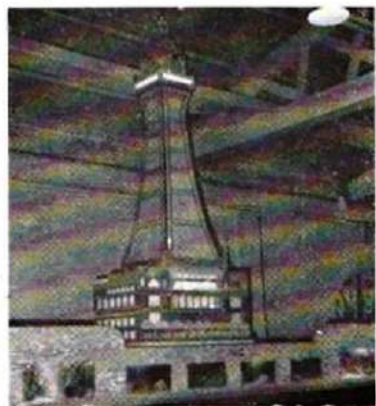
decided the visiting public, should go to Belle Vue (Manchester) A.S. where a giant model octopus surmounted the exhibit and curled his tentacles between the furnished tanks below.

Among other enterprising efforts was a gigantic model of Blackpool Tower on the Blackpool and Fylde A.S. stand, an artist's garret created by Swinton A.S., an old-world garden from Rochdale, a model grotto from Bury and a lighthouse from Accrington, where the aquaria fitted into the rocky base.

Remaining Prizewinners

The remaining prizes were awarded as follows: Daily Dispatch Challenge Trophy for the best fish in show to Mr. B. Horsfell of Macclesfield with an *Aplocheilichthys lineatus*. The silver Challenge Trophy for the best furnished aquarium to Bury A.S. (runner-up Belle Vue A.S.). Challenge Trophy for the best six pairs of fish to Belle Vue A.S. with 499 points, followed by Macclesfield A.S. with 498½ points. The Challenge Trophy for the best complete display to Burnley A.S. with 664 points to runner-up Belle Vue's 617.

The Silver Challenge Cup for the best pair of livebearers was presented to Mr. A. Grant (second, Mr. F. Taylor) and the Silver Challenge Cup for best pair of coldwater fish to Mr. V. Fletcher (second, Mr. F. Smith). Winner of the Challenge Trophy for the best pair of Cichlids was Mr. T. Peel (second, Mr. W. New) and Challenge Trophy winner for best pair of Labyrinths was Mr. I. Thorington (second, Mr. N. Boardman). Mr. B. Horsfell won the Bland Challenge Trophy for best pair of Fighting Fish (second, Mr. C. Shillito) and the Silver Challenge Cup for best pair of Barbs went to Mr. E. Cooke (second, Mrs. Selbey). Challenge Trophy for best pair of Characins was awarded to Mr. B. Cheshire (second, Mr. A. Grant) and Challenge Trophy for A.O.V. Tropical Fish to Mr. B. Horsfell. The two remaining classes were won by Messrs. S. B. Cass and N. Boardman, respectively.



Photographs by J. L. Alderton
A model of Blackpool Tower on the display by Blackpool & Fylde A.S. at the Manchester Show.

News from the North-West

Useful Evening's Quiz Programme

BRAINS trusts and quizzes put on as part of a winter programme are often an unimaginative copying of similar radio features, but Southport Aquarist Society began their meetings this season with a much brighter competitive idea. With Mr. M. Hilton as chairman, the meeting was shown lantern slides of tropical fishes which the audience had to try and identify. Two of the members gave 38 out of the 40 fish correctly. They were Mr. B. R. Dougan and Mr. S. Radam. A party from Southport later had a joint fish quiz with the Merseyside Aquarist Society, in Liverpool, and the Merseyside society returned the visit the following month.

One of the foremost women authorities on British fishes, Dr. Winifred E. Frost, famous for her studies of eels, etc., recently communicated to the Salmon and Trout Association her studies on the Brown Trout in Lake Haweswater, the Manchester Corporation waterworks' reservoir in Lakeland. Here she found that, when the water-level of the lake was raised 38 ft., the average size and weight of the trout increased, because of the extra food made available by the inundation of extra land. But this was not maintained and, after a few years (since 1949) the trout-fishing at Haweswater had deteriorated, a falling off in the size and growth of the fish being due to the fact that extra food, once consumed, was not replaced without further inundation and raising of the water-level.

Excess Rainfall

The findings at Haweswater are largely what one would expect, and what has happened elsewhere. Indeed, the very wet season of 1956, with the surface run-off of minerals, earthworms and other small invertebrate food, is thought to have been the cause of an increase in the size of catches from several angling waters. This was not the case everywhere, however, for at Ashfield Hall, near Neston, in Cheshire, where five field pits were well-stocked with Roach and other fish, and the previous year had produced some enormous catches, all but one pit had the fish killed because the excessive rains running off the fields brought in some chemical fertilizer or insecticide. A similar fate befell Childwall Lake or Pit (Liverpool), a noted haunt of Carp and Rudd.

Warrington anglers are hoping to encourage their local fish to grow bigger by returning 10 lb. Pike to the waters. A Pike of 19½ lb., caught at the Walton Hall Reservoir in October by Mr. L. Thornley, was returned in the hope that it would grow large enough to exceed the local record of 24 lb. Before it was drained at the end of the war Arley Mere, which is not far from Warrington on the Cheshire side, gave a Pike of 33½ lb. in July, 1944, and in 1941 the Leg of Mutton Dam at St. Helens, not far away in south Lancashire, produced one of 24½ lb. Anglers will probably find the reason why many

waters have spells of "specimen fish" years and then lean years is that there have been changes in water level or other influences which affect food supply.

Further to my remarks about the abundance of lizards in 1956 as an aftermath of the good breeding season in the hot dry Summer of 1955, Thurston Common (a National Trust heathland in Cheshire) also showed more of these reptiles than usual when friends were collecting for their vivaria.

Reasons for the decline in the number of Natterjack Toads in West Lancashire are not collectors in search of specimens and disturbances caused by holidaymakers and ramblers as has been suggested. The Natterjack haunts the west Lancashire dunes from Hillsdale and Ainsdale (Southport) to Freshfield (Formby) and Crosby.

Ecological changes alone have caused any decline in numbers or range, which once extended to Bootle—changes due to drainage and building in its old haunts, and the planting of pinewoods on the dunes. Holidaymakers and ramblers have had nothing to do with it, although for generations they have walked through these haunts by the dune paths from Hatfield Road and Delamere Road south-end, and either side of Shore Road (Ainsdale), Pinfold Lane (Woodvale), Formby Golf Course (Freshfield), Hillsdale Golf Course, Wicks Lane and Shore Road, Formby, and the pools or "slacks" behind the sandhills on the crowded beach just south of Ainsdale Lido, without ever endangering Natterjacks by collecting.

Despite the crowded beaches in Summer, the dunes are frequented chiefly by naturalists, partridge-shooters, pony-riders and courting couples! The greatest collectors of rare plant and animal specimens in the North-west are University students (they have the technical knowledge to recognize rarities), museums and some amateur collectors.

As well as nine known breeding sites on the south-west Lancashire coast between Hightown and Preston (chiefly on the Ainsdale-Freshfield dunes), plus another small one on the Lancashire coast at Cockerham, the Natterjack also has small breeding sites on the solway marshes of Cumberland, two parts of the Cheshire coast (at Leasowe and the West Kirby-Hoylake salt-marsh), the Flintshire coast near Rhyl, the Conway Estuary and isolated inland sites in Lancashire and Cheshire.

Ecologically, a Natterjack might find the modern city sewer a convenient substitute for the brackish estuary creek which formerly existed in an old locality. Such was the case with a colony found some years ago occupying an old part of Liverpool, although they were referred to locally as "singing frogs". Indeed, it is of further interest that a busy thoroughfare not far from this little colony was originally

By Aquaticus

named Frog Lane (from the croaking, not of frogs, but Natterjack toads) and it is built on the site of an old creek of the Mersey. During severe cloudbursts, this low-lying area is always one of the first to have its basements and sewers flooded.

Water Starwort (*Callitriche stagnalis*) is well known as a native water-pool plant, a very variable subject with little greenish male and female flowers in the axils of the leaves. Canon G. A. K. Hervey, of the Penrith Natural History Society, recently found a large colony of it growing submerged in a mountain tarn at 2,600 ft. in Ruthwaite Cove, on the east side of Helvellyn. Instead of forming a mass, each plant was separate with a single, erect, underwater stem and submerged leaves. This flower grows at nearly 3,000 ft. in Snowdonia, and may be seen in mountain tarns above Cwm Idwal and Cwm Glas.

Water Starwort is apparently sometimes hydrophilous (pollinated under water), though usually it is wind-pollinated from aerial flowers.

Since the Clapham, Tutin and Warburg's standard "Flora of the British Isles" was published, the Water Starworts have been reclassified

New Club Secretaries

Bethnal Green A.S.—Mr. W. Wiegold, 46 Cranbrook Street, Bethnal Green, London, E.2.

Dewsbury A.S.—Dr. G. Cust, College House, College Street, Birstall, Nr. Leeds.

Huddersfield A.S.—Mr. J. Healey, 4 Mayfield Avenue, Dalton, Huddersfield.

Perth A.C.—Mrs. J. Hogg, 99 Needlass Road, Perth.

W. Middlesex A.S.—Mr. C. L. Wood (acting), 19 The Crossways, Heston, Hounslow, Middx.

Weston-super-Mare A.S.—Mr. H. D. Marshman, "Roseneth," 66 Quantock Road, Weston-super-Mare.

and the seven species there have been revised as eight, i.e. *C. stagnalis*, *C. truncata*, *C. obtusangula* and *C. polymorpha* remain, but a form of *C. polymorpha* becomes *C. platycarpa*; *C. verna* becomes *C. palustris*; *C. intermedia* reverts to *C. hamulata*, and *C. autumnalis* becomes *C. hermaphrodica*. Except for seed and chromosomes, some forms are indistinguishable!

With further reference to Clapham, Tutin and Warburg's famous "Flora", I was surprised to see the authors exclude the round-leaved Sundew, a well-known waterside plant from the Mediterranean. Not only has this been located and accepted without dispute by academic botanists in Spain and Italy, but it was reconfirmed in war-time at two sites in the Lebanon, although its nearest haunts from there are Bulgaria and the Caucasus. The recent wet Summer enabled Sundews to recover some lost ground. Some years ago we introduced several plants of *Drosera intermedia* from the south of England to certain bogs and heaths in Cheshire, with success.

Judges Meet at Guppy Show

MR. H. ESTERBROOK spoke on the tendency for some judges to put size before type at a Judges' Conference held at London Zoo on the opening day of the F.G.B.S. Cup Show. After discussion, it was decided to refer the matter to the F.G.B.S. Judges' and Standards Committee, when written guidance would be given.

Guest at the Conference was Mr. Percy Campkin, chairman of the F.B.A.S. Judges and Standards Committee who, in conveying the wishes of his Federation, said he thought it especially important that specialist judges should meet together periodically. Twenty-six judges were present and nine recently qualified ones received their certificates and judges' boards.

Mr. C. R. Looker thought a modification should be made to the layout of the judges sheets to bring them in line with those issued by other organisations. It was agreed that the amendments would be incorporated at the next printing.

Mr. Fred Riddle, who had a serious illness some while ago from which he has not fully recovered, announced his resignation as chairman of the Judges' and Standards Committee.

It was stated that plastic cards in black and white had been issued to judges for use as backgrounds when assessing exhibits. The committee had thoroughly investigated suitable colourings for the backgrounds and had found black and white were the most satisfactory.

F.B.A.S. News

OFFICERS of the Federation of British Aquatic Societies who retired at the A.G.M. on December 1 were Mr. W. S. L. Mellish (chairman), Mr. R. M. Baylis (treasurer), Mr. L. Coatsman (services secretary), and Mrs. W. M. Meadows, Mr. S. Moore and Mr. F. Stone (councillors). Mr. Coatsman, Mrs. Meadows, Mr. Moore and Mr. Stone were available for re-election. Mr. J. E. Edwards resigned from the Council earlier this year and his place was also to be filled. In his report the Services Secretary said that Mrs. Meadows had travelled over 4,000 miles on Federation engagements. She had 36 bookings. Figures indicating societies affiliated to the Federation show only small decreases in recent years during a period when the fortunes of many clubs have fluctuated.

F.B.A.S. clubs in 1953 were 118; in 1954, 111; in 1955, 100 and in 1956, 98.

The Federation has recently issued charts giving details of the tank contents used in the F.B.A.S. display at WATER LIFE'S 1954 show. It will be recalled that each aquarium contained geographically related subjects. A typical entry in the duplicated sheets is that for Siam where the tank contained sand and pebbles, brown sandstone, Cryptocorynes, Fighters, *Trichogaster trichopterus* and Pearl Danios (*Brachydanio albolineatus*).

The F.B.A.S. has also published duplicated information on breeding various groups of fishes in co-operation with Mr. W. L. Whitern of the Canadian Aquaria Society. Each booklet is moderately priced at 1/6 and there has been a good demand for those issued so far.

JOE GRASSBY, The Glen, Moberley, Nr. Knutsford, Cheshire, tells us that he is receiving quite a number of enquiries for Hykro Products from private individuals. Mr. Grassby's trade is entirely wholesale and he does not supply direct to consumers although he will provide details of an enquirer's nearest stockist if any difficulty is experienced.

Club Notes and News—contd.

In November, Mr. W. R. Burwell was the speaker. Mr. P. Kelly speaks on "Cacti" during December. The society's annual dinner will be held on December 10, when Mr. and Mrs. W. L. Mandeville will be the chief guests. The A.G.M. is scheduled for January.

MR. AND MRS. W. C. WEBLEY received a presentation at the September 25 meeting of Nottingham A.S. on their impending departure from the Nottingham district. The October speaker was Mr. C. Hill who gave an illustrated talk entitled "Fish on Stamps."

BEST fish in show at the annual exhibition of Tottenham A.S. was Mr. Piacenti's *Cichlasoma severum* which was awarded 95 points by Mr. and Mrs. B. Meadows, who were the judges. Best furnished aquarium was Stoke Newington's coldwater entry. Both exhibitors won WATER LIFE Diplomas.

FIRST prizewinners in a breeders' competition judged by Mr. Flinham at a recent meeting of W. Middlesex A.S. were Messrs. M. Langridge and C. L. Wood. Whist judging was in progress an informal discussion took place. The society's A.G.M. will be held in February.

ON November 29 and 30 Weston-super-Mare A.S. staged an open show in conjunction with the local cage bird society's event. There were 18 classes and the judges were Messrs. E. R. Blunsden and V. E. Jones of Bristol.

AT the third annual general meeting of Yeovil A.S. Mr. N. Stainer was appointed President; Mr. R. Stone, chairman; Mr. D. Silver, secretary and Mr. Langdon, treasurer. At this meeting it was proposed to hold more interclub shows.

FROM October 8-13 the Perth A.C. had an exhibit at the Perth Traders' Show. Meetings of this society are held on Thursdays at fortnightly intervals in the Museum & Art Galleries, Perth.

THE annual dinner of Plymouth A. & P.S. will be held on January 30. Election of officers at the A.G.M. resulted in the following being appointed: President, Mr. H. Woolcombe; chairman, Mr. Berry; vice-chairman, Mr. Summers; secretary, Mrs. V. Coslett; treasurer, Mrs. Page and press officer, Mr. R. P. Acland.

A WORKS group in the North-west London area is the Post Office Research Aquarist Society. Meetings are held on the first Thursday of each month at the Post Office Research Station, Dollis Hill, N.W.2. The secretary is Mr. J. Garstang, 73 The Avenue, Pinner, Middx.

MR. C. W. G. CRED spoke at an interclub meeting of the Reading A.S. and Basingstoke society. He also judged the table show for Characins and livebearers.

AN interclub table show was put on by Redhill A.S. between Herley, Crawley, Guildford and Redhill societies. Mr. Curtis showed an *Hypheosbrycon rosaceus* which took the best fish in show award.

Club Matters Discussed at Chelsea Meeting

THIRTY-FIVE delegates from 12 societies were present for an F.B.A.S. meeting at Chelsea A.S. headquarters when the running of aquatic societies was analysed. The intention was to find out the reason for setbacks which clubs had experienced and also to suggest possible solutions.

F.B.A.S. officials spoke on various aspects of club management, including reception, committee work, programmes, finance, publicity, meetings, membership and the duties of delegates and officers. In addition, 39 questions from the floor of the meeting were answered.

Mr. R. O. B. List, F.B.A.S. General Secretary,

THE Southall society will in future be known as Southall & District Fishkeepers' Society with headquarters at South Lodge, The Green, Southall, Middx. Officers appointed at the last A.G.M. were chairman, Mr. C. Gillman; secretary, Mrs. F. Evans; treasurer, Mr. J. Wincott and social secretary, Mr. A. Hastings. Membership of the club is now open to aquarists in all areas.

A SHOW in conjunction with the Sunderland Budgetary Society was put on by Sunderland A.C. during November. Mr. A. Brunton spoke on "Commercial Fishbreeding" at the November 8 meeting. During the same evening a table show was held when Mr. B. Hodgson and Mr. A. Brunton won first prizes.

AN interclub table show was held between Llantwit Major A.S. and the Welsh National Society on October 10. Mr. R. S. Wigg showed the best fish, a Veiltail Guppy which was awarded 94 points.

NEW officials of the Macclesfield A.S. are chairman, Mr. S. B. Cass and treasurer, Mr. H. R. Davenport. Meetings of the society are held on the first Monday of each month in the Large Sunday School, Roe Street, Macclesfield.

THE Medway A.S. concluded its show year by winning two firsts, a second and a third, in their interclub furnished aquaria competition. The club's annual show has been held in the canteen of Elliott Bros. at Rochester Airport, when there was a quite good attendance.

OF the 75 diners present for the coming-of-age dinner and dance of the Midland A. & P.S. held on October 26 several were founder-members and life-members. One of the club's founder and life members, Mr. W. E. Barrett, died on November 6. He was 86 years of age and the society believes he was probably the oldest active fishkeeper in the country.

AT the annual open show of N. Birmingham A.P. & A.S. held on October 6, Mr. R. B. Raven won the WATER LIFE Diploma for second best coldwater fish with a Veiltail and Mr. J. Selvey took similar honours in the tropical section with a Siamese Fighter.

MR. AINSWORTH won two firsts with Blue Gularia and Vellifera Mollies in a breeders' show recently put on by Riverside A.S. (Hammersmith). Forthcoming events include a lecture on "Water," a table show and the annual general meeting.

FUTURE meetings of Romford A.S. will be held in the Church House, Wykeham Hall, Romford, Essex on the first and third Thursdays of each month.

THERE were 28 classes in the 28th annual show of the Scottish Aquarium Society staged in Glasgow from November 29 to December 1.

MEMBERS of the F.B.A.S. Council attended the November 29 meeting of Friends A.S. when fishes that had won awards at table shows throughout the year were on view. Mr. A. Bisby won a WATER LIFE Diploma with his 92-point Dwarf Gourami in the club's recent championship exhibition.

reports that the fixture was well received and served a useful purpose. Similar meetings for other areas are now visualised. North and North-west London will be first followed by Eastern districts and then the Midlands.

Crocs. and Coral

THE director of an Australian wholesale gift business hoped to sell about 2,000 stuffed crocodiles from Queensland's Gulf country to overseas visitors at the Olympic Games. It was expected that the crocodiles, ranging in size from approximately 10 inches to 3 feet, would sell for about 7s. 6d. an inch. The same firm was also examining the possibility of using Barrier Reef coral in the manufacture of ornamental souvenirs.

F.B.A.S. Approved Products Scheme

Pros and Cons of the New Plan

THE Federation of British Aquatic Societies has chosen to enter a highly controversial field in launching a products endorsement plan for acceptance by the aquatic trade. The scheme was begun, apparently, at the request of some aquatic traders and the intention is that the potential purchaser will have an assurance that the approved product, bearing a seal, has been tried, tested and found satisfactory.

Now let us look at the project from an opposite angle. The reputable aquatic manufacturer is almost without exception a specialist. The knowledge behind items he produces is firmly based and well garnished with practical experience. The manufacturer knows that his product must be of high quality to sell consistently and build up or retain his firm's reputation. One unproven article which later shows itself to be sub-standard can harm the firm's entire trade. The organisation therefore goes to some pains to ensure that what it offers reaches an acceptable standard.

A Protection

With the manufacturer continually in pursuit of perfection we might ask where the need for an endorsement plan arises? As a protection, perhaps? The trader who is certain of his products will be unafraid of submitting them for independent tests, whilst any who rely on quick turnover but are not jealous of their reputation will be more chary.

Does this mean that only F.B.A.S. endorsed products will be safe to buy? It does not. There is evidence that a significant percentage of established traders are saying that they know, and their many customers know, that their products are good; the underlining of the F.B.A.S. is not required; their reputation is enough. They ask why they should be expected to pay £10 for the first item submitted, £5 for each subsequent article and £1 renewal fee each year.

Comparison Made

In introducing the scheme, the promoters compare it with that of the Good Housekeeping Institute. Nevertheless, it is by no means certain that a plan which works effectively in one field will necessarily have the same relevance in another. For one thing, the majority of hobbyists buying aquatic accessories are regular purchasers and they are in a fuller position to use their own judgment. Further, the aquatic hobby and trade is proportionately smaller; the retailer knows what products sell and what he can recommend based on his own experience. The beginner has that unwritten guarantee.

And so it seems that whilst the F.B.A.S. scheme will undoubtedly be pursued with absolute fairness, secrecy and thoroughness, and has, in fact, been promised support by some, the need for it in the aquatic world is not over-pressing. That would appear to be borne out by the decline in support for an almost parallel safeguards plan sponsored by a trade organisation.

When the hobby is considerably larger, when aquatic manufacturers are multiplying to meet a larger demand then would seem to be the time for such a scheme to prove itself; it could form a useful protection for the reputable trader and novice purchaser. Ethically the F.B.A.S. plan can hardly be questioned—only its practical necessity at present.

We may be proved wrong; perhaps the majority of the aquatic trade will accept that now is the time to have an independent enquiry. If they do, the F.B.A.S. will have shown it correctly assessed the feeling of the hobby and trade and all credit should go to it.

WE learn from Mr. R. Smith that all the products of Morgan Bio-Labs will in the New Year be manufactured and marketed from the house of "Brosiam". Further details will be announced in the near future.