July 1958 *Two shillings*

FISHKEEPING

and Water Life

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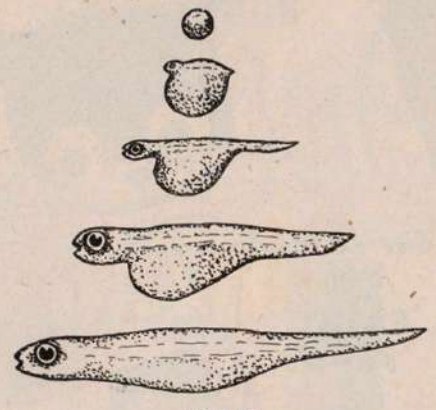

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VOL. 13 NO. 9
NEW ISSUE
JULY 1958

FISHKEEPING

and Water Life

IN THE SWIM

Popular Goldfish · Aged Fishes
Sea-shore Study · Junior's Enthusiasm
Low Temperature · Radio Publicity
New Fish · Water Gardens

upon by most folk as just interesting curiosities.

Whilst on a short holiday recently I noticed the intense interest shown by fellow holiday-makers in the collecting excursions of young boys around the rock pools. The variety of creatures these youngsters accumulated before the tide took the animals out to sea was astonishing.

Truly the marine side of our hobby has tremendous potentialities which, as yet, are hardly exploited. When we also consider the brilliance of tropical marine fishes, the scope is quite limitless.

● **Common Ambassador.** In our pursuit of the more exotic Goldfish varieties we should not forget the quiet publicity campaign put on over several decades by the humble Common Goldfish.

There are few coldwater fishes that can excel its attractive colouring and contours or its hardiness. This fish has undoubtedly been responsible for very many aquarists' first serious interest in fishkeeping.

Our cover picture this month, from a Laurence E. Perkins' transparency, shows just how decorative two Common Goldfish can appear in a well laid out coldwater aquarium.

● **Longevity records.** Following the note last issue about long-life among aquarium and pond fish, Mr. K. A. M. Robertson reports on page 457 that Golden Orfe have been kept in the Carnegie Aquarium, Edinburgh, for almost 31 years. Chub have lived there for 26 years and Golden Carp in the same establishment can boast a life span of 28 years.

Mr. J. E. Morris writes from Bath to tell me he has had a Black Widow Characin (*Gymnocorymbus ternetzi*) for seven years, and it was adult when it came into his possession.

● **Untapped source.** More than one reference is made in this issue to the delights of keeping aquaria containing seawater creatures but the fact remains that marine tanks are still looked

● **Stripped for action.** When you're young and when you're interested in fishes it's the most natural thing in the world to dress for the part if you go on a fish collecting expedition. Should your enthusiasm be so strong that you are likely to topple in the water then it's obviously better to strip to the waist.

That is just what one of Mr. P. H. T. King's sons—who live at Norwich—thought and our picture shows the reward for his enterprise—a Stickleback, as handsome a native fish as you could find and certainly one that is ideal for the young aquarist to have in his early fishkeeping activities.

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● **Cold tropical.** Whilst at Southsea Aquarium in May I met a number of local societies' officials, including Messrs. E. Knight (secretary) and Abel of the Carissius Club (Portsmouth).

Mr. Abel kept a female Buenos Aires Tetra (*Hemigrammus caudovittatus*) for about a year in an unheated aquarium. It lived quite happily at temperatures which sometimes dropped as low as 42 deg.F. Early on it shared an aquarium with Fancy Goldfish, but it gave their flowing finnage a knowing nip now and again so had to be taken out.

Mr. Abel is also a keen herpetologist. His collection of fly traps, unorthodox but effective by every standard, are in the best Emmett tradition !

● **On the air.** By now many readers will have found that a glance through the week's programmes for the B.B.C.'s Network Three is well worthwhile. Our companion hobbies of fishkeeping and herpetology have been well represented in 1958.

First there was the discussion on breeding the more difficult tropicals in March when

Goldfish Society members in conversation at this year's Olympia show. Left to right: R. Birkenhead (treasurer and show secretary), Helen R. Gibson (from Newcastle-on-Tyne), R. J. Affleck, M.Sc. (President) and A. W. Sambler (committee).

Derek McInerny took part. We hear that several fishkeepers made tape-recordings of this broadcast for their future reference.

In May there were two further programmes in succeeding weeks. Robert J. Affleck, M.Sc. (the Goldfish Society's President) gave a lucid description of modern techniques for Goldfish breeding when he made particular reference to hand-spawning and its advantages.

Seven days later Alfred Leutscher, B.Sc., one-time secretary of the British Herpetological Society, spoke in his inimitable style on the keeping of interesting reptiles and amphibians.

We believe that more of these broadcasts will follow and readers are advised to look at the advance programme notices.

● **Another Tooth-carp.** Just five pairs of a new *Pterolebias* Tooth-carp recently came into the possession of Ronald C. Johnson (Johnson's Aquarium) but they were sufficient for him to recognize the species as one of undoubted character.

Colouring varies somewhat between the specimens but the males are generally palish pink with iridescent green spots. The anal fin has yellow, red and faint blue in it, whilst the tail fin has bright green rays and a blue edge. The finnage is particularly well developed. Length of the fishes is 2 in., and their body depth $\frac{3}{4}$ in.

● **Modern trend.** The changing pattern of life seems to be reflected more fully each year at the Royal Horticultural Society's world-famed Chelsea Show. Whilst the variety of plants and gadgets gets greater at every show, the exhibitors of complete garden set-ups—water-gardens included—become fewer.

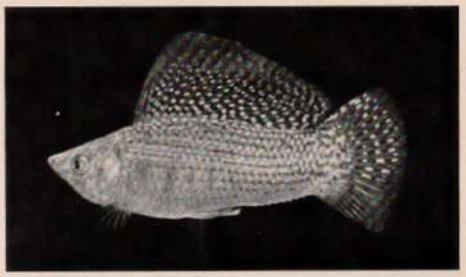
This year there were just two gardens with a water motif. One, from J. R. Barralet, showed a small town garden beautifully yet simply arranged, and incorporating a formal pool. The second was a large informal layout prepared by George Whitelegg in the same fine tradition of earlier years.

Is this reduction in water garden displays symptomatic of a decline in interest ? Any who have seen just a fraction of the many new garden pools built each year will hastily deny such a suggestion. What we may well be getting is a fuller interest in the more modest design which the owner can keep in order himself, whilst the ornate and extensive designs of yesteryear could be losing some of their devotees due to manpower shortage.

● **White worms and red worms.** An interesting comment comes from one of our largest White Worm, Dwarf White Worm and Mikro Worm producers. A large percentage of enquirers for cultures are lady aquarists, he says.

We know that chopping Earthworms is not highly regarded by members of the fair sex but it seems that the culture of various white-coloured worms for fishes' livefood is a task which ladies do not find distasteful.—L.W.A.

SPECTACULAR VELIFERA MOLLIES



A male Velifera Mollie from the author's stock. Photograph, Roy Skipper.

Not difficult to keep and breed if certain principles are observed

by J. V. MORRICE

THE Velifera Mollie must rate among the loveliest of the livebearing fishes with its deep yellow chest and magnificent dorsal fin. Yet, in my experience, it is one of the easiest to keep and breed. The Velifera's requirements are very modest—the addition of a little salt to its tank water (two tablespoonfuls of block salt to each gallon of water), plus a good supply of algæ.

For all that it will acclimatise itself to average tank conditions. The male can easily be distinguished from the female, in that it has a large dorsal fin and is much more colourful than the female.

Differences between Species

The Velifera is often confused with the Latipinna Mollie, but the main difference is that the Velifera has 18 or 19 rays in its dorsal fin, whilst the Latipinna has approximately 14. The Velifera also has three vertical bars on its body, but the Latipinna has five. In addition the shapes of the fishes' bodies are slightly different.

Before selecting Veliferas for breeding, a very careful study should be made of those males available. Colour is naturally very important and quite often the smaller male has more brilliant colouring than a larger one. Markings should also be studied and taken into consideration when making a selection.

The simplest method is often the best and this maxim is true when breeding Veliferas. Place the selected male in a breeding tank together with one or more females. The tank should contain plenty of surface plants, preferably Indian Fern floating on the surface, which will give the young fry an opportunity to rest near to the surface. Under these conditions they are quite easily caught by using a cup for the purpose.

Mollies, as a rule, will not eat their young, provided they are well fed. There are, of course, exceptions, and it has been known for an occasional adult fish to eat the young as fast as they are born.

As the fry are collected they should be transferred to a rearing tank; this need not be too large at first, an $18 \times 10 \times 10$ in. aquarium is quite adequate initially, even though broods number from a dozen up to 150 or more. The average number in a brood is about 50.

Alternatively a community tank can be used for breeding this species, provided that it is adequately supplied with plants, particularly

surface plants. This is necessary as a safeguard for the young fry; if they have nowhere to hide they may fall victim to any carnivorous fish which is looking for a meal.

Feeding at any time is important, but this is especially true of the food for the fry. Whilst algæ is undoubtedly the best food for the young fish, it is not always possible to supply it in the quantities required, but fine cereal foods are effective alternatives.

Transfer of Youngsters

After approximately a month the fry can be transferred to the largest tank available. At this stage feed the fish on wheat-germ dried food and any of the coarser proprietary foods. The only livefood that the fry seem to eat in any quantity is Dwarf White (Grindal) Worms.

The fish should now grow quite steadily until they are about a year old, when the males start to sex and show their glorious colours. Some males will sex before the year is up, but they will usually be on the small side. The females, on the other hand, are ready for breeding at about nine months.

Mollies as a group are very susceptible to Dropsy and Veliferas are no exception. Unfortunately there does not appear to be any effective and permanent cure for this ailment. They are also prone to boils, but these can usually be cured by getting the fish into good condition.

Swim-bladder trouble may be encountered should the fish be chilled or if they receive a knock. This trouble can often be corrected by raising the temperature and increasing the salt content of the water.

If it is intended to exhibit Velifera Mollies it is most important to train them. This can be accomplished by placing a small bare tank in a room in continuous use and transferring the required fish to it at frequent intervals. After it has been in the tank several times—sufficient for it to become acclimatised—it will start to display and eventually throw up its dorsal fin and generally show off.

Maximum Pleasure

The ultimate results are well worth the time and care taken in breeding the Velifera Mollie and the maximum amount of enjoyment can be obtained from this species, particularly during the training period prior to showing and, of course, in the actual exhibiting.

Supplementary Source of Livefood

by J. G. COOPER

WHILE rearing a number of young lizards and seeking to vary their diet as much as possible, I found in a sack of hoof and horn fertilizer large numbers of larvæ, pupæ and imagos of at least two species of small moth.

One was easily recognisable as the familiar clothes' moth, *Tinea pellionella*. An entomologist would be required to identify the others, but all were of the same size and proved equally useful as food for the lizards; the pupæ, larvæ and the moths themselves being *all* greatly relished, even when dead. They were, in fact, often accepted after other food had been refused.

Frequently Present

I have since gathered that these moths are very commonly found in "hoof and horn", which may contain them when it is bought.

The life-cycle of the moths takes place over and over again in the sack. The larvæ, when first hatched, are about 1 mm long and increase to as much as 20 mm before pupating. They then weave a silky cocoon around themselves, incorporating particles of the 'hoof and horn' so that firm cases are formed. In these, the larvæ pupate, and the perfect moths eventually emerge from one end of the case.

Production of Eggs

Before leaving the sack, the moths mate and lay minute white eggs, which in turn hatch into more larvæ and re-infest their surroundings. The same succession of events will also take place satisfactorily in a tin and in other media such as biscuit meal. Very little moisture is required.

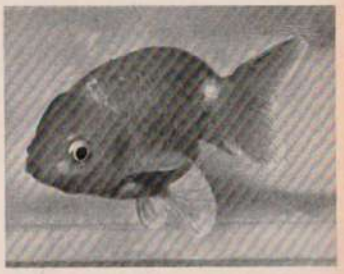
These creatures are certainly a useful food for small reptiles and it seems very probable that they may be eaten by various amphibians and even fish.

Good features of this food are: a wide range of size and form is available; a stock can be maintained and regenerated in a simple container with the minimum of attention; the food is usable at any stage in the life-cycle; as they feed on nitrogenous fertilizer, the moths should be of good nutritional value.

EQUIPMENT NEEDED WHEN BREEDING GOLDFISH

Minimum aquarium requirements and suitable pond space

by R. J. AFFLECK, M.Sc.



A Bramblehead, one of the more curious Goldfish varieties. Photograph by courtesy of Tackbrook Tropicals.

THE general aim of the expert breeder should be to possess and maintain a strain of fish which will produce exhibition specimens. Before this is possible he must obtain good stock, have the necessary apparatus and equipment and be prepared to spend much time and energy in maintaining the whole set-up.

Large Number Required

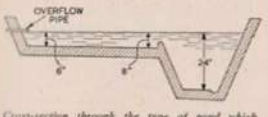
Some Japanese breeders eventually retain one fish in 250 and, if this is a fair proportion, then it follows that a large number must be raised initially even to produce half a dozen adults. Unless the aquarist has a very large breeding establishment, it is much better to concentrate on, and be a real master of one variety than to attempt to maintain a number of different strains. Let us assume, therefore, that the reader wishes to keep one variety of Goldfish and then discuss the requirements and detailed method of breeding.

The stock of fish carried at the end of the breeding season after the final selection for the year has been completed should be:

Age	6 mths.	18 mths.	20 mths. and over.
Number	40	16	8

These will comprise two breeding pairs and two pairs in reserve against unforeseen mortalities; eight males and 8 females for growing on another year when half will be rejected, and 40 of the most promising specimens from the current year's spawnings from which eight of each sex will be selected in a year's time. Note that no fish will be used for breeding until it is three years old.

The minimum requirements for aquaria are eight of $24 \times 18 \times 8$ in. dimensions (deeper tanks may be used but are not necessary) and one spawning tank which can be $36 \times 18 \times 12$ in. or larger. The eight tanks will be used mainly for eggs and young up to a month old and for conditioning fish at the beginning of the season.



Cross-section through the type of pond which Mr. Affleck considers ideal for rearing Goldfish. It is provided with a large area of shallow water.

Special Spawning Tank

These aquaria should have glass sides so as to admit the maximum amount of light, but the spawning tank should be a conventional one with the glass painted to exclude side light from all except just one side of the aquarium. The spawning aquarium, in particular, should be placed where it will receive the maximum amount of *top* light.

Heating units will be required for the tanks. There is always discussion on the merits of electricity, gas, coke and oil for heating purposes. In my own opinion electricity, while somewhat expensive, is the most suitable

for Goldfish breeding because installations can be very flexible in operation.

A recommended arrangement is to connect one side of the mains, through a thermostat on the first tank, to a batten fixed behind the row of tanks, while the other side of the mains goes straight to the batten. A number of sockets are arranged along the batten (two to each tank) and connected up to the supply in parallel.

In the early part of the season one 40-watt heater should be plugged in for each tank, but later, when eggs and alevins are in the tanks, an additional 40-watt heater will be required for each tank.

It is necessary to ensure that the thermostat is suitable for the total wattage used. It will probably be necessary to employ another thermostat for the spawning tank.

The water should be agitated during the alevin and fry stage and this can best be done by means of an air pump connected to diffusers in the tanks. The amount of air passing into each diffuser may be controlled by screw clamps (Hoffmann pattern), but I personally use T-pieces with screw adjustments. Either rubber or a good quality plastic tubing may be used for the airlines.

The ponds required by the breeder should be designed for efficiency in raising fish and not for appearance. An ornamental lily-pond may be constructed, but it is not wise to use it for young fish. One type of pond is needed for the current year's fish and the other for adults.

The ideal shape of a pond for young fish is shown in the diagram. It will be noted that the depth of the water is only 6-8 in. over most of the area. This shallowness, besides being ideal for young fish, ensures that the maximum temperatures, due to the heating effect of the sun's rays, will be obtained.

Purpose of Deeper Section

The deeper trough at one end is necessary in order to increase the volume sufficiently to prevent violent fluctuations in temperature. The whole pond should have a removable cover similar to a gardener's cold frame which will, in effect, turn the pond into a miniature greenhouse. The minimum size for this type of pond is 5×3 ft. and it should be unplanted. Algæ will grow on the sides and bottom and Blanket Weed should be encouraged but thinned out frequently. Duckweed can be allowed to cover the surface.

If the pond is constructed of concrete the bottom should be 4-6 in. thick and the sides 3-4 in., depending on the subsoil and on the thoroughness with which you mix the concrete. A depression in one corner will enable you, when necessary, to bale or siphon out the last few drops of water.

Adult fish require a deeper pond if they are to be kept in it through the Winter, but it should have the same general section as the shallow one. The deep part should be about 3 ft. 6 in. with the shallow region 10-15 in.

Two inches of ballast will provide a rooting medium for plants in the shallows and a concrete lip about 3 in. high will prevent the shingle from falling into the well when the pond is emptied. *Lagarosiphon major* (*Elodea crispa*) is recommended for planting this type of pond as it will stand rough treatment.

For the programme being considered one deep pond 10×5 ft. and two shallow ones 5×3 ft. are regarded as the minimum requirements, but a lily-pool in which livefood can be raised will add to the efficiency of the establishment.

A Large and Versatile Cryptocoryne

by Dr. H. C. D. de WIT

THE largest of all Cryptocorynes also has the widest area of distribution. *Cryptocoryne ciliata* (Roxb.) Fisch. ex Schott occurs on tidal muds, often along river banks or creeks but always where freshwater is mixed with a certain amount of sea-water.

Locally it may grow very abundantly and, sometimes along the water's edge, fields or pure stands of tens of thousands of *C. ciliata* flourish.

Being readily available on the coasts of India, the Malay Peninsula, Sumatra, Borneo, Indo-China, Java, New Guinea and elsewhere, it is regularly imported and obtainable.

Will Flourish in Freshwater

C. ciliata grows well in the freshwater of our tanks provided that the soil contains some loam and the amount of light is sufficient. It stands the lack of salt but it is worth remembering, if one contemplates keeping an aquarium with fishes originating from coastal, sea-invaded regions (e.g. Glass Fish, many livebearers, *Scatophagus*, *Monodactylus*, etc.) that *C. ciliata* may be very useful to have for decoration.

For our freshwater tanks as well, *C. ciliata* is a most desirable plant. The leaves attain a length of 20 in. (50 cm.) or more and, although specimens growing in an aquarium usually remain smaller, they are always very much larger than other *Cryptocoryne* species.

The leaves are light green, without purple colouring or markings. The green petioles are stout and the oblong leaf-blades often laxly wavy and somewhat succulent. The nerves have the same colour as the blade.

If you obtain a *C. ciliata* specimen, put it in a roomy tank and give it ample space to develop.

For the Best Effect

When a single *C. ciliata* is placed well apart from such a contrasting subject as a background of dark-green *Hydrilla* or a well-stocked slope of *C. beckettii* or *C. affinis*, a strikingly beautiful effect is achieved. As a matter of taste—never put it in the exact centre of your aquarium !

Lagenandra is a Genus closely allied to the Cryptocorynes and one species of *Lagenandra* is hardly distinguishable from *Cryptocoryne ciliata*, although the flowers are very different.

C. ciliata grows in tidal muds; it is one of the plants composing the mangrove of shallow tropical shores where silt is deposited. Many mangrove plants are biologically interesting. The plants in them have remarkable life-habits which seem particularly well suited to their environment.

Some of the low trees are "viviparous", a condition in which the seed skips the resting period, which is a characteristic of nearly all Angiosperms.

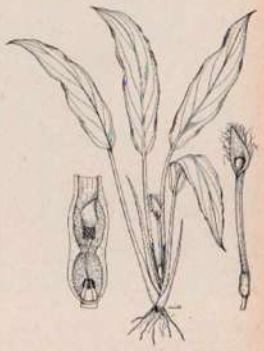
Seed-bearing Plants

Practically all seed-bearing plants produce seeds which reach full development by continuous growth after fertilisation of the egg-cell. When this stage of full seed-development is completed, the embryo (a minute plantlet within the seed), and the seed as a whole, enters a period of immobility. Its growth is discontinued, interrupted, and the seed "rests".

This period of rest is of different length in various kinds of plant but it may be stated that nearly all seed-bearing plants pass through this time of seed-rest. Many mangrove plants, however, show no seed-rest whatsoever. The seed keeps on developing to a young plant (a seedling) that is often found dangling on the parent tree.

The herbaceous *C. ciliata* seems to be "viviparous" in exactly the same way. Its seedling, once it has escaped from the outer case, appears to float easily in the water. It is provided with a tuft of very delicate, needle-shaped "leaves" and one is inclined to think this peculiar bunch of appendages might serve as a means of anchoring the drifting seedling.

It should be noted that, in a few cases, seedlings of other *Cryptocoryne* species, not occurring in mangrove, have been studied and the tuft of hair-like "leaves" were absent from such seedlings.



Drawing of Cryptocoryne ciliata. *The flowering plant is shown in the centre, whilst, to the left, there is a close-up of the inflated lower part of the tube with the ovaries and partly-covered stamens. An enlarged entire flower is on the extreme right.*

Cryptocoryne versteegii, discussed in the last issue, is, however, also provided with a tuft when emerging from the seed-hull and it is the second species known to have this characteristic.

From Mangrove Swamps ?

Is it, then, a mangrove plant ? I do not know. It occurs in New Guinea, and, very likely, on marshy river flats. Though it was found far inland, the Lorentz river runs over an enormous distance through low plains. Does the tide penetrate as far as its growing locality and is the water surrounding its roots brackish ? The characters of the seedling suggest it might be.

Do it yourself

Contemporary aquarium arrangement

A design which fits in well with modern lounge furnishings

by GERHARD W. E. BRÜNNER

AQUARIUMS built in cabinets, bookcases or behind facia-boards are now quite commonplace and, in fact, such decorative tanks have contributed in no small measure to the wide popularity of fishkeeping today.

The aquarium of 28×15×13 in. dimensions described here is combined with a sitting-room bookcase and stands on a low, robust part of the bookcase. For the panelling I used plywood, veneered with natural oak, which was fixed to a wooden framework. The wood was given a wax-polish finish which blended with the room furniture. The top cover was made of ¾ in. plywood and covered with oak-veneer in the same manner as the panelling.

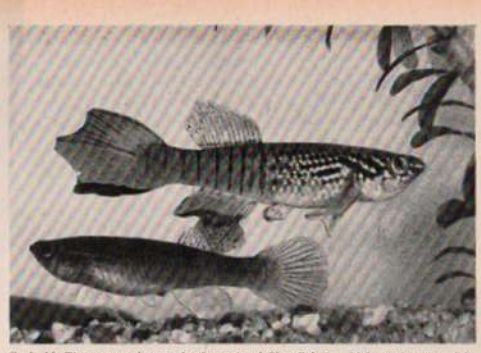
Electrical Leads

At the left-hand side there are the leads for the light, heater and pump. Heat is provided by a normal electrical heater (adjustable up to 100 watts). A thermostat is not used in this particular design because the room temperature is relatively constant and temperature fluctuations of the tank water are therefore in normal, natural limits. In addition, the wooden panelling helps to insulate the aquarium.

The siphon of the inside filter is placed under the heater and, by this means, an even temperature is achieved throughout the whole tank. The fish population is not excessive so additional aeration is unnecessary. Temporarily I use peat-moss for filtration.

For the person interested in tropical, aquatic plants good illumination is of great importance. (*Continued on page 438*).

Aquarium light canopy lifted to show the position of the two, 20-watt fluorescent tubes for lighting.



G. J. M. Timmerman photograph of a pair of Blue Gularis. Male is the upper fish.

BLUE GULARIS

Short-lived but brilliant Tooth-carp with lengthy hatching period

by C. A. & E. A. ALLEN

FROM the seaboard countries of tropical West Africa, there comes a beautiful group of fishes known as the Aphyosemions. Prominent among them, and one of the handsomest, is the Blue Gularis (*A. coeruleum*).

The male of the species grows to a length of about five inches and is, when in condition, one of the most beautiful of Egglaying Tooth-carps. His generally pale blue body, deeper blue mouth and throat and, outstandingly, the orange flare in his double crescent tail, make him a glorious sight.

Drabber Female

His spouse, however, following the general pattern of *Aphyosemion* females, is of a uniform green-brown colour, and fails by about an inch to attain the maximum length of her mate.

Given certain conditions, Gularis are suitable community tank occupants, and will live out their life span (seldom more than 12 months) giving the aquarium a certain elegance. They are fish to be noticed even by non-aquarist folk.

And now the conditions they require; first, old soft water, preferably rainwater rather than most South-of-England tap waters. We keep most of our Aphyosemions in rainwater passed through a silver sand and peat filter. Secondly, food, and our experience is that it must be live-chopped Earthworms (provided the pieces are large enough to wriggle), chopped *Tubifex* (the same instruction applies here), White Worms, mosquito larvæ and—a warning—very small fishes for Gularis have astonishingly large mouths. They are not vindictive, however, and do not snap or nip the fins of other fish which are their own size. So that is the third condition—do not trust well-grown ones with such fish as young Neons, for instance.

Unlike some Aphyosemions, Gularis are inclined to prefer the bottom of the tank. When kept in company with other fishes they are not shy, but will remain in a stationary pose for

some time, and then make a sudden dash for another position.

Generally speaking, the Aphyosemions are not lovers of high temperatures; they do best at about 70 deg.F. and *A. cæruleum* is no exception. In natural surroundings they are reputed to inhabit deeply shaded pools, and it is doubtful if the power of the sun ever reaches them. Whether that is so or not, experience leaves us in no doubt that semi-darkness is a very necessary requirement for the period in which the eggs incubate.

Whether Gularis are true annual fish (i.e. they live for one wet season, spawn, die when their ponds dry up, and the eggs hatch when rains once again flood the pools in which they have bred) is not yet generally known, but our best results have certainly stemmed from trying to simulate these conditions.

First Attempts

When first we were lucky enough to obtain six Blue Gularis a few years ago, our experience was limited to the Lyretail (*A. australe*) and *A. bivittatum*. We had bred both of these in reasonable quantities, and were confident of doing likewise with our new acquisitions.

We took some rainwater from a tank in which we had been keeping a large stock of Lyretails, filtered it to ensure cleanliness, and with it, covered a 2 in. deep base of granulated peat in an 18 × 10 in. tank. Into the water we placed a considerable bunch of coconut fibre, previously soaked in boiling water. There must be sufficient of this material to give cover, but not enough to make swimming difficult as fish are liable to become frightened in water too constricted.

At this point we would like to say that Gularis—in truth all Aphyosemions—would spawn without the fibre or its equivalent on, or in, the peat. Most eggs are laid this way, some adhere to the fibre, but its main use is to provide shelter for the female.

We covered the tank with brown paper and, after leaving it to settle for about a week, introduced a pair of the fishes. The male was beautifully coloured and about 3 in. long. The female showed a desirable rotundity in its body.

We were hopeful of a successful spawning and so, at least in part, it proved to be.

The fish spawned much as we had expected. They took up a side-by-side position over the peat base, trembled, and appeared to deposit an egg. After an interval they moved on, and repeated this procedure an inch or two away. This went on for some considerable time and, having read that the eggs took about six or eight weeks to hatch at a temperature of 70 deg.F., we left the fish together for three weeks.

During this period they were regularly fed twice a day, on a diet of White Worms. The risk of introducing pests with *Daphnia*, etc., at this stage was too great to be taken.

When we removed the spawners, we took out a dessertspoonful of peat, which was examined closely. It contained six eggs, all apparently in good condition. We hastily put it back.

After 35 days the first fish appeared, six days afterwards there was another fry, and after two months we had six young Gularis. It was very disappointing, we had apparently done all the right things, and had no idea where we had gone wrong.

We waited a few more weeks—three months in fact from the date of removal of the parents—and then sadly took out our six fry, which were growing apace on Brine Shrimp. We siphoned off most of the water, and tipped the peat into one of the polythene bowls we often use for spawning.

A gallon of rain water was poured on top of it, our intention being to use it for a pair of *A. cognatum*, lately purchased, and left it to settle. Two days later the glass cover was taken from the bowl, to put in coconut-fibre and, lo and behold, it was full of baby fish—Blue Gularis!

On counting we found there to be 76 of them. The rainwater we had poured in was at room temperature, about 65 deg.F. The babies were fed, as had been their forerunners, on Brine Shrimps and, after about three weeks, on Dwarf White Worms. They were 1½ in. long in eight weeks.

Since then, that has been our procedure with *A. cæruleum*. Spawn in one tank, remove any youngsters that appear, and after a period of 90 days or so repeat the process described. It works for us, it could work for any aquarist prepared to take the trouble, so we wish you good luck with the beautiful Blue Gularis.

Contemporary Aquarium Arrangement

(*Continued from page* 436.)

This I have provided by using two 20-watt fluorescent lamps of the warm-white type. Duration of daily illumination is 12 hours, Summer and Winter. Plant growth is excellent, even of the difficult species.

Fluorescent lamps get only hand-warm, so additional ventilation is not necessary and the lamps can be fitted directly over the cover-glass which is in two pieces. Black paper is used for the background and sides.

On the panel at the left-hand side the switches for heater, light and pump are positioned. The actual pump and the transformer to the fluorescent lamps are fixed on the room wall outside the panelling.

To service the tank, the top flap can be lifted and fixed in position with a metal bar. If a greater servicing area is needed, the whole panelling can be removed.

Dr. Ghadially's two sons sitting beside the polythene-lined Daphnia *pond.*

SUCCESSFUL METHOD OF KEEPING DAPHNIA

by DR. F. N. GHADIALLY

THE inclement weather we have been having delayed the appearance of *Daphnia* this year, but a few weeks ago I found that the pools were full of them once more. I brought home large quantities and, after feeding the fish all they could consume, I came to the age-old problem of how to store surplus *Daphnia* for future use.

A few *Daphnia* can be kept in a bucket, bowl or bath tub for several days but, if there is any overcrowding, they die rapidly. The dead ones putrify and pollute the water and this soon kills off the remainder. Brisk aeration is of little use; the *Daphnia* are quite powerless to hold their own against strong water currents and are soon knocked against the sides of the container.

Very slow aeration is just not good enough to take care of any degree of overcrowding. If *Daphnia* are to be stored for more than one or two days then some thought must be given, not only to their oxygen requirements, but also their food needs.

I have kept small quantities of *Daphnia* going for many weeks in old sinks, bath tubs and similar containers by feeding ripe Infusoria cultures and a few drops of a yeast emulsion. The yeast emulsion is made by shaking up a small piece of yeast in a quantity of water. A few drops of this are added to the container containing the *Daphnia*. It should be just sufficient to produce a faint turbidity in the water (if too much is added the *Daphnia* will perish). *Daphnia* feed on the yeast suspended in the water. As this progresses the water will become clear once more and more yeast suspension can then be added.

Using Polythene

Polythene sheeting is now available easily and cheaply and this year I am storing surplus *Daphnia* in a polythene pool constructed with little effort in my garden. The pool is an informal one. It was made by digging an irregular hole about 12 ft. long, 5½ ft. wide and one foot deep.

The basin having been excavated, the next step to to ensure that there were no sharp stones, twigs, etc., which might puncture the polythene. A layer of peat or sand can be laid to guard against this, but such a course is not absolutely necessary if care is taken to eliminate all sharp objects.

The sheet of polythene (which cost me only 12s.) was next spread out to cover the excavated area. A round pebble measuring about 3 in. in diameter was placed in the centre of the sheet of polythene and this was made roughly to coincide with the centre of the excavated area.

Water was then run in from a hose. As the water filled the pool it flattened out the polythene against the walls of the pond. No attempt was made to flatten out or adjust the polythene manually as pulling, dragging or sharp creasing might have damaged it.

Once the pool was full to the brim and overflowing, the edges of the polythene were flattened out and held in place by large flat stones, similar to those one would use to make crazy paving.

The pool proved a tremendous success until, one day, some children threw a large number of stones and bricks into it. Multiple tears developed and the water and the *Daphnia* disappeared. The pool was repaired in a few minutes by laying another sheet of polythene directly on top of the old sheet. This second attempt has met with more luck than the first one. It is now over a month and the pool is still holding water and *Daphnia*.

So far as I am aware polythene sheeting may be bought in three different thicknesses. I have used what is known as the superior quality, i.e. the in-between grade, not the thinnest nor the thickest available.

Enlarged photograph by Dr. F. N. Ghadially of Daphnia, *which is an important livefood for fishes.*

One other point needs considering. Before the pool was stocked with *Daphnia*, the water had to be made habitable for them. A couple of handfuls of garden soil and a bucketful of ripe Infusoria culture were placed into it. A week later a large number of *Daphnia* were introduced. They are fed twice a week as described earlier. Large numbers of *Daphnia* have been netted out every alternate day to feed to the fishes.

There is little doubt that, not only can this pool successfully store large numbers of *Daphnia*, but that some breeding is going on also. This is evident from the large numbers of very small *Daphnia* which are now appearing in the pool. These are invaluable for feeding tiny fry which have passed the Brine Shrimp and Mikro-worm stage.

To make use of the small *Daphnia* it is important to separate them from the large ones. Failure to do this can lead to undesirable complications. A lot of large *Daphnia* in a tank full of fry which cannot eat them will result in (a) overcrowding because *Daphnia* use dissolved oxygen in the water just as fishes do; (b) the *Daphnia* will rapidly filter out all the Infusoria from the water and, if the fry are tiny and still feeding on Infusoria, this can produce a serious shortage of food for them; (c) the uneaten *Daphnia* may die and pollute the water; (d) if only a few of the fry can eat the *Daphnia* introduced into the tank while others cannot, then a tremendous difference in the size of various fishes in the brood will result. This is because the larger fish in the brood which can tackle the *Daphnia* will increase in size rapidly, while the others will be short of nourishment.

For all these reasons it is advisable to make certain that only the correct-size *Daphnia* for the particular fish are introduced to the aquarium.

The grading of *Daphnia* according to size is easily and quickly achieved by using fish nets made from organdie, nylon, nylon net, etc., and polythene strainers, etc., which provide varying mesh sizes. The "mixed" *Daphnia* are placed in one of these nets or strainers and then held dipping into the water of the tank.

The smaller *Daphnia* swim through the mesh into the tank and the larger ones remain behind and may be re-sifted to remove the medium-sized ones for the medium-sized fishes. Finally, the large ones left behind in the net or strainer are washed out into tanks containing adult fish.

The process of sifting *Daphnia* confers a further advantage. It keeps out water beetles, Water Tigers and other undesirable creatures from the fry tank where they can do most damage. Medium-sized Water Boatmen, and even Water Tigers, are readily disposed of by large fishes, particularly Angels and other large Cichlids. What would have been a menace in a fry tank is often no more than extra food to the larger fishes.

Month-old Pompadour Fish with their mother-fish. Early in life Pompadours take nourishment from their parents' bodies. Photograph, Roy Skipper.

Hormones and Reproduction in Fishes

by C. W. EMMENS, D.Sc., Ph.D., M.Inst.Biol., F.S.S., F.A.A.

(*Professor of Veterinary Physiology, University of Sydney*)

FISHES produce a whole series of hormones, most of which are very similar to or identical with the hormones we ourselves manufacture in our own bodies. There are apparently some differences and there are, of course, differences in the various actions of these hormones depending on the habits and habitat of the creatures concerned.

Thus, fishes possess all the various so-called endocrine glands (which are the glands producing hormones) that are seen in other vertebrates and produce well-known hormones like insulin and thyroid hormone. These hormones have just the same actions that they have in humans.

In this article we shall be particularly concerned with the hormones affecting reproduction which are produced by two glands in the body, the pituitary gland which lies at the base of the skull and produces about eight different hormones of vital importance, and the gonads —the testes in the male and the ovaries in the female, which also produce hormones in addition to the germ cells.

The pituitary gland controls a number of other glands in the body, including the gonads, and they, in turn, have an influence on the pituitary so that we are faced with a rather complex situation with one gland in part controlling the output of the other in a push-pull relationship.

If the gonads are removed from fishes by surgical operation, not only is the animal made sterile, but the development of various sex characters and of behaviour associated with reproduction is prevented. This action is exactly what occurs in higher animals. Again, as in higher animals, the effects may be repaired by injecting the hormones produced by these glands or by preparations made from cattle glands, or even synthetically.

Since the gonads are dependent upon the pituitary, the same result is achieved by cutting out the pituitary gland. The pituitary gland produces hormones called gonadotrophins, in the absence of which the gonads fail to develop and thus fail to produce their own hormones.

Pituitary Gland

The normal awakening to sexual activity in the young individual, or the seasonal, sexual re-awakening in mature individuals occurs via the pituitary gland. Various factors which depend upon the particular species of fish in question operate to cause this.

A very common factor is light, but the temperature of the water, or the sudden access

to fresh water, or even just the proximity of the opposite sex may operate to cause a relatively sudden release of hormones which stimulate the gonads to activity and the fishes to sexual interest and to spawning.

In the Stickleback (*Gasterosteus*), for instance, it appears that an increase in the daily period of natural sunlight causes these changes. In the Spring the pituitary gland awakens and the testis is stimulated to put out male sex hormone or androgen. This, in turn, in the male stimulates a red coloration on the throat and ventral surface of the body, the production of a great deal of mucus, which is used in nest building, and enlargement of pelvic fin musculature used in incubating the eggs.

It also causes combativeness and territorial ambitions of the future father and, later on, the usual breeding behaviour follows, involving nest building, courtship, spawning and incubation of the eggs.

Corresponding Hormone

In the female the corresponding female sex hormone, or oestrogen, is released from the ovaries, but that does not stimulate combativeness but only willingness to mate.

In the mammals the pituitary gland frees another hormone called prolactin, which is responsible for maternal behaviour and for the production of milk. This same hormone operates in other classes of vertebrate, such as birds, in which milk is not produced, of course, but where "crop milk" may be produced as in the pigeon, and a milk-like substance is then regurgitated from its crop for the early feeding of the young. Outstandingly in birds, however, prolactin is concerned with broodiness, nest building and the willingness of both sexes in many species to sit for long periods on the eggs.

Prolactin is found in the pituitary glands of fishes and, although nobody has actually demonstrated that it performs a similar function in them, it seems most likely that it does. Thus, in those fishes like the Cichlids, which care for their young for a considerable period after hatching, it seems most probable that this behaviour is stimulated by prolactin. The very interesting and fairly recent observations initiated by Mr. & Mrs. Roy Skipper of Hendon, on the necessity for young Pompadour Fish (*Symphysodon discus*) to feed from the sides of the parents for a few weeks after birth raises the speculation that this may be due to prolactin.

Prolactin Responsible ?

Although the mother is said to play a somewhat greater and more important part than the father, apparently both sexes of the Discus fish provide mucus and it would therefore be the easiest explanation that prolactin is responsible. On the other hand, it would not be entirely impossible for the sex hormones to be involved since each sex could respond to its own hormone by a production of the nutritive material.

However, as the mucus production occurs well after the mating period is temporarily in abeyance, I still feel that the prolactin explanation is the most likely.

It is, of course, evident with many of the bony fishes (Teleosts) with which we aquarists are mostly concerned, that the female is not necessarily the only sex which may care for the young. The best-known examples of parental care occur where the male parent is involved. Male Pipe Fishes and Sea-horses (*Syngnathidae*) are good examples from the marine world of male fishes having specialised brood pouches in which the young are placed for early development, and the male is often the main nest builder and protector of the young.

There has been a very great deal of experimental work on the direct effects of gonadal sex hormones, as they may be added to the water in which fishes swim and remain long enough for their actions to take effect. This is not true of the pituitary hormones but only of the hormones from the gonads. Even if fishes possess particular hormones of their own which closely resemble but are not identical with the mammalian hormones, they nevertheless respond very well to mammalian hormones.

Livebearers Widely Used

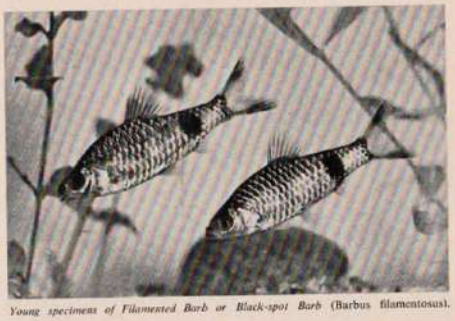
Because of the well-developed secondary sex characters, such as coloration and fin shape or body size, the livebearing fishes have been most widely used in investigations of this sort. It has been shown that the modified anal fin or gonopodium and the coloration of the male is usually dependent upon the action of male sex hormone which, if added to the water in amazingly minute quantities, will cause the premature development of these characters in both males and females, or the gradual assumption of male characteristics by the female herself even if she is a mature fish.

This can never be complete in a mature female because her own fin development is unalterable to an extent, but in particular she will take on the colours of the male. This has been used as an interesting method of testing for the latent coloration characteristic of the females, since the process may be stopped at a stage before rendering the female sterile (which would otherwise occur if treatment were continued) and thus she may be allowed to revert to femininity and to go on breeding after the test has been made.

An idea of the minute quantities of hormone required may be gathered from the fact that with methyltestosterone, one of the male hormones under discussion, a concentration of 1 mg. per 25,000 litres (this equals approximately 1 grain per 360,000 gallons) is sufficient to start the process.

The effects of female hormones are, of course, predominantly feminizing and they do not produce such spectacular results because the female fish is usually less colourful and less aggressive than the male. A good deal less work has been done on this particular aspect of the subject, so that it is only possible to state that various degrees of feminization may occur under the influence of the female hormone but whether or not it is normally able to suppress male development does not appear to have been fully investigated.

AQUARIUM FISHES FROM CEYLON



Young specimens of Filamented Barb or Black-spot Barb (Barbus filamentosus).

No. 2. Species which frequent the acid, lowland swamps

by RODNEY JONKLAAS (Ceylon)

IN the warm, slow-moving waters of the lowland swamps of Ceylon lives a variety of fishes, many of which are peculiar to this habitat. These swamps are distinct from the mangrove swamps of the coastal areas ; they are further inland, free from the influence of the tides and salt-water and are, for the most part, semi-stagnant with only very slight variations in *p*H, temperature and hardness.

The acid, lowland swamps are not found outside the wet zone of Ceylon and are confined to the low-lying western and south-western portions of the Island, extending no higher than 300 feet into the hilly areas.

Many species of fishes which have strong tolerance to varying conditions and are prolific breeders are found apart from those peculiar to these swamps but they will only be mentioned here as "intruders".

Typical of the acid swamps are the following: Dwarf Panchax (*Aplocheilus* (*Panchax*) *blockii*)*, Green Panchax (*Aplocheilus dayi*), *Barbus vittatus*, Scarlet-banded Barb (*Barbus amphibius*)*, Filamented or Black-spot Barb (*Barbus filamentosus*), Swamp Barb (*Barbus chola*)*, Climbing Perch (*Anabas testudineus*), Striped Snakehead (*Ophiocephalus striatus*), Common Snakehead (*Ophiocephalus gachua*)*, Round-tail Paradise Fish (*Macropodus cupanus dayi*), Dwarf Rasbora or Green Carpet (*Horadandia atukorali*)*, Flying Barb (*Esomus danricus*), Spiny Eel (*Macrognathus aculeatus*),

Smooth-breasted Snakehead (*Channa orientalis*), Common Catfish (*Mystus vittatus*), Grey Catfish (*Clarias teysmanni*) and Stinging Catfish (*Heteropneustes fossilis*).

Strictly speaking, however, perhaps only those marked by asterisks are found in these areas alone. The others, though being typical of such situations, are hardy and fast breeding enough to occur in different areas as well.

"Intruder" species comprise the following: *Rasbora daniconius* (almost an ubiquitous fish !), *Etroplus maculatus*, *Etroplus suratensis*, *Tilapia mossambica* (introduced), and *Trichogaster pectoralis* (introduced).

The latter two are fast becoming dominant species, much to the dismay of aquarists and collectors and they already threaten to reduce the population of indigenous fishes. This is an unfortunate result of hasty stocking programmes.

Lowland acid swamps vary in size from large, shallow lakes to small ditches of brown, slow-flowing water. Almost always the bottom is soft, muddy and weedy. The water in these swamps is seldom, if ever, really stagnant, and then only in extreme droughts.

Generally Shallow

For the most part, the swamps are shallow and are deep only if they run into and merge with man-made abandoned quarries or pits where coral or gems have been mined. For most purposes it is better to consider that the average depth would be less than three feet. Whereas the Tooth-carp species live on the weedy shallows, the Barbs keep to the bottom along with Catfishes and Eels.

Seldom does the water of the swamps drop below 75 deg.F. and the usual temperature is 85 deg.F. I have known Dwarf Panchax to be lively and apparently unmindful of 96 deg.F. in the shallows! The Catfishes and Climbing Perch can cheerfully withstand even 100 deg.F. The best average to be given them in an aquarium is 80 deg.F.

Dwarf Panchax and the Green Panchax like bright light for long periods of the day but are observed to rest in the shadows when the sun is at its height. The Catfishes are, of course, nocturnal and live in the deep, muddy gloom, feeding out in the shallows by night. The Barbs, Rasboras and Cichlids live in moderate light.

At a conservative estimate I would conjecture that the ideal lighting would be a 10-hour stretch each day, having moderate to direct natural sunlight when available but supplemented by artificial illumination when there is no sun.

Although I have used the term "acid" to describe the swamp water, in fact the water is seldom much more acid than, say, *p*H 6.4 with neutral and even alkaline conditions sometimes occurring when there is rain.

In some parts of Ceylon there are ancient swamps close to the coast where a form of peat is found, derived from decayed ferns, but it is never solid and stable enough to approach the European peat. Mingled with this peat is soft, brown mud, or clay, and occasionally, sea-sand. The water is a translucent light brown (the colour of coffee without milk), sometimes amber, but seldom really clear. Rarely, it is muddy and completely opaque when unusually heavy rains have fallen in the area.

Hard Water in Places

Where swamps invade man-made pits formed by the excavation of old coral (used in the manufacture of quicklime) the water is quite definitely hard and nearly all the fishes listed above seem to adapt themselves well to it. However, they are not easy to train to ordinary soft tap-water if taken in these locations and they require careful acclimatisation.

A good general *p*H for the aquarium would be 6.4 with the water soft rather than hard because it has been observed that the fishes are at their best and breeding fastest in soft water rather than in the artificial hard-water pools such as those described.

A remarkable variety of very desirable aquatic plants thrive in the swamps. More often than not a great deal of room is taken up by riotous growths of submerged or floating water-plants which, in a few cases, completely choke waterways and are declared plant pests.

Foremost is *Salvinia*, a much maligned introduction from Australia which took the place of the Water Hyacinth (*Eichhornia crassipes*) some years ago after the latter had been "declared" and almost completely eliminated. However, *Eichhornia* has since staged a dramatic comeback and, in many places, the authorities are uncertain which of the two is the greater menace.

A Common Plant

A very typical plant of this area is *Aponogeton undulatus*, the bulbs of which are not only eaten by the poorer people but also exported abroad in huge quantities for aquarium use. The average *A. undulatus* plant, at its best, would boast leaves of at least two feet in length and it is not uncommon to see a healthy specimen sporting from 15 to 20 of these magnificent leaves.

Lotus (*Nymphea lotus*), Water Snowflake (*Limnanthemum indicum*) and various Water-lilies (*Nuphar* and *Nelumbium* species) are common in these waters. As a matter of fact, the Water Snowflake will not grow anywhere else and is most difficult to train to a garden pond or aquarium.

Another introduction (obviously by aquarists!) is *Cabomba caroliniana* which is doing very well indeed thousands of miles from its native America. *Hydrilla verticillata*, a pretty native species, is a very familiar swamp plant and a favourite bushy refuge for fish fry.

The Water Fern (*Ceratopteris* sp.) is more a bog-plant than a submerged plant in Ceylon, in company with others like *Monochoria*, many species of Arrowhead, and an introduced beauty, *Limnocharis humboldtia*. The only submerged Water Ferns are the plantlets which fall off the flooded stiff, fine-leafed branches of adult plants just after the rains. As the water level decreases these pretty delicate-leafed fern plants soon grow out of water and become tougher.

Very typical of this area is *Aponogeton undulatus* which is hardy enough to survive even complete dessication during drought or reduction of water level when growing marginally.

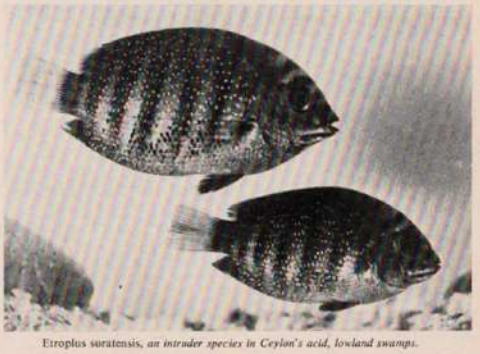
Of the lower plants, these bogs are seasonally infested with filamentous algæ, typified by *Oedogonium*, as well as many lesser known species on which numerous fishes, notably *Etroplus suratensis*, feed.

Sunken, rotting logs and branches of trees, marginal plants with bushy submerged roots and occasional rocks complete the setting of the lowland swamps, especially where they are wooded and uncultivated.

Algæ in Season

The fishes of the swamps obtain their supplies of food in varying quantities and at varying seasons. Just after the rains, for instance, algal growth intensifies and is eagerly sought after by *Etroplus suratensis*, and by the unwelcome introductions, *Tilapia mossambica* and *Trichogaster pectoralis*.

The Tooth-carp species feed on or close to the surface and are constantly gobbling at



Etroplus suratensis, *an intruder species in Ceylon's acid, lowland swamps.*

minute insects and their larvæ, ants and the like, plus the tiny fry of other fishes, when available.

The Barbs grub about on the bottom for worms and insect larvæ and no doubt take in a considerable amount of vegetable matter in the process.

The Rasboras, Danios and *Esomus danricus* are top and mid-water feeders, dashing eagerly at flies, insects, ants, their larvæ, baby fishes and almost anything that comes their way. Close to human habitation they become speedily sophisticated and greedily devour boiled rice, kitchen refuse, bread, etc.

I shall continue this discussion on the natural life of Ceylon's acid, lowland swamps in the next issue.

Metynnis *fishes, which are some of the largest Characins kept in aquariums.*

Rarer Fishes in the Recent Introductions

by P. MILLET

WHILE I have seen no entirely new fish during the last few weeks, many of the rarer species that appear at very infrequent intervals have arrived, and also several old favourites have been imported in tip-top condition.

I had hoped to describe two entirely new species that should have come to Britain recently from one of the French colonies, but conditions in France have delayed this import, though it is hoped that the fishes will make their appearance in the near future.

Giant American Mollie

A well-known livebearer, that is often not seen at its best, has recently arrived from the U.S.A. It is the Giant Sailfin Mollie (*Mollienesia velifera*). These fish, which can attain a length of up to six inches, need a certain amount of special care and attention if one wishes to grow them to exhibition standards.

Half the battle is won if they can be provided with plenty of space and plenty of suitable food. Given these conditions the rewards are worth the small trouble involved, for the males in full condition are a really magnificent sight.

Coming, as they do, from river estuaries, they appreciate a little sea-salt in the water, and appear to do better if this is provided. Like all Mollies, they must have a fair proportion of vegetable food in their diet and, if suitable algæ is not present in the aquarium, it can be substituted in the form of finely chopped lettuce, cooked spinach, or wheat-germ dried food.

While, for obvious reasons, importers rarely bring in the savage Piranha, which must travel expensively in lordly isolation and even then cannot find a ready market, its peaceful cousins of the Genus *Metynnis* arrive at fairly frequent intervals. Although too large for the average community tank, these dignified Characins are quite peaceful with fishes of their own size. Unlike the Piranha, they are omnivorous in their diet, and consume a fair amount of vegetation, so rare and delicate plants should not be kept in the same tank !

The species on offer at the moment is *M. zehreitmulleri*, a silvery fish with a beautiful red anal fin. Other Characins on the market at present include the Pencil Fish, *Poecilobrycon eques* with its attractive caudal fin and gentle manners, *Nannostomus marginatus*, Cochello Tetras and Platinum Tetras. All are desirable fishes that are not seen every day, and which are eminently suitable for the community tank.

Among the rarities available at the moment must be included one of the Old World Catfish, a member of the Genus *Clarias*. Like the Anabantids, these fishes have an accessory breathing organ which enables them to breathe atmospheric air, and which indicates that the fish can live in water foul and turbid enough to be very uncomfortable for normal gill-breathing species.

Wide Distribution

This Genus extends from Africa to the Orient, but the species on offer is, in all probability, an African one. *Clarias* Catfish, when adult, are too big for the small tank but are good fishes for the aquarist, who likes to collect (or show) something out of the ordinary.

Another aquarium rarity at a London trader's is the true African Lungfish, *Protopterus annectens*. Importers often wish that other fish shared one of the peculiarities of this species, for it can be imported in a leisurely fashion dried up in a cocoon of dried mud ! In the dry seasons the fish is able to aestivate without water, and can live for up to a year in this condition.

While not beautiful, the species is interesting for its own sake. Not only is it a "living fossil", but it illustrates one of the stepping stones in evolution between the true fishes and the lung-breathing land animal. It is so dependent on atmospheric air that in an unsuitable aquarium it could actually drown !

Other Lungfishes live in Australia and S. America. *Protopterus*, though it has never bred in captivity, is a nest builder, and the young are provided with extra external gills which enable them to extract oxygen from the stagnant water where they live. Vestiges of these gills remain for life in the present species. Unlike the young of most fishes, no yolk sac is present, and the larvæ are more like the tadpoles of certain amphibians than fish fry.

The lungs of these fishes are adaptations of the swim bladder found in other bony fishes. Lungfish eventually grow enormous, and also eat other fishes !

Rarer fishes of types that are only readily available at this time of the year are now being imported and it is interesting to note that exactly 20 years ago an advertisement in WATER LIFE for July 12, 1938, offered Scats at 12s. 6d., which is not far from the price of this fish today. Can readers think of any commodity that has hardly gone up in price in that time ? In spite of our grumbles, fishkeeping can be numbered amongst the cheapest of the worthwhile hobbies!

Herpetologists will be interested in a consignment of reptiles and amphibians recently received by a well-known importer in the North-west. It includes an enormous, spectacular toad from Ecuador, *Bufo blombergi*, a new species of lizard, *Leiocephalus trachycephalus*, and the "Marsupial Frog".

Pouched Frogs

The Pouched or Marsupial Frogs, *Nototrema*, are tree-frogs in which there is a pouch at the rear of the back of the females. There are about six species, most of which are confined to Western and Central Tropical America.

The eggs are placed in the pouch (it is thought by the male) and undergo their entire metamorphosis in this strange environment. Owing to overcrowding in the pouch Nature has provided the newly-hatched tadpoles with a cover for their delicate external gills. That these fascinating frogs can be bred in vivaria is demonstrated by the fact that the importer already has several hundred young ones which he has bred in England from his original stock.

The distinctly marked Nannostomus marginatus *Characin, a colourful species now available in Britain. Photographs taken by G. J. M. Timmerman.*

From My Experience . . .

by R. W. ANDREWS

EVERY now and then I cannot resist giving over one of my tropical fish tanks to the fishes which were my first interest—our native coldwater species. The last occasion this occurred was when a friend, returning from a field trip to the riverside, brought back some young Bullheads (*Cottus gobio*). These quaint-looking fish, which appear all head and shoulders and have outsize pectoral fins, were placed into a 24×12×6 in. tank where a number of flower-pot caves had been positioned.

All of the Bullheads soon settled down, each one displaying a solitary disposition by choosing a separate cave to itself. In Nature these fish spend most of their time hidden beneath large stones but, under aquarium conditions, they remain quite happy so long as they have some form of cave in which to shelter.

At the same time they soon learn to display an intelligent interest in the approach of their owner and immediately swim out to take a feed of worms. Incidentally, a six-inch depth of water appears to be the maximum for the Bullhead's comfort.

Another old favourite of mine is the Common

Bullhead or Miller's Thumb, an interesting species native to Great Britain. Photograph, H. V. Lacey.

Carp (*Cyprinus carpio*). Small specimens make ideal aquarium pets, for they are very hardy and will literally take anything that is edible. Added to this is their soon-developed tameness, which gives their owner the great satisfaction of the fish feeding freely from food held in his fingers.

My favourite fishy story concerns a large Carp which an uncle of mine caught during an evening's angling in a local lake. This fish was taken home to provide the following morning's breakfast.

On reaching home my uncle placed the Carp in a large zinc bath, to keep it alive until required, but next day the family were so intrigued by the fish's obvious contentment in its new environment that its demise was postponed for another day and, in fact, it actually became a family pet, eventually to be taken back and returned to its original lake.

Small specimens of the European Catfish also become very tame under aquarium conditions. An interesting colour change experiment can be conducted with this species. When the Catfish is placed in a tank with a clear glass bottom, its normal jet black coloration will soon change to an overall dull silver. Then, if a sheet of black or dark brown paper is placed against the underside of the glass, the fish's coloration will revert to jet black.

Individualistic Traits

From time to time I have had the pleasure of observing one or other of my fish develop some form of individualistic behaviour which has earned it the distinction of being described as a " character ". One such specimen was a large, very rotund female Shubunkin Goldfish, which I had reared from the fry stage.

This particular fish shared a tank with three Fancy Goldfish. The latter three fish never appeared to deviate from normally expected behaviour, but the Shubunkin always seemed to take a keen interest in what was going on both inside and outside the tank ; in fact, it was the leader in all activities.

It was my custom to feed this tank of fish at about nine o'clock each evening, but it so happened one evening that I was busy writing and completely forgot this feed until I chanced to glance over at the tank and noticed the Shubunkin resting on her side slowly flapping on the bottom compost. Naturally I immediately went to investigate and to my amazement the Shubunkin at once recovered and shot straight up to the feeding ring.

From that evening onward this same artful trick was performed, if necessary at frequent intervals, until the food arrived. I cannot recollect that the Shubunkin ever attempted the trick during the daytime and invariably it was any time after seven o'clock. None of the other fish copied the behaviour but they would all gather around as soon as the performance started.

BREEDING TROPICAL EGGLAYERS

BUBBLE-NEST BUILDERS

by D. B. McINERNY

Pair of mature Thick-lipped Gouramies (Colisa labiosa); *male is the upper specimen. Fish of this species grow to about 3½ in. long. A Gene Wolfsheimer photograph.*

THE Family *Anabantidæ* provides the aquarist with some of the most interesting and colourful species for his aquaria. Among them are Climbing Perch (*Anabas testudineus*), Combtails (*Belontia signata*), *Betta picta*, Siamese Fighting Fish (*Betta splendens*), Giant Gouramies (*Colisa fasciata*), Thick-lipped Gouramies (*Colisa labiosa*), Dwarf Gouramies (*Colisa lalia*), Kissing Gouramies (*Helostoma temminckii*), *Macropodus cupanus dayi*, Paradise Fish (*Macropodus opercularis*), Chocolate Gouramies (*Sphaerichthys osphromenoides*), Leeri Gouramies (*Trichogaster leeri*), Moonlight Gouramies (*Trichogaster microlepis*), Three-spot Gouramies (*Trichogaster trichopterus*), *Trichopsis pumilus* and Croaking Gouramies (*Trichopsis vittatus*).

Variation in Breeding Pattern

Actually all these are not bubble-nest builders; *Betta picta* is a mouthbreeder and *Anabas testudineus* and *Belontia signata* do blow some bubbles but hardly form these into a nest, neither is this necessary, as the eggs are lighter than water and float to the surface. *Trichopsis pumilus* (which I christened the Sparkling Gourami) builds a bubble-nest, not at the water surface, but under a horizontal leaf an inch or two above the sand. Incidentally this little beauty makes a croaking sound at breeding time that can easily be heard 10 yards away from the spawning tank.

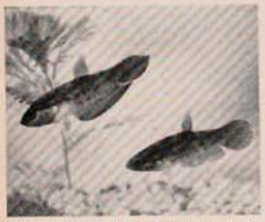
The remaining species do build bubble-nests, though quite a few do not rely entirely on bubbles, but reinforce them with pieces of plant. Of the species mentioned, the Climbing Perch and the Combtails are not safe in a community tank, whilst Paradise Fish and Blue Gouramies can become bullies. Male Siamese Fighting Fish rarely refrain from fighting among themselves and tearing each other's fins, but the remainder make good community fishes.

Aquarium Dimensions

The majority of Anabantids breed readily, those exceeding 3 in. in length preferring a breeding tank of 30×12×12 in. dimensions, but the smaller species are quite happy in our standard 24×8×8 in. breeding aquarium.

Overhead view of bubble-nest built by the popular Siamese Fighting Fish (Betta splendens).

After covering the bottom of the tank with a 1 in. layer of clean ¼ in. grade sand, it should be filled with one-third rainwater and two-thirds tap-water. A pH of 6.8 to 7.2 and a hardness degree of 120 to 180 p.p.m. is recommended. Set the thermostat for an 80 deg. F. reading. The tank should be planted liberally with Cryptocorynes and a bunch or two of *Myriophyllum*, topped off with a floating mat



Fishes of the rather rare Betta picta *species.*

of Lesser Bladderwort. This arrangement will suit most fish of the Family.

Though *Betta splendens* makes his nest entirely of bubbles, the plants afford a refuge for the female until she is ready to spawn. Dwarf and Thick-lipped Gouramies will mix their bubbles with the Bladderwort, whilst the Leeri, Blue, and Moonlight Gouramies will also add to this pieces of *Myriophyllum* to strengthen the structure. *Trichopsis pumilus* will build its bubble-nest under the arching leaves of the Cryptocorynes.

Never attempt to breed from any female until she is bulging with roe (see the diagram accompanying my last article), you will not get a successful spawning, and she may be killed by an overzealous male if she is not ready to mate.

Generally the pair can be placed in the tank safely, but with Fighters I prefer to keep the female in a jam-jar floating in the breeding tank. The male can see her, and her presence encourages him to build a nest, but he is unable to harm her.

Eventually, when the nest is complete, she is carefully taken from the jar with a small net, and placed in the tank. If she is ready for breeding all will be well but, if not, she may be bullied. Give the pair time to come to terms, but once the female hides in a corner and is obviously being harmed, catch her and pop her back in the jar. Try introducing her to the male again next day, and so on. Nearly always it is only a matter of time before the display of the male excites her sufficiently to take part in the breeding.

During the courtship of other bubble-nesters both male and female spread their fins and waggle their bodies at each other. Their colouring intensifies till both are at their best. Whilst the male builds his nest he may resent the female coming too near and may drive her away rather aggressively. Nevertheless, once all is ready, he will attack her no more but, after approaching her, will attempt to coax her to follow him beneath the nest. If she responds, spawning soon takes place. The male curves his body in a crescent, and the female comes close to him. His grip tightens about her and, thus interlocked, the pair roll over until the female is in an upside down position. Their bodies tremble, and eggs are exuded and fertilized. As the embrace epds, the eggs may be seen falling slowly through the water.

Collecting the Eggs

Now the male, and often the female as well swim down and gather every egg in their mouths. Surrounding the eggs with an air bubble and coating this with a skin of saliva, they blow them out in the base of the nest.

Presently the process is repeated until there may be 250 to 850 eggs in the nest. Once the female is spawned out, the male takes charge and, distrusting her presence any longer, will drive her away. In Nature she is able to escape, but in a breeding tank she cannot get away, so remove her as soon as possible, or she may be harmed.

Attention of the Male

The male now takes charge of the nursery and is most attentive, guarding it with his life. Should any bubbles burst, he repairs the damage by blowing fresh ones.

In 36-48 hours the eggs hatch, and any fry that fall are seized in the male's mouth, recoated with fresh bubbles and blown back in the nest. Twenty-four hours later the now stronger fry wriggle so vigorously that they burst the bubbles continuously and the male then just makes certain that they remain in the vicinity of the nest under his protection, and none is allowed to wander too far away.

By next day the fry are free swimming and the male may be removed. The tiny babies then require plenty of Infusoria, and should have at least two, 2 lb. jam-jarfuls a day. In a week they will take newly-hatched Brine Shrimps and, after a further week, may be put on to Mikro-worms and very fine dried food.

Ten or so days later the fry start to develop the labyrinth and losses are sometimes heavy

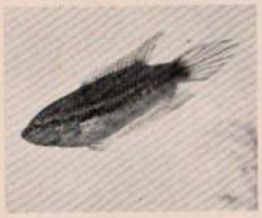
at this time. A large spawning of 500 may dwindle to a mere dozen or so. In the past it has been stated that, when going to the surface for air, the fry catch a chill and this is the cause of deaths but, even in centrally-heated fish-houses where it is the warm atmosphere that maintains the temperature of the tanks, losses can be equally heavy. This is particularly so with Moonlight Gouramies and, in my opinion, it is caused by a minute organism which lodges in the gills or bronchial cavity. I have found that a quarter of a tablet of Euflavine, or a few drops of a solution of potassium permanganate, added to the water in the tank kills the bugs and fry deaths are considerably reduced.

Varying Methods

Dwarf and Thick-lipped Gouramies build their nests of minute bubbles forced backwards through the gills. With *Betta picta* it is the male which incubates the eggs in his mouth. With *Trichopsis pumilus* the parents often move the newly-hatched babies from one leaf to another so, if they are not seen under the same leaf, it does not necessarily follow that they have been eaten. Nevertheless, once the fry are free-swimming, it is safer to remove both adults but keep them where you may know which is the male and which is the female when next required.

Sphaerichthys osphromenoides is a species I have not yet bred, and there are conflicting reports from the few people who have succeeded in reproducing it. Some state it is a bubble-nest builder yet others insist it is a mouthbreeder. However, one thing is certain, unlike most other Gouramies it only does well in rather acid and extremely soft, water, thus it is not really happy in the average community tank, and certainly will not breed under the more normal conditions.

Macropodus cupanus dayi, *one of the less common Labyrinth fishes. It grows to about 3 in. long.*



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Fish Philately

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Scorpion Fish

PRINTED in the fish's natural red hues, against a background of dark indigo, this 50-dinar stamp was issued late in 1956 by the Government of Yugoslavia. It is one of an exceptionally fine series, each of which depicts one of the many species of fish or marine creatures found in the clear waters of the bays, inlets and islands of the Adriatic Sea.

The species on this stamp is the Scorpion Fish (*Scorpaena scrofa*) which, with a related species, *S. porcus*, is common in Mediterranean waters. Both belong to the vast Family *Scorpanidæ*, a branch of the Order *Scleroparei*oidea, or Mailed-cheek Fishes, whose characteristic form has a bony process which joins the skull bones to form a coat of mail covering the whole head.

In the Genus *Scorpæna*, the head, with its skinny flaps, is very uneven in outline ; there is no air bladder, and each dorsal spine has a small, venom-secreting gland.

The favourite habitat of this Scorpion Fish is where the sea-bottom is heaped with concealing rocks. It is a sluggish creature with a voracious appetite. There it lies motionless in wait for its prey but moves with lightning speed, mouth gaping wide, when fish or crustaceans come within range.

Its flesh is regarded as good eating, but the fish is much disliked by fishermen. Its nearest relative in British waters is the Rose Fish, or Norway Haddock (*Sebastes marinus*). Other species of Scorpion Fish are found in all warm seas.

JOHN WAKEFIELD

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FISH ENEMIES

Flatworms

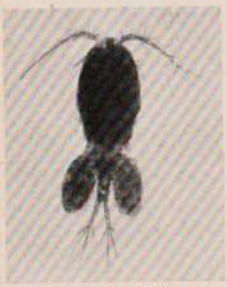
by JOHN CLEGG, F.R.M.S.

Illustrations by the author

THE great group of the Animal Kingdom called *Platyhelminthes*, or Flatworms, contains a number of creatures that are fish pests. One division of the Flatworms includes the Trematodes, or Flukes. They are distinguished by one or more suckers on the underside of their bodies with which they attach themselves to the creatures which they parasitize, including fish.

The best known are the Gill-flukes, or Gill-worms as they are sometimes called ; these are often attached externally to freshwater fish, particularly on the gills. *Gyrodactylus*, a creature only about 1/25 in. long, is sometimes found in great numbers and no less than 200 to 300 have been recorded on a single Stickleback.

Dactylogyrus, a related species, has been found on aquarium fish in this country and is common in a wild state on the Continent on



Enlarged picture of a female Cyclops. *Cyclops can be the intermediate hosts of certain Tapeworms.*

A Planarian, one of the free-living Flatworms that can prove troublesome. Its actual length is ½ in.

such fish as Carp and Bream. The larvæ of these flukes are free-living creatures which swim round until they encounter a suitable host.

Gill-flukes have a comparatively simple life-history involving only one host. Other flukes, however, have more complex life-cycles which need more than one host to complete. *Bucephalus*, for instance, which in the adult stage is a parasite of Perch and Pike, passes the first larval stages in freshwater mussels and later passes into smaller fish, such as Roach. It can only complete its life-cycle if the Roach is in turn eaten by a Perch or Pike !

Tapeworms are Flatworms which have become so completely adapted to a parasitic existence that they have lost nearly all the parts of the body except those concerned with reproduction and with holding on to their host. The head serves merely as an attachment to the food-canal of the host and the rest of the body is a series of segments each containing immense numbers of eggs. Liquid food from the host is absorbed over the whole body-surface of the Tapeworm.

Varying Life-histories

Although some Tapeworms have comparatively simple life-histories, others are complex. A common species found in Sticklebacks, often causing a large bulge on one side of the body, starts its active life as a free-swimming minute larva which bores its way into the body of small pond creatures such as *Cyclops*, where it develops and then forms a cyst. This may be the end of that particular flatworm but, if the *Cyclops* is eaten by a fish, the parasite becomes active again and eventually causes a larger cyst in the body-cavity of the fish, which is the cause of the large bulge already mentioned.

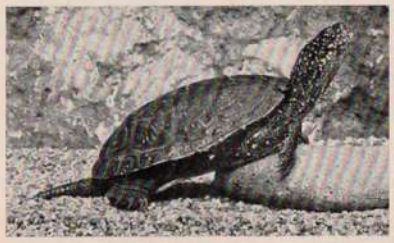
To complete the full life-history of the Tapeworm the Stickleback must be eaten by a water-bird, in the digestive tract of which it then lives. Eggs pass outside the bird's body in its droppings and hatch out near the water into the free-swimming larval stage.

Not all Flatworms live as parasites ; some are free-living creatures and among these are the various species of Planarian, common in all fresh waters. They vary in length from about ⅛ in. to 1½ in. and are all dark in colour with the exception of *Dendrocoelam lacteum*, which is milky-white.

They generally live on the underside of stones or leaves, although they may sometimes be seen crawling rapidly over the bottom of a pond or even on the underside of the surface-film. They lay their eggs attached to stones or leaves. Any small form or animal life is taken for food and the planarians protrude a tube-like pharynx from the underside of the body along which the food passes. This is well shown in the illustration.

Planarians are often unsuspected enemies of the fishkeeper for, being largely nocturnal in habits, they remain out of sight during the day under stones or leaves but at night sally forth to devour fish eggs or even, it is reported, fish fry.

A thorough sterilizing of stones and plants introduced from the wild is the best preventive of planarians. I am not aware of anything that can be done to prevent the entry of parasitic flatworms to aquaria or ponds but, when they are detected, prompt measures in isolating affected fish will prevent the unloosing of the immense numbers of eggs that are such a characteristic feature of these parasites.



The European Terrapin (Emys orbicularis). *Photograph by L. E. Day.*

PICK OF THE PETS

No. 5. EUROPEAN TERRAPIN

by ALFRED LEUTSCHER, B.Sc.

FOR hardiness and long life among reptiles, also ease of care and feeding, a terrapin is hard to beat. There are many records of their life span in vivaria exceeding 50 years. And yet many herpetologists seem to have difficulty with this kind of pet and find that it can become afflicted with certain ailments.

These are due to a number of causes. The two main troubles are lack of natural sunlight and a shortage of calcium in the diet. In Nature, terrapins or pond-tortoises—called pond turtles in America—spend much of their time basking out of water. Their tastes in food are also very wide.

Blindness and deformity, due to vitamin deficiency, may be avoided by giving sunlight. The remedy is obvious. Shell softening can be counteracted by giving shell and bone matter with the food. Pieces of raw fish (fresh or salt-water), pond snails, and cuttlefish bone grated on to the food are all very good.

Apart from this, the main foods given to my terrapins consist of pieces of raw liver, Earth-worms and various water insects. I find that an occasional liver oil capsule wrapped up in a

piece of meat is taken without trouble, and helps to maintain good health. Incidentally, some species will eat water plants and fruit.

It is quite true that some terrapins are more easily kept than others. Tropical kinds, for instance, need rather special care and extra warmth. This also applies to most North American species. Although their Winters are more severe than ours, one must remember that the Summers over there are much warmer and more reliable. Let us face it—Britain is not noted for continuous warm and sunny weather, and a run of poor Summers could upset a terrapin's health. Some keepers guard against this by giving their pets an occasional tonic under the ultra-violet lamp.

For real toughness and tolerance to our climate, even when kept outdoors, the European Terrapin (*Emys orbicularis*) is about the best. It is on sale most Summers and usually comes from Italy. At one time this species existed in Britain. It has died out here, or rather been driven out, by the altering climate.

The critical time in a reptile's life is the so-called incubation period, during which there must be a minimum temperature for the egg to hatch. This can no longer be guaranteed and, even if the European Terrapin breeds over here as a pet, it is doubtful whether the eggs will hatch unless given special care.

Adult European Terrapins do very well, and I have kept specimens in the garden pond all the year round. They have hibernated many times at the bottom, often covered for weeks under the ice. Partial respiration is said to take place through the lining of the cloaca.

I once had a specimen which became so tame that it would swim across to be fed by hand. It had the freedom of the garden but never wandered far from the pond. The dog and cat used to play with it, and I have even seen a sparrow perch on its shell, pecking at the algæ which had grown on it! The Goldfish were never molested. I imagine that it was so well fed that the effort to chase a fish was too much for it.

If healthy and given the opportunity, terrapins will feed voraciously, eating many pieces of meat or worms at one meal. With my European Terrapins I adopt the practice of giving two big meals a week. Young specimens are best fed daily and kept indoors under artificial heat (a suspended light bulb) unless the weather is warm and sunny.

For a simple indoor home an aquarium can be used. The floor is covered with the usual sand or gravel, heaped up at one end to give some land space, or this can be made into islands by using rocks.

A depth of about four inches of water is sufficient. This should contain some floating plants, such as Duckweed or Crystalwort. *Salvinia* also looks very attractive. The reason for the plant introduction is that terrapins like to get under cover when in the water, merely pushing out their heads to look around.

If a garden enclosure is to be used it should contain a shallow pool of water. A sunken bath or sink would do, provided that the terrapins can climb out. The simplest kind of surround to erect is wire netting fixed to stakes which must be bent inwards at the top, since these animals are good climbers.

Readers' Hints & Tips

STARTING UP A SIPHON

I FIND the following method of starting a siphon both effective and easy and it avoids getting mouthfuls of water when the tube is sucked in the normal manner.

The apparatus is quite simple and consists of a tube about 1 in. diameter connected to another one of about ¼ in.–⅜ in. diameter.

The wider tube is placed in the water until the top is just below the water surface. One's finger must be kept over the end of the thin tube whilst this is being done.

When the finger is taken away water flows into the thicker tube, rushes up the thin one and starts the siphon working.—(P. GALTON, London, N.8.)

10s. 6d. is paid for each hint received from a reader and published in FISHKEEPING.

We like to have your views but please keep letters to a reasonable length. The Editor does not necessarily agree with the opinions expressed.

Dogfish Spawn

SIR,—For some time I have kept a pair of Freshwater Dogfish (*Umbra*) in an 18 × 10 × 10 in. tank, together with a Bitterling and a Stickleback.

In April this year I noticed the female Dogfish was chasing away the other occupants from a certain area of the tank. On closer examination I noticed she was guarding some eggs, laid on a small, round stone.

I took the other fish out of the tank immediately and left the Dogfish to fan the eggs. After one week she appeared to lose interest in guarding them and, a week later, I noticed two fry in the tank. I removed the parent and fed the young on proprietary liquid fry food for four weeks. They then received small, live *Daphnia*. The fish are now eight weeks old and growing fast.

The tank was fairly thick with plants; blanket weed and other algæ were present. The plants were mainly Willow Moss.

It was probably a mistake to leave the parent with the eggs for longer than a week, but I looked for information in many old magazines and books without gleaning guidance on the breeding habits of this fish.

I believe it is rare for Dogfish to breed in small tanks and aquarists may be interested to read this account.

Woodcote, Reading, Berks. P. H. THOMPSON.

Good Deed for the Hobby

SIR,—The Canadian Aquaria Society has recently put into operation, with the permission of the General Council of the Boy Scouts Association of Canada, a programme for training Boy Scouts wishing to obtain their "Aquarist Badge".

I have prepared a special "Instructors and Examiners" book which has been printed by the Boy Scouts Association. All Canadian aquarium organizations are co-operating through the various Provincial Commissioners of the Boy Scout movement. There has been a special "Aquarist Badge" designed and made for distribution.

Another major project of the Canadian Aquaria Society is the voluntary work being done with the St. John's Training School for Boys (Reform Institution). This calls for three of our members to travel slightly over 40 miles each fortnight on a Saturday morning. They give lectures and assist in building large aquaria in an effort to set up a very large room within the institution as an aquarium room.

In addition to this, the Canadian Aquaria Society directors are endeavouring to find aquarists within the individual areas from which these boys come and will return, with the idea that such fishkeepers will try and keep the boys' interest alive once they are released from the institution.

Toronto, Ontario, Canada. W. L. WHITERN, (President, Canadian Aquaria Society).

South-West Viewpoint *by H. C. B. Thomas*

THE Bristol and Bath Section of the Guppy Federation have good reason to feel proud of the showing that their entry made at the recent exhibition organized by the Portsmouth Section. From their 30 entries they collected one special (R. Bryant), three silver pins (R. Bryant, E. Challenger and J. Burge), and five cards.

If any aquarists are passing through Bristol on their way to or from holidays I strongly recommend them to allow time for a visit to the Clifton Zoo. The gardens lie on the edge of the Downs on the main by-pass from North to South. The Gardens themselves are always a picture and aquarists can be sure of a welcome and sound advice from Victor Jones who is in charge of the Aquarium. I need hardly say that good catering and parking facilities are also available.

From time to time I get a complaint that I fail to give enough information about forthcoming events, so I propose to include reminders of some information already given and also details about local societies. As usual I shall be delighted to receive notes from secretaries concerning their future activities.

First the display by Bristol A.S. and Bristol Tropical F.C. at the Civic Horticultural Show on the Downs from September 3-5. This show is a "must" for anyone who loves flowers or gardening.

The Keynsham Branch of the Bristol A.S. meets on the third Thursday of each month at the home of Mr. R. King at 63 St. Ladoc Road, Keynsham. Members are drawn from Bristol, Bath and Keynsham and the meetings have a mainly tropical bias. The gatherings are essentially informal and details of the future programme can be obtained from the secretary, Mr. R. White, 103 Charlton Road, Keynsham, Bristol.—H. C. B Thomas, 2 Grove Park, Bristol 6.

Societies and individuals in the areas of our correspondents are invited to contact them with news highlights.

News from the North-West *by "Aquaticus"*

SO far the season has seen more rainfall than readers will have wished for; the rain washes dirt and oil from nearby tarred roads into lily-ponds unless precautions are taken and several outings arranged, with much trouble by society secretaries, have been rained off.

However it is a good year for the frogs but, strangely, not for the ducks, for breeding ornamental waterfowl, like the breeding of wild duck, is more successful in a dry season than a wet one.

In open garden pools fishes spawned rather later this Spring owing to the cold, late season, and some Tench were spawning well into May and June.

In the Stanley Hall, Castle Street, Macclesfield on July 11 and 12 the Macclesfield A.S. are staging their seventh annual show jointly with the local branch of the cactus and succulent society, and further support is coming from the local cage bird society and the grammar school. Mr. Robert Jackson will include some of his reptiles so that visitors will be assured of one of the finest little shows in the North.

Post-war Formation

The Macclesfield A.S. was founded four years before its first show—in 1948, and has weathered the precarious first few years of enthusiasm to settle down to a successful existence. Founder-members like Mr. Stanway, the President, and Mr. W. Edmondson are still with the club. For the past five years membership has averaged about 35. The peak of interest was in 1951 when the society had 80 members.

Of the recruits gained as a result of the annual show, about four-fifths drop out after their first year because of a falling off in their brief enthusiasm. The interest of such people would, no doubt, be transient in anything they took up. Probably half the town's fishkeepers are members, however. Up to a thousand children visit the July show in organized school parties. It works out roughly that one person in every 500 in the town is a fish-keeper.

Mr. A. Lunt, the society's secretary (who at his home at 53 Stapleton Road has had some fine spawnings of Egglaying Tooth-carps) tells me that splendid co-operation exists with the North Staffs A.S. who loan them tanks and equipment, as well as judges, to enable them to stage their show. Five trophies have been donated locally for the exhibition. In 1956, four out of eight of the major trophies at the British Aquarists' Festival in Manchester went to Macclesfield members.

In a notable garden pond kept by a member, Mr. A. New, Water Hyacinth, Giant Sagittaria and *Cabomba* all survive and produce luxurious growth. The pool also has Paradise Fish of tropical tank origin. Indoors, Mr. New specializes in Gouramies; at the 1955 B.A.F. show he secured first and second prizes for pairs of Labyrinths.

Among the society's most successful fish-breeders are Mr. R. Bradley, who specializes in White Clouds and Mr. S. B. Cass who has bred Blue Gularis and has a good collection of Cichlids and Scats. Not to be overlooked among the successful ones is the secretary himself with his Fighters, *Panchax*, etc.

The society cuts across all walks of life, and the President, Mr. E. Stanway, shares the twin hobbies of fish-breeding and bird-breeding with distinction. Mr. D. Frith, the chairman, is a local printer, while the vice-chairman, Mr. S. B. Cass, is a local cinema manager. The secretary is manager at a local stationery and bookbinding works and the show secretary, Mr. H. Cox, is a retired railway agent.

The club maintains tropical fish tanks in Macclesfield Infirmary, the West Park Hospital, Biddulph Children's Orthopaedic Hospital and Lyme Green Paraplegic Settlement.

Many societies hold their meetings in public houses, schools and cafes, but Macclesfield have a rather original line in meeting the first Monday each month at the Sunday School in Roe Street. The club subscription is only 6/-.

Referring to Natterjack Toads again, after my comments in the last issue, I found a small colony breeding recently in the pools at the north side of the derelict aerodrome at the north end of Walney Island, near Barrow-in-Furness.—"Aquaticus", 47 Woodsorrel Road, Liverpool 15.

Midlands Miscellany *by W. L. Mandeville*

CONSIDERABLE coastal erosion would be necessary before the waves reached the boundaries of the Midlands, but our association with the sea is very close. From Cradley come the anchors and chains; lighthouse gear and lanterns from Smethwick; sea boots from Raunds; davits from Brierley Hill; marine engines from Wolverhampton and boilers from Dudley.

Birmingham provides some naval personnel, and Leamington Spa houses many who have served and are now retired. From this one would infer that an interest in marine aquaria would be a foregone conclusion.

John S. Vinden—whose informative articles on this subject appear regularly in FISHKEEPING—wishes that the inference was true. His talks to local societies are always closely followed, and invariably he points out how easily living material can be collected during a seaside holiday, and maintained alive in simply contrived aquaria.

With holidays in the offing, a further reading of his previous articles would increase the enjoyment to be found on the seashore, and enable one to return home with mementoes more interesting and, with care, more durable than the inevitable stick of rock.

This could lead to the formation of a Midland

Marine Aquaria Society, and none would be more pleased to have his monopoly destroyed than Mr. Vinden.

Membership

Midland societies ask little of their members other than prompt payment of the annual subscription. Their attendance at meetings is hoped for, and participation in social events is encouraged; but the donkey-work of all societies continues to be done by an active nucleus who find their reward in the work itself, and only hope to be spared undue criticism from the onlookers.

Maybe this is as it should be. An individual having joined a club, has a right to enjoy the amenities without being too concerned with the inner workings. But what is satisfactory for society membership is by no means satisfactory when it comes to the membership of a society to an association.

The Midland Association of Aquarists' Societies has done much to assist societies with their programmes, providing speakers for meetings and judges for shows. Any secretary, remembering the days when address after address could be written to before finding the welcome 'yes' to fill an engagement, will appreciate the convenience of having this work done by the Association.

Mr. C. E. Jenkins of Nuneaton—the Services Secretary for M.A.A.S.—does his best to satisfy society requests, but he can only arrange the interchange of speakers and judges from the list provided by member-societies themselves—and the list is getting low.

At a recent meeting of the Judges' and Speakers' Panel this problem was fully discussed. It was decided to encourage speakers by making available to them a library of visual aids, and steps will be taken to assist potential lecturers with the effective presentation of their material—but societies themselves must feed in the potential speakers.—W. L. Mandeville, 327 Queslett Road, Gt. Barr, Birmingham.

Mrs. W. Gascoine (right) receiving a bouquet from Mrs. B. Speak (present secretary) when she retired after eight years as secretary of Leicester A.S. Mr. S. B. Scargill (chairman, centre) also presented an honorarium to Mrs. Gascoine as a token of the club's regard. Photograph, Leicester Evening Mail.

Scottish Commentary *by K. A. M. Robertson*

DURING the Summer months a number of aquarists will no doubt be coming north of the border on holiday. There always seems to be some hidden power that draws such people to enquire about fellow enthusiasts of the hobby in the area where they visit.

In Scotland there are at present 17 aquarium societies more or less evenly distributed over the country. While the actual addresses of officials cannot be given in full here, these can be obtained from either Mr. A. Cross, 49 Ferry Road, Monifieth, Angus, or myself.

Public Aquarium

In addition to the various societies there are, of course, other attractions for the aquarist; the Carnegie Aquarium in the Zoological Gardens of Scotland at Murrayfield, Edinburgh, for instance. This Aquarium has now been in existence for nearly 31 years and evidence of the care and attention given to the inmates can be assessed from the fact that some of the Golden Orfe still seen there are the original stock introduced when the Aquarium was first opened.

Other long-lived specimens on view are Chub (26 years) and Golden Carp (28 years). A fine specimen of the Loggerhead Turtle has also been in the Aquarium for 26 years despite the fact that it has occasionally broken the 1¼ in. glass of its tank and viewed the surroundings from the outside.

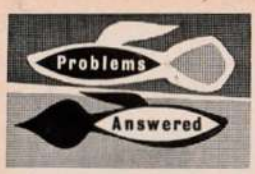
Many visitors who have, in the past, thrown coins into one of the ponds containing a Giant Salamander, will be sorry to hear that this creature died last month after 26 years. A large selection of both tropical and coldwater fish are always on view and many specimens of marine life, mostly collected from the Firth of Forth.

For those who are interested in marine life there are Biological Stations at both Aberdeen and Millport. One is always amazed at the selection of marine life which can be collected from local waters even in the colder parts of these islands.

Other aquarists may prefer to study and keep British native fish and here again there are places of considerable interest such as the Freshwater Fisheries Laboratories at Pitlochry, and various other parts of the country, particularly where Hydro-electric schemes are in operation.

Salmon and Trout

These Stations are mostly concerned with salmon and trout. However, at Loch Lomond, there is a wider interest taken in local fishes by the Glasgow University and the most precious specimen from these waters is the Powan, sometimes called the Freshwater Herring. This fish is peculiar to Scotland so far as the British Isles is concerned and, in fact, there are only two known sources even in Scotland.—K. A. M. Robertson, 32 Edgell Drive, Newton Mearns, Renfrewshire.



Queries are answered free of charge by experts. They should be sent to FISHKEEPING, 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 here.

Tank Positioning

I should be grateful for some advice on the plants in my 36 × 12 × 15 in. aquarium. The tank is positioned in an alcove and receives no direct sunlight. Artificial lighting is provided by two 40-watt clear bulbs on for six hours a day. The plants never seem to thrive and cuttings of Hygrophila, *etc., die away.—(H.A.H., Weymouth, Dorset).*

The retarded plant growth seems entirely due to insufficient light. Your tank would benefit if it could be moved so that daylight could enter the end nearest to a south-facing window.

If this is not possible it is suggested you experiment with stronger wattage bulbs for varying periods, up to eight or 10 hours each day, until the stage is reached when your plants flourish.

The plant you mention (*Hygrophila*) needs plenty of light to do well and sunlight for preference. Under continuous artificial light it is inclined to become "leggy" with very small leaves.

Plants of the *Cryptocoryne* Genus would do quite well in the tank positioned as you have it at present.

White Axolotls

Several months ago, through an advertisement in FISHKEEPING, *I purchased two White Axolotls. They are in a 24 in. × 12 in. aquarium and are fed mainly on chopped worms with an occasional meal of proprietary dog meat. One is about 8 in. long, the other about one inch shorter. Could you tell me how to sex Axolotls, if they are easy to breed and whether there would be any point in raising the temperature of the water. Their tank is at present entirely unheated and is in a bedroom.—M.J.B., Tiverton, Devon).*

It is fairly easy to sex Axolotls when they are of a reasonable size and have reached maturity (from about 4 in. upwards). You will find that the male usually has a slightly plumper body, a more swollen cloaca and a longer tail. The female is slimmer and has a longer tail.

There is no reason why your specimens, if they are a pair, should not breed. This breeding, by the way, is likely to occur on any day of the year, Winter or Summer, and can sometimes be encouraged by partly changing the water, thereby dropping the temperature slightly, or by changing or adding some water plants. The female lays her eggs on the plants. It is best to keep to the colder room temperatures, especially in Summer.

Avoid strong lighting and try to arrange some retreats for the Axolotls. An excellent way is to make a rock "cave" on the aquarium floor.

For Your Bookshelf

Of Fish and Men*

JON MILLER, the enterprising author of this book, is no stranger to readers of FISHKEEPING for, some time ago, he gave us details of fishkeeping behind the "iron curtain"; the first such news for many years.

The author, whose enthusiasm for fish appears to be limitless, has travelled extensively in Russia, Czechoslovakia and Rumania, visiting fish farms and zoo aquaria on behalf of the Zoological Society of London.

He has many interesting things to tell us about fish culture generally in these countries, and much in particular about individual species of fishes.

Near Prague, Crucian Carp are kept in water so foul that, for five months of the year, they are in water, under ice, that contains no free oxygen whatsoever. This startling fact is now being investigated to see how the fish compensate themselves for this lack of the vital gas.

There is a fascinating chapter describing the activities at the London Zoo Aquarium "behind the scenes", and Mr. Miller has been fortunate enough to visit the Zoo's collecting station at Madeira to assist in catching colourful marine animals for the Aquarium.

He keeps marine aquaria at his home in Sussex and wonders why aquarists do not take more interest in the wide variety of life that exists on our own shores. This is a subject near to the reviewer's heart, for he wonders too!

Space does not permit a fuller account of this extremely readable book which is packed with fish lore, and true to its title has many comments on men and their ways as well.—J. S. VENDEN.

* By Jon Miller, 160 pp. and 29 illustrations, Jarrolds, Ltd., 18s.

Water Analysis

SAMPLES should be sent (NOT delivered by hand) in a clean pint bottle, well packed, to FISHKEEPING 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 examination of fishes cannot be undertaken under this service and corpses must not be sent to our Analyst with samples of water.

by H. O. MUNRO

THE well-known Netherlands aquarist, A. van den Nieuwenhuizen, describes in the March issue of DATZ his experiences with a recently discovered *Pachypanchax* species, *P. homalonotus*. This fish, which comes from Madagascar, resembles in shape the colourful *Pachypanchax playfairii* and, as in the latter species, male and female are easily distinguishable by their shape and colouring.

Their colour is most attractive; the basic body shade being brown, while the back is darker. The sides of the fish vary between iridescent green and light blue, according to conditions and lighting. The fins vary between dark brown and light green.

P. homalonotus attain a size of approximately 3 in. They are relatively easily kept and are not at all dependent on special water conditions. The writer kept his fishes in hard tap water to which he added a slight portion of sea salt but, after a short period, he omitted this as well.

These *Pachypanchax* require a roomy tank as the male fishes will pursue the females incessantly and only ample space and sufficient plants and hiding places will give the females a chance to elude them.

Given these conditions and ample livefood the fish will spawn readily and prolifically. Eggs are deposited singly in plants. The fry hatch in 12 to 16 days and will accept Brine Shrimps from the start.

They are fast growing and, after three months when they have reached a length of 1½ in., the young male fishes start displaying before the females. Nieuwenhuizen expects that the eggs would endure a dry period as with most Egglaying Tooth-carps.

Scottish Federation's Plans

AT the inaugural meeting of the Federation of Scottish Aquarist Societies in May, club secretaries were asked to draw up lists of local fishkeepers who would be prepared to welcome aquarists from outside their locality. The idea is that a hobbyist who visits another district of Scotland will know on whom to call whilst in the particular area.

Member-clubs, in the first year of the Federation, will pay to the F.S.A.S. a fee equal to 1/- per head of the society's membership. The first issue of the Federation's Newsletter will be issued shortly.

N.W. London Activities

AT the May meeting of the North-West London Group of Aquarists Societies Mr. and Mrs. R. Skipper and Mr. Bob Cairow presented a history of fishkeeping over the last 100 years.

In the preview show on the same evening Miss Gerkin and Messrs. L. G. Lawrence, G. Richardson, P. Utton, E. Landau and A. Beldock were first prizewinners. Judges were Messrs. A. Bourder, C. W. G. Creed and W. G. Phillips.

The second competition of the 1958-59 season took place on June 3 when first prizewinners were Messrs. A. Farmlen, F. Tomkins and E. Landau. The Willesden club gained 20 points to Hendon's 12 and Independent's 8. The points position after this show indicates that Hendon and Willesden at present tie for first place with 25 points each.

Quality Fish at Cambridge

FISHES, reptiles and amphibians were on show at an exhibition organized recently by Cambridge A.S. Mrs. W. M. Meadows, who judged the fish entries, thought the standard was particularly high.

A Tiger Barb, owned by Mr. J. Palmer, was best fish in show (Simpson Cup and Morley Cup) with 92 points. Mr. Palmer was also successful with a Doublesword Guppy which won both the Guppy Cup and the Tadpell Cup for livebearers. Four fully furnished aquariums were on view and also a display of various livefoods.

Other specials winners were Mr. F. J. Driver (Moyce Cup with Common Goldfish), Mr. J. Palmer (Breeders' Cup), Mr. C. P. Gibson (Filzroy Cup) and Mr. C. Holmes (Pairs Cup). First prizewinners were Messrs. F. J. Driver, J. Palmer, C. P. Gibson and A. W. Amps.

Venue Fixed for 1958 Guppy Show

THE 1958 annual show of the Federation of Guppy Breeders' Societies will take place in Queen Mary's School, Basingstoke, Hants, on September 27-28. Show secretary is Mr. R. Forest-Jones, B.Sc., 5 Park Lane, Old Basing, Basingstoke.

The Federation now produces its enlarged bulletin at bi-monthly intervals. A newsletter is issued separately.

A new competition will begin in September of this year for holders of the coveted F.G.B.S. gold-jewelled Guppy awards. The competition will be for a "diamond bar award" to be presented annually.

There are 54 judges on the F.G.B.S. panel, newcomers being Messrs. J. H. Hood and Thompson (Newcastle) and A. Maher and F. W. Hunspidge (Cheltenham and Gloucester).

Essex Exhibition

DAGENHAM Town Show, at which there will be an aquarist section consisting of 19 classes plus a special competition for Guppy Federation members, will be staged in the Central Park, Dagenham, Essex, on July 12 and 13. F.B.A.S. judges will officiate.

Specials for Three Counties

AT the Three Counties Show, to be held in Basingstoke on September 4-6, the Pengilly Memorial Trophy and the Colindale Trophy will be up for competition.

The Pengilly Trophy will go to the best pair of livebearers and the Colindale Trophy will be competed for in the plant class.

Show secretary is Mr. R. Forest-Jones, B.Sc., 5 Park Lane, Old Basing, Basingstoke, Hants.

Photographic Competition

PLANS are now well advanced for a photographic contest to be arranged at Southend Aquarium by South Coast Aquatic Nurseries Ltd. Cash prizes will be offered for the best pictures taken in the Aquarium.

Garden Party

MR. H. G. RUNDLE, the well-known aquarist and exhibitor, will hold a garden party from 2.30-6.0 p.m. on Sunday, July 27, at England's No. 1 Cafe, Bypass, Bagshot, Surrey. He extends an invitation to fishkeeper friends to attend this gathering.

Club secretaries are invited to send reports of their activities for publication. Items should arrive no later than July 18 for the August issue. Fishkeepers who would like to know the name of their nearest society should write to the Editor

● The schedule for table shows held in 1958 by **Walthamstow A.S.** is practically identical with that used for the society's annual show. Several classes are held each evening. At the last competition Mr. H. Holben took a first with Mollies, Mr. T. V. Hill, leading place in the Swordtails, Mr. W. J. Chenneus, first in the Carps (excluding Barbs) and Mr. H. Holben, premier position in the Labyrinths. In May, a party of members visited Messrs. Whitwell & Smykala's establishment at West Bergholt.

● The **Exeter A. & P.S.** will again hold an exhibition this year in the Lecture Room of the Museum in Queen Street, Exeter. It opens on August 11. On May 17 a cabinet aquarium, complete with fishes and plants, was presented to the Women's T.B. Ward of Whipton Isolation Hospital. Part of the money needed for the tank purchase was given at last year's exhibition.

● In an inter-club table show between **Hornsey A.S.** and the Independent society, Independent were the winners by 70 points to Hornsey's 50. First prizewinners were Mrs. Joyce and Messrs. E. Smith, K. Gould, L. Dare and Tomkin. Winner of Hornsey's own Fighter Championship was Mr. K. Gould.

● There will be a table show for Barbs at the August 12 meeting of **Dundee A.S.** and, on September 2, the show will be for Guppies.

● Annual show of **Welsh National A.S.** was held on June 28. New secretary of the society is Mr. W. G. Abram, 46 Festining Road, Gabalfa, Cardiff, and the treasurer is now Mr. J. Lindford.

● At the June 9 meeting of **Ilford A. & P.S.** Mr. A. L. Jarvis was elected President; Messrs. E. Atkins, F. W. Mullins and A. Charrier, vice-presidents; Mr. A. L. Stebbing, chairman; Mr. A. Charrier, vice-chairman; Mr. D. Hunter, treasurer, and Mr. V. Price, secretary.

● On June 2 Mr. Chapman of Sheffield spoke on "Show Standards" to **Ferranti A.C. (Manchester)** members and then he judged a table show. The Ferranti Aquarist Trophy for 1958 was presented to Mr. B. Carter who had gained most points in table shows over the previous 12 months. A visit was paid to Belle Vue A.S. on July 2. An anglers' section has been formed in the club, and Sir P. Ferranti has given sights for its members to fish in the waters of Henbury Hall.

● Main topic discussed at the June meeting of **Bristol Cobbwater Fish Breeders' Group** was the raising of fry when members compared the varying methods they employed. Several good spawnings of Red-scaled Veiltails were reported.

● The May meeting of **Dewsbury A.S.** was addressed by Mr. H. Foden of Huddersfield who discussed the increased interest in the hobby generally but the lack of response for society membership.

● Mr. P. H. Whiting, lecturer at Bristol University, spoke on the "Five Senses of Fish" at the June 9 meeting of **Bristol A.S.** Entry forms for the society's open show on October 31 to November 1 are now available from Mr. V. Capaldi, 18 Glen Park, St. George, Bristol 5. Thirty-three classes are scheduled.

● New address of the **Sheffield A.S.** secretary, Mr. R. P. Middleton, is 90 Old Park Road, Sheffield 8. Slides of insects and other pond life were shown at a recent meeting and members have also heard a talk on reptiles from Mr. Lee. The *July* table show is for Fancy Goldfish and the August one will comprise a labyrinth fish competition.

● On June 1 **Aylesbury A.** members visited the Royal Botanic Gardens at Kew.

● In the second leg of the inter-club table show between **Friends A.S. (Kensington)** and the Clapham society on June 2 Clapham were the winners. A recent speaker at a Friends club meeting has been Mr. P. Hewitt who spoke on "Egglaying Tooth-carps". Catfish and Loaches were the fish selected for Friends club's May 22 table show. This society issues an informative quarterly bulletin.

● A change of secretary is reported by **Accrington A.S.** The new holder of this position is Miss F. Bentham, Brookside, Hudson Street, Accrington, Lancs.

● Mrs. W. M. Meadows visited **Bournemouth A.C.** in June and told of her experiences in breeding tropical fishes. The talk was greatly enjoyed by members. In the annual Payne Memorial Trophy competition for the best home-furnished aquarium the 1958 winner was Mr. E. Hillier.

● At the open table show of **Southampton A.S.**, held on July 3-5, the judges were Messrs. C. W. G. Creed and Mr. B. Meadows. The Mayor performed the opening ceremony.

● Recent activities of **Bradford A.S.** have included a talk by Mr. M. Watson on "Gouramies", a quiz competition with the Leeds society and a visit to Chester.

● An interesting programme has been drawn up by **Independent A.S.** for the coming months. The society meets every Monday at the Islington Men's Evening Institute, Hornsey Rise, London, N.

● Best fish in show at the **Guppy Federation Portsmouth Section's** Exhibition on June 14 was Mr. R. Forest-Jones' Cofertail Guppy, which received 78 points.

● Members of **Guildford A.C.** were scheduled to visit Queensborough Fisheries' establishment at Wraysbury on June 29. There will be a table show for coldwater and tropical fishes on July 9.

● There was an illustrated talk on "Pond Life" at the June meeting of **Llantwit Major A.S.** On the same evening Mr. J. Holme took first place in the table show for Platies.

● At the ninth A.G.M. of **North of Scotland A.S.** it was decided to hold one meeting each month during the Summer and two in the Winter. Mr. G. Robertson was elected President; Mr. C. Pirie, vice-president, and Mr. H. Wetherby, Jnr., 17 Aboyne Gardens, Rainhill, Aberdeen, secretary and treasurer.

● Future programme of **Mansfield A.S.** includes a talk by Mr. A. Atkins ("Types of Goldfish") on July 14, a table show for Goldfish on August 11 and a lecture and practical demonstration on "Properties of Water" by Mr. H. Moreton on August 25. Members have recently visited the Boot Aquaria at Leicester, and also heard a talk on Cichlids.

● There were classes for Mollies and Shubunkins at the June 3 table show of **Dunstable A.S.** when a quiz was also held.

● "Pond Construction" was the title of a talk given recently to **Kingston A.S.** by Mr. O'Neill. Two table shows have been held with the Clapham club; one was won by Kingston and the other by Clapham. A table-show competition has also been run with Streatham when the winners were Kingston. A visit to McLynn's Aquarium, Ewhurst, was paid on June 22 and Mr. D. B. McInerny, visited the club early in July to speak on "Cichlids".

● Dates for this year's annual show of **Bath A.S.** are September 11-13. The show secretary is Mr. J. Wheeler, 53 Cameley Green, Twerton, Bath. For their May meeting members visited the Bristol Zoological Aquarium and were shown round by the curator, Mr. V. Jones.

● The new President of **Merseyside A.S.**, Mr. Eric Hardy, gave a talk on "Local Waterways" at the society's May meeting. Mr. L. Connell, the club's new chairman, showed colour slides on the same night. Mr. D. Jones is now vice-president of the society; Mr. D. E. Hughes, 11 Deysbrook Lane, Liverpool 12, the secretary, and Mr. W. Kelly, the show secretary.

★★★★★★ Make a note ★★★★★★

July	**11-12**	MACCLESFIELD A.S.
	11-12	BEDFORD A.S.
	12-13	DAGENHAM TOWN SHOW
August		
	11-16	EXETER A. AND P.S.
	14-16	WALTHAMSTOW A.S.
	21-23	RUGBY A.S.
	23	ROMFORD A.S.
	27-30	MIDLAND A. AND P.S. (BIRMINGHAM)
September		
	4-6	THREE COUNTIES SHOW (BASINGSTOKE)
	5-6	BETHNAL GREEN A.S.
	6-7	ACCRINGTON A.S.
	6-14	SOUTHEND, LEIGH A.S.
	11-13	BATH A.S.
	13	BLACKPOOL AND FYLDE A.S.
	16-20	LEEDS A.S.
	20	E. LONDON A. AND P.A. (ILFORD)
	27-28	F.G.B.S. ANNUAL SHOW (BASINGSTOKE)
October		
	31-Nov. 1	BRISTOL A.S.
November		
	8-9	BRITISH AQUARISTS' FESTIVAL (MANCHESTER)
	12-15	SCOTTISH A.S. (GLASGOW)

★★★ of these Show Dates ★★★

Fine Entry for Barnley Exhibition

ON May 31 and June 1 Burnley A.S. staged its first open show for six years. Fourteen clubs competed and there were 260 single fish entries, nine breeders' class exhibits and nine furnished aquaria. Sixteen gold medals, nine shields and four plaques were presented to the winners by Mr. Noble, Chief Constable of Burnley.

Best fish in show and winner of a WATER LIFE Diploma was a *Phenacogrammus interruptus* which also took the best egglayer's special for its owner, Mr. H. Loder. Best livebearer was shown by Mrs. A. Morgan from Bolton. Mr. Loder exhibited the best furnished aquarium which was awarded 90 points and a WATER LIFE Diploma. The Whitham Shield for the society with most points went to Burnley.

First prizewinners in the exhibition were Mr. S. Taylor (Guppies), Mrs. A. Morgan (Platies), Mr. Rexell (Mollies), Mr. Lewis (Swordtails), Mr. Hodgetts (large Barbs and Catfish), Mr. J. H. Schofield (small Barbs), Mr. H. Loder (large Characins and coldwater), Miss Jones (small Characins), Mr. Crowther (Fighters), Mr. Pengilley (large Cichlids), Mr. Dione (Dwarf Cichlids and breeders' egglayers), Mr. A. Morgan (Anabantids), Mr. D. E. Talbot (Egglaying Tooth-carps), Mr. R. Cunningham (loach), Mr. C. Bennett (A.O.S. tropical) and Mr. L. Kelly (breeders' livebearers).

Barb Best at Tottenham

TOTTENHAM A.S. held a very successful club show at its new headquarters (Club Room, Northumberland Arms, N.17) on May 24. Judging was by Mr. C. W. G. Creed.

Best fish in show award went to Mr. L. Clements (chairman) with a *Barbus schwanefeldi*. A marine aquarium was set up by Mr. Clements in co-operation with Mr. F. Cook. Prizes were presented by the President, Mr. H. Brant.

Aquaria in a Mental Hospital

BEXHILL A.S. has recently installed two 3-ft. long aquariums in a mental hospital at Hellingly, Sussex. Fuller details will be given in an early issue. Such has been the success of the venture that Bexhill club, in co-operation with the hospital's Band of Friends, is anxious to set up more tanks but cannot assist further financially and the Band of Friends have only very limited resources.

Mr. J. Holder, the Bexhill secretary, writes: "I should like to appeal to readers for surplus tanks, stands, plants and fish. Tanks must be at least three feet long because of the size of the vessels, and preferably of the slow-growing varieties for easier maintenance, and fish of species other than livebearers (there is an abundance of these locally). Any offers should be addressed to me at 19 Selwyn Road, Eastbourne, Sussex."

Blackpool's Eighth Annual

THE eighth annual open show of Blackpool & Fylde A.S. takes place on September 13 at the Waterloo Road Methodist Mission, South Shore, Blackpool. Judges will be Messrs. R. E. Legge and G. Beaumont of the Blackpool Tower Aquarium. Schedules can be obtained from Mr. R. W. Crook, 37 Lonedale Avenue, Blackpool 5.5.

Good Response in Scotland

OVER 1,000 persons visited the exhibition put on by Rolls-Royce (Glasgow) Aquarium Club as part of its firm's Gala Day Show.

In the visiting societies' section Greenock A.S. were the first prizewinners with a tropical furnished aquarium, whilst Mr. D. W. Begg won the Rolls-Royce Section, also with a tropical furnished tank.

A special award for the youngest exhibitor went to 13-year-old H. Partridge of the Scottish Aquarium Society. Mr. Begg took a special for the best exhibit in show. Mr. K. A. M. Robertson, secretary of the Scottish A.S., judged the exhibition.

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August issue Closes for Press July 20th.

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Trade Cards

FOR your diary—The Midland Open Show— August 27-30. Bingley Hall, Birmingham.

WIMBLEDON Aquaria, 6 Stanley Road, S.W.19 for all aquarist and bird supplies. Extended payments. Provident Cheques.

DERBY Calling. Good selection Tropicals, plants, foods, live foods, accessories. Syd. Sharrock, 7 Cockpit Hill, opp. Bus Station, Derby. Tel. 42243.

McLYNN'S Fish Food is so easy to feed. Hold plastic box with thumb on top, slide thumb back to open lid ⅛", shake once over water surface, push thumb forward, box snaps shut.

QUALITY TROPICAL FISH for sale from our Crystal Clear Aquariums. Popular varieties. Also Goldfish and Shubunkins. All fish guaranteed. Plants and all equipment. Give us a call or send for List. Can send by Rail.—Stainers Pet Stores, 89 Middle St., Yeovil, Somerset.

DECORATIVE Cabinet with 42" tank, all fittings, £80; Cabinet of four 24" tanks, all fittings, £8.10.0; Cabinet containing 36" frame, requires completion, £3.16.0. Fish and Plants available. "Water Life" and "Aquarist" from 1949.—Woodlands Cottage, Harvest Road, Englefield Green, Egham, Surrey.

36 TROPICAL Plants, six varieties, 10/-; 12 Red Snails, 3/-; 18 Tropical snails, 3/6; 12 Malayan snails, 2/-; 6 Infusoria snails, 3/-. No better value ever offered. All my six books from here, 7/9 each. All post paid. Specimen fish for callers only, open week-ends. Marshall, Aquaria House, 26 Westbury Lane, Buckhurst Hill, Essex. BUC 4708.

MIDLANDERS ! ! ! ! For quality and value deal at Man "Aquatics Shop"—Large variety of fishes and plants—Complete range of equipment—Livefoods—Allsop Aquatics, 47 Oxford Street—Walsall Aquatics, 46 Stafford Street—Wolverhampton Aquatics, 147 Horseley Fields—Evenings and Sundays, 84 Lumley Road, Walsall.

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Appliances

WRITE for your Midland Show Schedule today—see advert on page 463 of this issue.

Appliances—*continued*

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GLAZED AQUARIA in all sizes including 36" × 15" × 12", 6/6; 18" × 10" × 10", 16/6; 24" × 12" × 12", 27/6, tanks despatched to any part of British, carriage extra. Plants, Accessories, Fish. Wright's, 10 Lorne Road, London, N.4. Phone Archway 3820.

BUILD your own Aquarium. Angle Iron and Pressed Steel Frames now available from stock. Frames and Stands made to customers' requirements. Despatch 7-14 days. Enquiries answered by return. Acton Works, 256 Commercial Way, S.E.15.

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continued on next page

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Fish

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PERFECT SPECIMENS. Line-bred Blue Scarfiall and American Flagtail Guppies, 15/- per pair. Apistogramma Agassizi, 7/- each. Carriage, 3/6. C. R. Perry, Professional Aquarist, 615 West Street, Crewe.

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