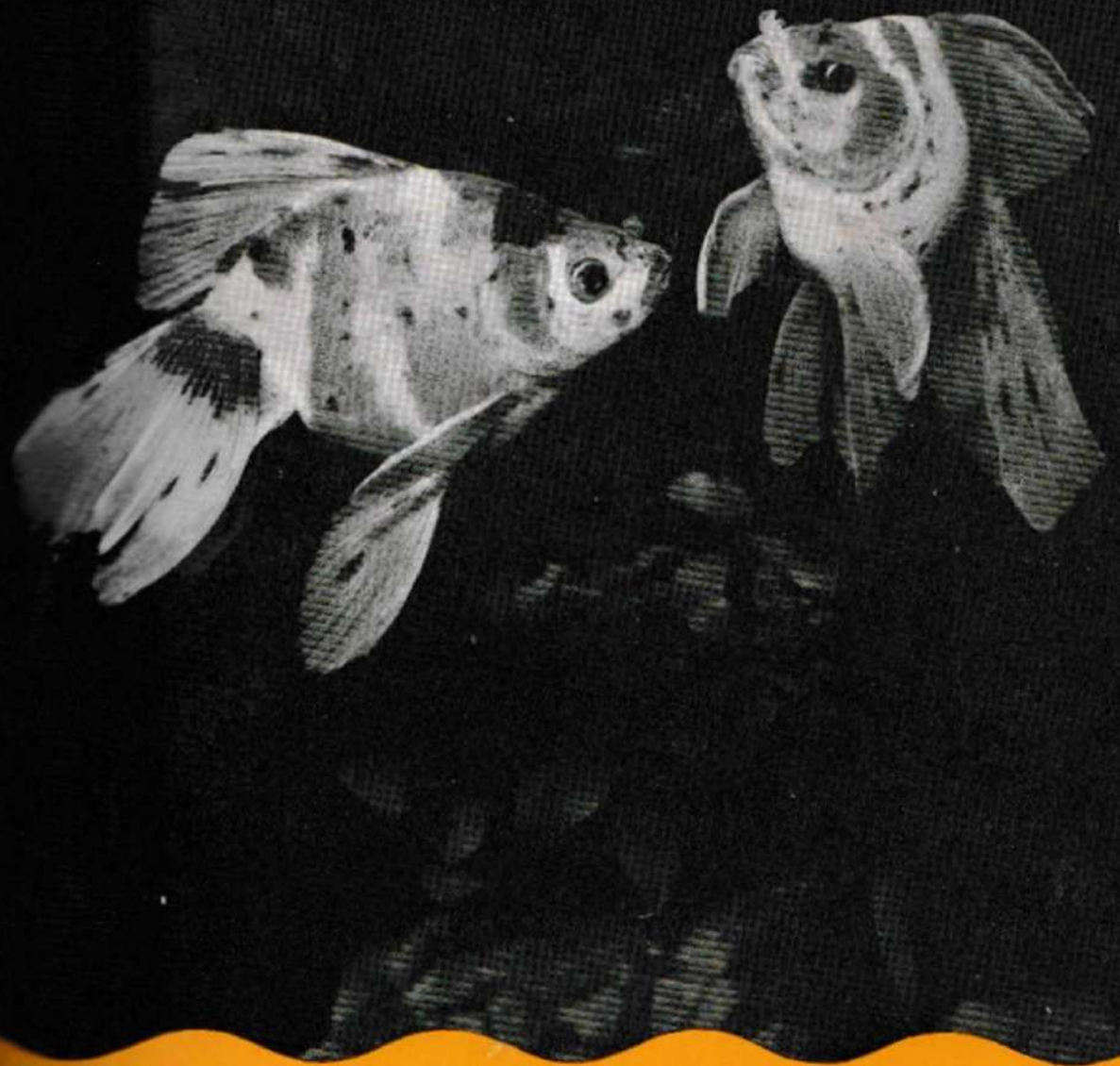
Water Life

AND AQUARIA WORLD



AUGUST—SEPTEMBER, 1954

TWO SHILLINGS & SIXPENCE

Water Life AND AQUARIA WORLD

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FRONT COVER: **NATIONAL WINNERS. In the domain of their first prizewinning tank entered for the individual coldwater furnished aquaria class of the National Aquarists' Society's Show in June this year, Mr. J. H. Franklin's Veiltails have every right to feel proud. Their aquarium was adjudged the best of those in the individual classes, and was thus awarded the Irene Trophy.**

Photograph] *[L. E. Perkins*

EDITORIAL

Just for Fun

IT is a fact that the number of aquarists who take their hobby so seriously as to join a club of their own volition and participate to the full in its life, to breed fish for the sole object of producing show quality specimens, and to become regular exhibitors, is small compared with the many who have aquariums or ponds, or both, just for the fun of keeping fish in them.

These many individual fishlovers are not all inclined to favour only one tank or one pond. In numerous cases, we have come across enthusiasts who have gone about the business of learning the art of fishkeeping quietly, have gradually increased their collections after quite modest beginnings and have built or converted sizeable quarters to hold their growing number of pets.

No doubt not a few of these non-club members are included in those who pay to visit our aquaria shows and who, if they would only be drawn out, could themselves tell of breeding successes that some of the regulars might envy. There are, of course, the minority among them who will never join a club since it is not their nature to do so. The rest, however, are sufficiently numerous to merit being wooed and won.

Encouraging Visitors to Join

Societies that hold shows ought to make it a rule always to be observed that visitors have somewhere where they can go to in the hall to enrol as members if they so desire. Many already do this but we have visited events where the opportunity to obtain new members is missed. Club membership has advantages that more than repay the cost of the annual subscription provided the clubs are functioning on the right lines. The successful ones are those that pay due heed to the business side of their affairs but do not let the time spent in discussing such matters take up all the evening at the expense of time devoted to talking about fish. The object of a club must be one and one only, namely to help its members in their fishkeeping activities. Those who have their say in running the affairs of the organisation should never let that be far away from their thoughts.

No one wants to sit for hours debating this rule or that; in holding inquests on what the committee has done or has not done or in being critical of fellow members. A club with that atmosphere will soon lose its members. What is required is a down to earth programme including a series of shows, whose object is not to create pothunters but to let members have their fishes commented on constructively as to their quality; a number of talks practical in their advice on fishkeeping rather than fish politics; a home-aquaria competition, to help beginners to set up pleasing indoor tanks; pre-arranged visits to all members' homes to learn from their tanks or to pass on hints and tips. The entire efforts of a club should be the co-operative one of helping each and every member to become an efficient fishkeeper. The one that puts fishkeeping before fishkeepers cannot but attract a reliable and ever-growing membership.

Guppy Breeding in Austria

Production of Strains — General Show Standard for All Varieties

By Franz Klausner

THE breeding of Guppies in Austria is not particularly well developed in comparison with Gt. Britain, and there are only a few fanciers occupied in intensive line-breeding. The reason for this may be that we use the aquarium to observe Nature and its laws and do not, as a general rule, keep fish for exhibition purposes.

Therefore the Austrian standards for breeding are not as specialised as the English show standards so that, at shows, the fish are judged using general rules only.

The standards are:—

1.	Form and size: desirable body length 20mm.	10 points
2.	Form and length of dorsal.	10 points
3.	Colour of dorsal; for each different colour, two points. Colourless dorsals are not judged.	14 points
4.	Form and length of caudal.	14 points
5.	Colour of caudal; for each different colour, two points. Colourless caudals are not judged.	14 points
6.	Colour pattern on body; eye spots regarded as desirable.	18 points
7.	Colours as varied and brilliant as possible	20 points
		100 points

As this standard does not say anything about shape of the fins each breeder follows his or her own æsthetic ideals and lays more stress on colour than finnage form. The Guppies most often bred resemble the English Doublesword variety.

In recent years a breeder in Vienna has developed a very beautiful strain of Doublesword type. The fish have parallel and only slightly ragged tail filaments. The dorsal extends about halfway along the caudal fin. Especially beautiful, however, are the colours; the sides of the body show an irregular interlaced pattern, ever-changing colours in gleaming blue and green with red design.

Some pairs of fish from this strain were given to a German aquarium society in Hanover and they filled the German breeders with enthusiasm. We are proud that the Austrian Guppies will now be used to improve the German strains.

This strain was bred by putting some medium-quality Guppies in a 44-gallon tank. When the youngsters were born the breeder removed all the males except a few of the best ones. By this means only the best males of the strain remaining in the tank fertilised the females without regard to their age. By adopting this selective breeding method for some years the strain developed very good and vigorous fishes.

This particular method was favoured for it had the merit that only one tank was needed but there is the disadvantage that it takes longer to achieve success and there is no control over actual pairings so that a successful breeding is not certain and depends on chance.

I carry on controlled line-breeding by using three females in three separate tanks which are fertilised by the same male. From the strain of the female which has the best males among her youngsters, I again take three young females, selected according to size and condition, and let them be fertilised by the best male I have, in order to continue the strain.

Advantages of the Author's System

This method has the advantage that the female can reach a certain age without being fertilised, for the broods are easy to control and females and males are separated as soon as the sex is obvious. Systematic breeding, crossing and improving of a strain is thus possible. Success is obtained more quickly but a greater number of tanks is required to separate the female fish of the different families for they, in contrast to the males, are not distinguishable by their external appearance so far as colour and shape are concerned.

The furnishing of breeding tanks is principally restricted to fine-leafed plants such as *Myriophyllum* and *Elodea* (*Anacharis*) and floating plants, e.g., *Salvinia* and *Riccia*, as these plants offer refuge for the fry against their cannibalistic mothers.

Immature Fish in the Breeding Tank

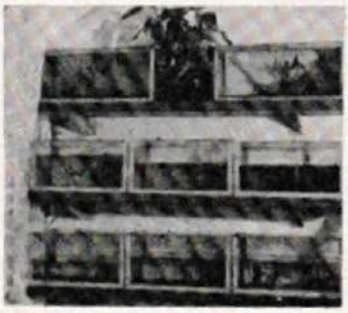
Sometimes half-grown youngsters are put in the breeding tanks as they divert the females from the new-born fishes. The number of youngsters produced varies from 20 to 60 according to the condition of the female at the time breeding takes place.

As the development of a being depends not only on heredity but also on environment, I bring up the young Guppies in tanks as large as possible, with clean and oxygenated water. This is obtained by moderate stocking with fish and the eventual use of aeration. Under these conditions, and in temperatures from 68 to 78 degrees F. with good and varied feeding, they develop very well.

Algæ Development Beneficial

I have noticed that in tanks containing algæ, which is eaten by the fish, colours develop well. Also the movement of the water produced by an aerator, which forces the fishes to use their fins and forms a kind of muscle training, results in strong fish. The latter practice is not recommended for the Veiltail variety as such fish need calm water to develop their long fins.

By the correspondence with your Federation of Guppy Breeders' Societies we have got new ideas and for this I wish to thank especially the overseas secretary, Mr. A. P. Stanley.



Tanks of a successful Viennese Guppy breeder, Mr. Ludwig Schikirsch. The aquariums are located on opposite sides of a room and vary in their dimensions. Mr. Schikirsch has also bred various species of Characins and Rasboras.

Pondkeeper's Year

Making the Best Use of a Pool Surround

Shrubs, Ferns, Bulbs and Primulas Can Add Character to the Garden Scheme

By J. Stott

WITH the arrival of August the peak period of the midsummer display steadily begins to wane and a little extra attention to the pond and its surround may be needed to clear away the aftermath in readiness for the late Summer flowers. Remove spent blooms and thin out excessive surface growth. When a rock garden forms part of the surround a complete and thorough weeding will be beneficial. If heavy growth has resulted in encroachment which may stifle slower growing species this is a good time to do a little careful thinning out and trimming back.

In the smaller type of pond the fish will appreciate a supply of fresh water especially if a dry spell occurred in the latter part of July. Drain away about a quarter of the pond water and replace with fresh after skimming the surface clear of all loose pieces of vegetable debris that often begin to collect at this time of the year.

Photograph [*J. Stott*

Japanese Maple (Acer palmatum atropurpuria), *a small subject suitable for the pondside.*

Colour in the marsh or bog garden surround will now be provided by such plants as Meadow Sweet, *Filipendula purpurea* (*Spiraea palmata*), with its pink and white flowers and, of course, several of the marsh-loving Irises with their long flowering period will still be producing plenty of attractive bloom. Purple Loosestrife (*Lythrum Salicaria* var. *superbum*) will be at its best and there is a type of Rockfoil which appreciates a moist position on the edge of the bog. It should be offering attractive yellow flowers from about now until well into September. The species is *Saxifraga Hirculus* which grows to a height of five or six inches.

Dwarf Shrubs and Trees

Whilst on the subject of the bog or marsh garden surround the opportunity can be taken to mention the dwarf ornamental shrubs and trees, some of which are eminently suitable for the moist conditions provided in such a position. It is important, however, to select the species with the intended site well in mind because a wrong choice can result in upsetting the overall balance of the general layout and design. Height is important—and so is appearance, for some of them are capable of providing a certain amount of colour when it is most needed at the pondside. The tint of their foliage can be a welcome sight in the late Autumn and early Winter.

Positioned in the Background

A certain amount of depth is needed in the marsh area for them to be displayed to advantage and their obvious position is in the background. If used in those narrow bog marginals often incorporated at the side of the pond even the smallest of dwarfs would look incongruous, in my opinion. The size of the pool will, of course, dictate the height of the subject if a sense of proportion is to be retained. Two particular favourites of mine are *Acer palmatum atropurpuria*, which is a Japanese Maple illustrated here, and a Wych Hazel, *Hamamelis japonica* var. *Zuccariniana* bearing pale yellow flowers in January and February. Where the marsh area will permit the choice of a shrub growing to a height of some six or eight feet, *Hamamelis mollis* is very colourful, producing deep yellow and brown centred flowers in November and December. *Enkianthus japonicus* is a delightful flowering shrub offering white bloom in late March or early April and yellow foliage in the Autumn.

Turning now to the rock garden surround here again the careful use of dwarf shrubs lends charm and an impression of depth to the scene as well as being usefully employed helping to provide shadow where this is needed for shade-loving alpines. In such a position the evergreen species are my choice when the rock garden is used as part of the pond surround. If the garden is situated in a large industrial town or city, however, it is perhaps wiser to use the deciduous species or varieties because of air pollution. Much of the attractiveness of evergreens is lost in such an atmosphere because of the deposit which forms and syringing is really necessary to obtain anything like a true picture of their decorative possibilities. When using the deciduous types they should be placed in the background and well away from the pond edge because of foliage shedding in the Autumn. If the air pollution is not too heavy in a particular locality I strongly recommend evergreens.

Photograph [*J. Stott*

Pasque Flower (Anemone Pulsatilla).

Leiophyllum buxifolium is a hardy evergreen shrub which does well in the rock garden and it flowers in June. It is of compact growth seldom exceeding 20 in. in height. Another hardy evergreen which appreciates a slightly moist loam is

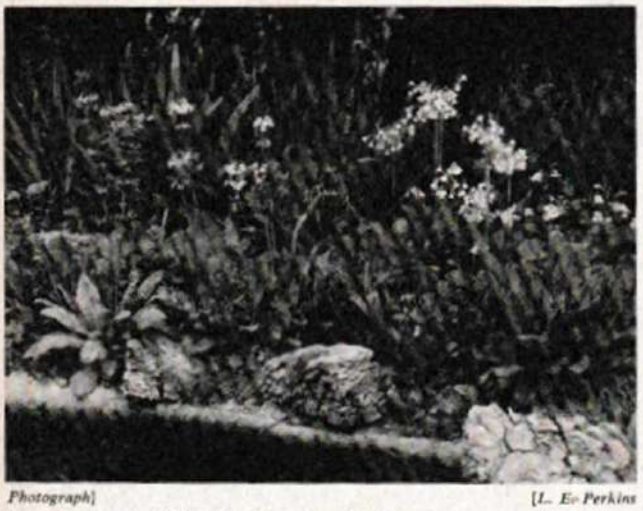
Ledum palustre flowering in May. Two dwarf Junipers suitable for the small rock garden surround are *Juniperus communis compressa* and *J. communis nanna*.

Somehow I feel that when the design of a pond is informal the planting is not complete unless one or two ferns can be seen. Used excessively they can have a disturbing effect and spoil the balance. Planted after careful consideration with regard to position and with numbers kept to a minimum they are capable of adding considerable charm to the pondside. It appears to be the custom to place the Royal Ferns at the head of the list when recommending ferns for the pondkeeper's purpose. No doubt their popularity is well deserved for they are indeed attractive but most of them are, when in their maturity, on the large side and not always suitable for the small garden pond.

Fern for the Smaller Pond

There is a species, however, which will fit into the more confined space at the surround of the smaller pond and it is *Osmunda Claytoniana* which seldom exceeds 25 in. in height. A moist, peaty loam will suit it admirably and the best time for planting is March or early April in a position where it will be in partial shade.

A delightful little fern for the marsh is the Sensitive Fern (*Onoclea sensibilis*). It is deciduous and grows to a height of about 14 in. A position where it will receive the early morning and late evening sun, but shade at midday, is ideal.



Photograph] [L. Ec Perkins

A group of Primulas flowering beside an ornamental pool.

A moist sandy loam seems to be the best soil and it should be planted in late April.

For the rock garden surround there is quite a wide range from which to choose but there are two I should like to mention. They are small and quite attractive. First *Woodsia ilvensis*, a deciduous fern appreciating shade and a well drained, sandy soil with a little peat added. It seldom exceeds 7 in. in height and April is the best time for planting. The other is *Lomaria alpina*, an evergreen growing to about eight inches high. It needs some limestone chippings mixed in with sandy loam for the best results and should be planted in the shade in a well drained position.

September is the month when the pondkeeper with an eye for the future begins to think about early Spring colour at the pondside and this is the time when planting may be commenced. Where a rock garden forms part of the pond surround some of the early-flowering Spring bulbs, especially the dwarf-growing species or varieties, are extremely useful. It is important to give careful thought about planting position. Much of the beauty is lost if they are placed in ill-chosen sites. It is always wise to avoid planting them in the higher parts of the smaller designs of rock gardens. In the small garden surround which one usually associates with the average-sized garden pool I feel that the dwarf varieties planted in the lower levels at the base produce the best results. In such a position they are seen with the rock-work as a background enhancing their colour and beauty.

Our old friends the Crocuses are well worth consideration and the following three species will offer early colour: *Crocus aureus* (golden-yellow), *C. biflorus* (white, striped violet) and *C. Sieberi* (light blue and deep yellow). Plant two inches deep in clusters.

Blue may be obtained by the use of the Grape Hyacinth (*Muscari*) and I can recommend *M. racemosum* for producing deep blue flowers in April. Plant about three inches deep in sheltered positions. Drifts of dwarf Daffodils and Narcissi at the base of the rockery make an attractive display but I do not quite like Tulip species in the rock garden where they *forms part of the surround to an informal pond.*

I think the dignified, formal appearance of the Tulip is too severe for such a position but they may be usefully employed in the surround of the strictly formal pond with impressive results, especially when they are massed. Some of the Dwarf Hyacinths are suitable for a similar position and I suggest *H. azureus* might be tried for flowers early in the month of March.

Apart from the Spring bulbs there are other plants suitable for the rock garden which are capable of providing a brave display of early colour. The Primulas offer a wide variety with attractive flowers. It is a large and very accommodating Genus for there are species that will grow in almost every type of condition from the wall garden and moraine to bog and woodland setting. *Primula Juliæ* and the Juliana hybrids Wanda and Gloria are to be recommended while *P. minima* and *P. spectabilis* are ideal subjects for the smaller rock garden surround.

Some of the tuberous-rooted Anemones are good providers of early colour and among them I should like to mention *Anemone Pulsatilla* (the Pasque Flower), flowering from late March to early May with foliage almost as attractive as the flowers and *A. blanda* which looks well when planted in clusters in a sunny position on a gentle slope. There is a fibrous-rooted Anemone which can be recommended for early colour and it is *A. hepatica*. It appreciates a slightly damp position in the shade and, therefore, is suitable for planting at the base of the rockery.

Early colour in the marsh and bog garden surround may be obtained by the use of marsh-loving Primulas such as *Primula Bulleyana*, *P. rosea grandiflora* and *P. pulverulenta*. For the higher levels of the marsh where the soil is less moist the Common Primrose (*P. vulgaris*) should not be forgotten. *Fritillaria meleagris* will provide bloom in April and May if planted in late September on the edge of the bog region around the pool.

Attention to Fish

September is also a time when particular attention should be given to the fish. Make certain that they are in good condition and not affected by parasites such as Argulus, leeches, Anchor Worms and the like because these creatures rob the fish of their vitality and cause loss of condition. Strong, healthy fish should be feeding well at this time of the year and good, wholesome food is needed to build up reserves for their well-being during the Winter months. This especially applies to those fish which it is intended to Winter in the pool rather than those specimens which are to be brought indoors and accommodated in aquariums during the coldest months of the year.

Water—the Basis of Fishkeeping

2. Conditions which Affect Aquatic Populations

By WATER LIFE Analyst

IN the previous article reasons were given why certain mineral salts were necessary to maintain healthy growth of aquatic plant life, and it was stated that water sustaining an abundance of aquatic flora could also be expected to maintain a prolific and diverse population of fauna. It may be thought that water of high fertility would soon be exhausted of some of its soluble mineral salts content and that, in consequence, a decline in productivity would ensue. In fact this does happen and it is clearly demonstrated by the fact that the algal growth of *Asterionella* in Lake Windermere reaches a peak and then rapidly declines after the content of sodium silicate, which is the limiting factor for growth, has fallen to very low levels of concentration in the lake water—a fact already mentioned in the previous article.

Limiting Factor for Growth

However, it will be noted that the limiting factor for growth of *Asterionella* is sodium silicate, a nutrient not required by other dominant algal growths occurring in the lake. After the decline of *Asterionella*, these latter flourish in turn throughout the Summer months, to take their place as the dominant species, when conditions of the mineral composition of the water are presented for optimum growth.

It is obvious that the growth of the different species of algæ of the phytoplankton, which are the primary producers in open water, may reach prodigious numbers when conditions for optimum growth are present. The term "bloom", as used by limnologists, means a dense population of usually a single species of algal micro-organisms, and may be so widespread as to cover the surface of a whole lake to a considerable depth. Eventual sloughing off of this growth presents an enormous organic pollutional load to the water, and potential instability exists, which would lead to so-called "stagnation" and for offensive conditions to prevail.

Dangerous Effect in Small Ponds

These conditions are, of course, quite a common occurrence in small ponds (with fatal results to any fish life) where the physico-chemical conditions of the water are liable to much wider fluctuations than those which can occur in the larger volumes of water in naturally-formed lakes.

Where physico-chemical conditions are maintained in step with organic productivity, dead vegetation is utilised by bacteria, and broken down into simple inorganic salts, which are again available as plant nutrients. This transformation of complex organic matter into harmless inorganic end-products is known as aerobic decomposition, and is dependent upon a plentiful supply of dissolved oxygen being available in the water, and also to a calcium content, sufficient to neutralise acidity caused by the bacteria during their process of decomposing organic matter.

A deficiency of dissolved oxygen during the process of decomposition leads to the organic matter being attacked by anærobic bacteria, and the products from such decomposition are toxic to all life, and unpleasant odours are produced. Because of the high acidity produced during the decomposition of organic matter, any deficiency of the mineral salts of calcium used for neutralisation results in complete inhibition of decomposition, and death to bacteria. This, of course, is exactly what happens during the formation of peat.

Photograph] [*H. Bastin*

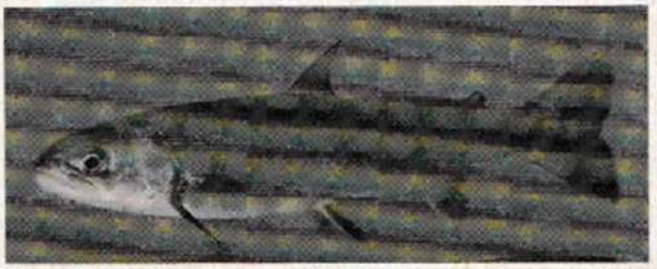
Magnified picture of Amœba, *a minute unicellular aquatic animal.*

So far, only the phytoplankton, or floating vegetation, has been considered. Zooplankton, the animal life of plankton, is composed largely of *Crustacea*, which include the Copepods (such as *Cyclops*) and Cladocerans (e.g. *Daphnia*) as well as numerous members of the *Rotifera*. The Zooplankton uses the phytoplankton as food—indirectly to a large extent. *Cladocera* feed on organic detritus especially, much of which is derived from the planktonic green plants. In this connection, the predominance of a particular species of algal growth in the plankton would seem to determine, to a large extent, the fauna association.

An example of this is found where there is a heavy growth of the Green algæ, *Eudorina* (which is to be found among the slimy growth covering the submerged parts of rooted aquatics), commonly consisting of 32 globular cells, embedded at regular intervals in an oval mass of mucilage. This gummy polysaccharide appears to be an ideal, partially solubilised, organic media upon which Rotifers and *Crustacea* will thrive, and large populations of these animals are present when there is an abundance of *Eudorina*.

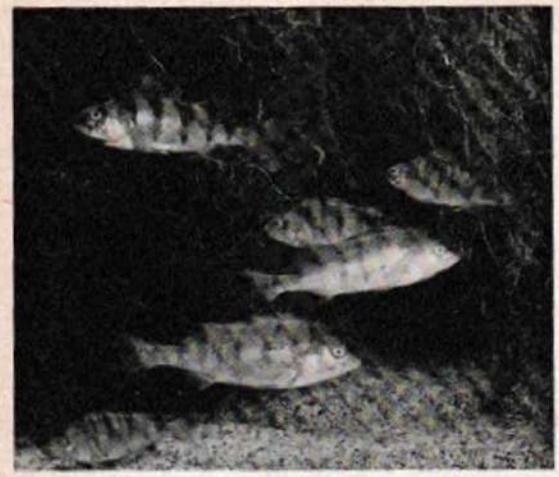
Infusoria, a term loosely applied to a miscellaneous collection of single-celled animals comprising a Phylum of the animal kingdom called *Protozoa*, are the smallest members of the plankton community.

Of great interest is the fact that there are numerous transitional types between the unicellular photosynthetic algæ and the unicellular animals. The transitions presented by these types of organisms are such, that it is quite impossible to decide clearly whether in fact they belong to the vegetable or animal kingdoms. The *Amœba* Genus of the rhizopod *Protozoa* is, however, essentially animal in character. It consists of a "blob" of protoplasm surrounded by a shapeless gelatinous "envelope" and flows



Photograph] [*W. S. Pitt*

Char, one of the few species of large fish found in the rocky lakes.



Photograph] [Planet News

Young Perch feed on plankton when young but later they are predacious on smaller fishes. This species and Pike are now found in large numbers in Lake Windermere.

about in search of food which it takes into its interior, and digests and assimilates, excreting the waste products. This one-celled animal has a great advantage in being able to prolong its existence for it can encyst and remain dormant for considerable periods of time. In this state it can withstand extremes of temperature or drought which would be injurious to the animal in its normal state.

Relation to Fish Life

Having described the characteristics of but a very few of the vegetable and animal organisms, which populate the floating plankton of natural waters, consideration may now be given to its importance with regard to fish life. Firstly let us explain the paucity of plankton in natural waters due to a low mineral salts content. For instance, "soft" waters will certainly mean a restricted population of fish life. In the rocky Lakes of Wastwater and Ennerdale there is little in the way of nutrient salts to support a varied planktonic growth. Thus these Lakes contain only Trout and Char, of the larger fish. In contrast, and although the water would be classified as "soft" in character, the higher concentration of mineral salts present in Lake Windermere allows for a greater variety, and quantity, of plankton growth to be present. This in turn, both directly and indirectly, supports a greater and more varied population of fish life than is to be found in the comparatively non-productive rocky lakes. Hence in Lake Windermere not only Trout and Char, but also Perch, Pike and Minnows abound, whilst Roach have been recorded.

Diet of Various Species

Plankton forms the principal diet of Char and Minnows. Trout are also plankton feeders, although the adult fish supplement this diet with large insects. Perch feed on plankton whilst young but, as they get older, feed on smaller fish, whilst Pike, of course, even when quite young feed exclusively upon a fish diet. Undoubtedly, over the last 40 years, the quantity of plankton has increased in Lake Windermere, and new species have made an appearance. One of these, *Uroglenopsis americana* which forms yellow-green colonies, is indicative of a higher organic content in water. Another indication of higher organic content is the presence of Blue-green algæ which are noticeable during the Summer months.

Of the fish population, Trout and Char fishes are gradually being replaced by enormous numbers of small Perch with a corresponding increase in the number of Pike. This increased population of coarse fish is due to larger volumes of sewage effluent finding its way into the Lake. The organic content of sewage effluent, together with the high calcium content of water draining off agricultural land upon which large quantities of lime are used, has made increased amounts of nitrogen and phosphorus available in forms which make possible the development of larger plant and animal populations.

Oxygen Demands Increase

Demand for oxygen increases with increasing population, and any deficiency of this vital element in water, means certain death to its inhabitants either by asphyxia or by toxic substances produced during the decay of organic matter in the absence of free oxygen (anærobic decomposition). As most natural waters are more or less polluted, very few in number are fully saturated with oxygen. Deficit values up to total depletion (i.e., complete de-oxygenation) may exist, however, where serious pollution has gained the upper hand.

The result of an examination of water for content of dissolved oxygen is usually expressed as "per cent of saturation". Thus 10 per cent of saturation found, would mean that the water was 90 per cent deficient of saturation. This form of expression quickly conveys the extent of de-oxygenation caused by pollution. Quantitative significance is, however, lost during conversion of the actual amount of oxygen analytically found into percentage saturation values. Thus 100 gallons of fresh water at a temperature of 6 deg. C. (42.8 deg. F.) and at 100 per cent of saturation would contain $\frac{1}{3}$th of an ounce by weight of oxygen in solution, whilst the same volume of water at 17 deg. C. (62.6 deg. F.) would contain only $\frac{1}{4}$th of an ounce.

Where critical conditions exist in water for content of dissolved oxygen in relation to fish requirements, these differences of actual content, although having the same percentage saturation values, may be of extreme importance.

As an example of this it is known that Rainbow Trout require water containing a fairly high level of oxygen concentration; water containing only 20 per cent of saturation at a Summer temperature of 17 deg. C. ($\frac{1}{12}$th of an ounce per 100 gallons) may well prove to be fatal to the fish after a short period, but fish in water containing the same percentage saturation at a Winter temperature of 6 deg. C. ($\frac{1}{25}$th of an ounce per 100 gallons) would have a much longer period of survival.

Oxygen Content of Water

It will be noted that oxygen is less soluble in warm water, and this fact is important in the keeping of tropical aquaria. Sudden death of the inmates for no apparent reason—especially if they are of the "oxygen-loving" species—is nearly always due to an insufficiency of dissolved oxygen in the water. Investigations into an epidemic of fish mortality in the tank of the Indian Museum, Bengal, during 1930 led to the conclusion that the sudden dying off of the fish was due primarily to decaying organic matter of vegetable origin. The average dissolved oxygen content of the tank water was found to be only 3 per cent of saturation.

It was found that sulphuretted hydrogen gas (given off by the anærobic decomposition of the organic matter) was present in the water to the extent of 4.5 parts per million and was a contributory cause of death. The low oxygen content was due, it was concluded, to a period of dull weather reducing the photosynthetic action of plant life to a minimum; thus the main supply of oxygen was cut off, and putrefaction rapidly removed residual oxygen from the water. The fish showed symptoms of death from asphyxia.

The next instalment in this series of articles will deal with water in aquaria and the rapid physico-chemical changes that take place in very small bulks of water.

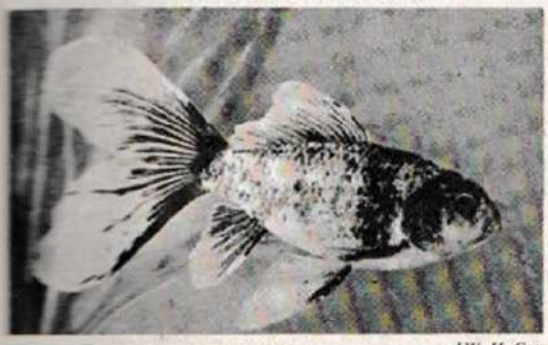
Goldfish Show Standards

Facts, Not Opinions, Are Wanted, Says Mr. L. E. Perkins, If There is to Be a Single Set of Ideals

I WOULD like to make it quite clear that, although I am a member of the Goldfish Society of Great Britain, the views expressed here are entirely my own; in fact, I have not been an active member of that Society for some time but do feel that a constructive effort should be made to clear up the confusing issue of show standards.

That there must be standards is obvious for, whether a person belongs to a society or not, as soon as he starts to breed any of the Goldfish types he will be confronted by numbers of fry exhibiting considerable variation in form and colour and will obviously want some guidance on which to retain and grow on. Nevertheless the fact that there should be numerous standards is absurd and must, in the interests of the hobby, cease at the earliest possible moment.

When the Goldfish Society was formed under the technical directorship of Mr. R. J. Affleck, M.Sc., (now President), the matter of guidance for its members was gone into very thoroughly and, since members were expected to take the hobby seriously with regard to the task of accumulating facts relating to Goldfish breeding, it was felt that four varieties would be sufficient for specialised breeding and members were advised to concentrate on one variety. That some deviation from existing standards was made may call for comment but I think, if impartial examination be made of the various sets of standards, it must be admitted that only those of the G.S.G.B. bear any resemblance to living fish. This is not without reason for they were based on the best types available.

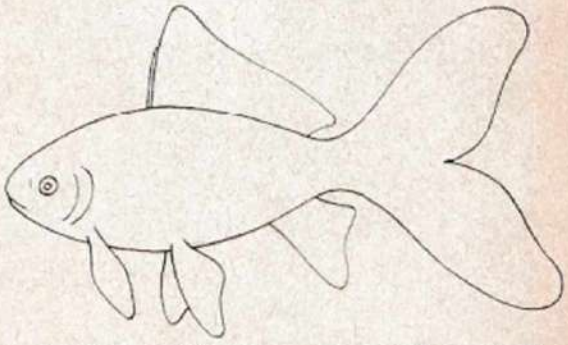


[W. H. Cox

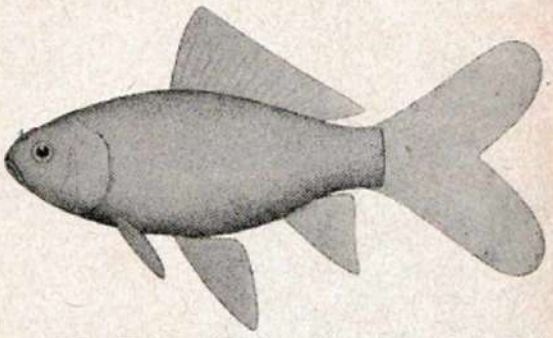
ACTUAL PRIZEWINNER. This Shubunkin, owned by Mr. W. Ducre, led a class of 84 *at the* 1948 *Bristol A.S. Show. Its luxuriant caudal fin is referred to in this contribution.*

Now, disregarding all standards for the moment, suppose we consider the actual fish with the various difficulties which each variety presents. Perhaps the most difficult, and certainly the most disappointing, is the Veiltail or Twintail. This handsome variety probably breeds less true than any of the others, a very large percentage exhibiting malformed caudals. Even when good specimens are obtained, their greatly developed finnage can so easily suffer damage or rot in the course of development that few tip-top fish are seen. The general characteristics of shape are sufficiently difficult to approach so that the addition of expected colour patterns makes the production of prize fish an extremely formidable task.

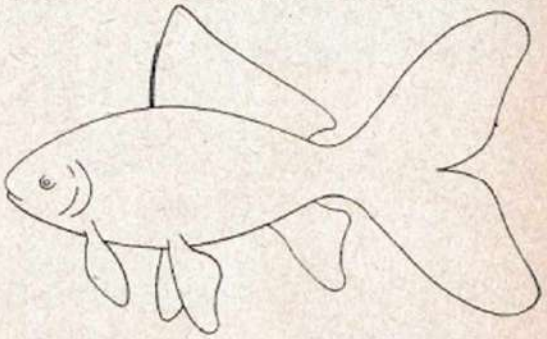
With the Moor there are many difficulties but the colour and eye-formation, of course, take precedence in the matter of selection. However, finnage and rotundity also provide snags for, apart from the fact that elongated Moors are a sign of retrogression, there is the additional point that both Fantail and Veiltail Moors are recognised by the Federation of British Aquatic Societies and Bristol A.S. Cross-breeding with Veiltails to obtain Veil. finnage has resulted in loss of eye-development. This is to be greatly deprecated for such crossing of distinct varieties is the



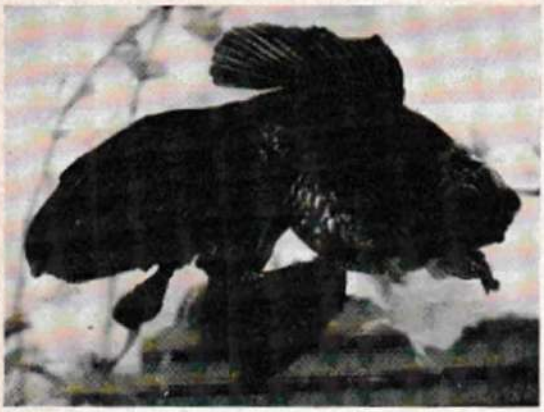
F.B.A.S. IDEAL. Shubunkin standard originally formulated by Bristol A.S., and approved by the F.B.A.S. in the year 1947.



G.S.G.B. IDEAL. The Singletail of this specialist body.



BRISTOL A.S. IDEAL. Revised Shubunkin standard published in 1952. *Note the modified caudal fin shape.*



Photograph] [L. E. Perkins

Moor Goldfish showing metallic scales, a common fault in fish of this variety where brassiness is usually on the lower parts.

major cause of poor show specimens amongst them.

Of the Lionhead, so little has been seen of this type in recent years that, so far as British-bred fish are concerned, little can be said. Apparently this situation may soon be remedied for I for one have recently secured some quite good youngsters from Chinese parent fish at a very reasonable cost, from Birmingham. It will be interesting to see how aquarists will fare with these newcomers now that they are available in quantity.

This brings us to the point concerning new varieties such as the Pearl Scales and Bubble-eyes which are also in plentiful supply. Except for their main characteristics, there seems to be considerable variation, especially in shape and finnage, so here a standard will also have to be laid down.

That old favourite, the Shubunkin, is one of the sore points when standards are discussed, and, although the Bristol drawing is quite pleasant to look at, I have yet to see a living specimen exhibiting such a caudal fin. One of the nearest was probably the prize-winner of Mr. Dacre's, a really fine specimen but not showing the upper curve to the tail which is characteristic of the Bristol drawing. In attempting to produce this type of caudal, excessive finnage is frequently developed and this, far from enhancing the specimen, produces somewhat bedraggled creatures. However, I suggest that, whatever compromise is arrived at with the fish, the standard should be known as the Bristol Shubunkin, in deference to the prodigious work put in on the type by that Society, and not *Monourleptus* or Singletail which, in any case, are not pleasant-sounding words, and scarcely call to mind the beauty of the fish.

Photograph] [L. E. Perkins

Eight-month Veiltail with fine development of finnage. It also has good fin carriage.

One point must be borne in mind; the making of standards has no influence on the fish at all until such standards have been seriously followed for a great many years and, even then, the effect is slight and soon lost by careless breeding. It is, therefore, of paramount importance that standards shall be uniform and abiding, constant alteration merely serving to defeat the common aim—to produce beautiful, true-breeding types.

Now, all this being so, surely it should not be difficult for genuine fish-lovers to arrive at some agreement as to what is desired. What, then, is the source of trouble? That, I am afraid, is only too easily answered. It is the petty society spirit which puts its pride before the interests of the hobby in general and, in this remark, I include them all although I must make one reservation regarding an individual. In my honest opinion, Mr. R. J. Affleck cannot be associated with this tendency. He is by far and away the most knowledgeable and accomplished Goldfish man we have in the country quite apart from his scientific qualifications and his only fault—if fault it be—is that he is too modest. I have always found him ready to offer advice, to demonstrate a fact or to help in any way those interested in fish, whether from a purely scientific angle or from the point of view of breeding.

Photograph] [L. E. Perkins

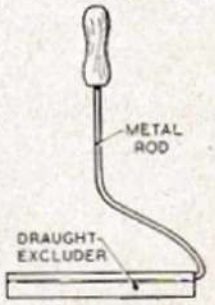
Pearl-scale Fantail, a new introduction to this country. Individual specimens show many variations in shape and finnage.

Such a man might prove adamant, however, if asked to approve standards which were biological absurdities and in this he would deserve out support. It is obvious that each interested body will expect to put its point of view and, such being the case, I suggest that those responsible for the existing standards should each select two men and that a committee of those selected be formed to decide finally on suitable standards. The only proviso is that at its meeting, facts, and not society opinions, should take precedence, and that the welfare of the hobby be kept to the fore during the discussions.

Readers' Hints and Tips

Algæ Remover

TO clean the inside glass of my aquariums I have found the piece of apparatus illustrated very effective. It is made from a length of $\frac{1}{4}$ in. metal rod, which is shaped as shown. The lower 6 in. is straight as, on to this part, a piece of rubber draught excluder is pushed. A wooden handle is firmly fixed to the opposite end. The rubber blade is drawn across the glass and it removes all algæ.



This glass cleaner has the advantage that it is easily made and there is no blade which might rust and have to be replaced.—(S. T. Dean, Wythall, Nr. Birmingham).

(10s. 6d. is paid for all published hints and tips.)

Unusual Spawnings

Fighters, Catfish and Angels Show Departures from their Normal Breeding Procedures

By. R W. Andrews

Mr. Gene Wolfsheimer's male Albino Fighter, the breeding from which is described by Mr. R. W. Andrews here. Due to this fish's weak eyesight its breeding procedure is of particular interest to all fishkeepers who propagate the species.

THE following spawning incidents will perhaps not be regarded as exceptional by the experienced aquarist, but they are unusual in the sense that they differ considerably from the accepted standards of spawning behaviour, as generally given in the majority of aquatic text books.

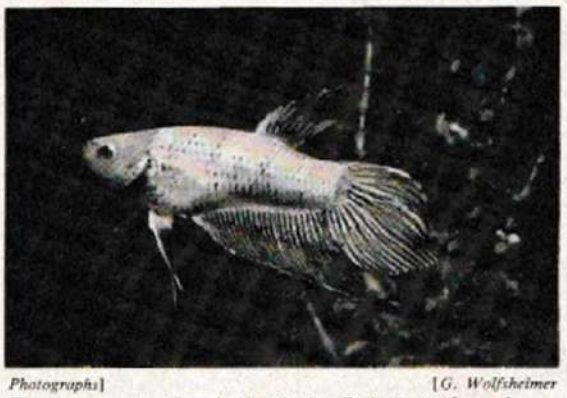
The Fighter (*Betta splendens*) often provides classical examples of unusual breeding procedure. A noteworthy event of this type I observed whilst breeding from an eight-month pair of virgin fish. The pair had been previously separated in a glass-partitioned tank until the male had blown a bubble-nest. Then the partition was removed and, to my surprise, the female immediately swam to the nest without waiting to be driven there, whilst the male went wandering off round the tank.

After a brief pause the female completely reversed the normal procedure by swimming out from the nest and endeavouring to drive the male back under it. After succeeding in this manœuvre she had then to go nearer the nest, arousing his spawning instinct by swimming close alongside him and half turning over on her side. Eventually the male started to make clumsy attempts at embracing and, after a while, these efforts improved until the usual tight embrace was achieved to squeeze out the eggs.

Female Attends to the Eggs

As the pair unclasped I watched for the male to gather the eggs in his mouth and carry them up to the nest. However, once again the reverse occurred, for he just ignored the eggs and it was the female who attended to them This unorthodox spawning continued for a much shorter time than usual, then the male, apparently bored by the whole affair, went wandering off again, whilst his mate retained a position directly beneath the nest, quite evidently intending to maintain sole responsibility for the welfare of the eggs.

Now I was in a quandary for I realised that the female could not re-blow bubbles of the nest should it start to disintegrate but, as an experiment, the male instead of the female was removed. During the remaining hours of that day, she carried out her unnatural duties in tending the eggs in a zealous manner but, next morning, as I feared, the rest, which was not very large to begin with, had completely disappeared and the eggs were lying on the tank bottom. They were slightly affected by Fungus and, as time proved, all were dead. The behaviour of those two fish, with the subdued signs of spawning stimulus in the male along with his lack of interest in the eggs, would suggest that, but for the unusual dual spawning instincts of the female, no such event would in this instance have taken place.



Photographs] [G. Wolfsheimer

The co-operative female Cambodia Fighting Fish used as a mate for the Albino in the upper photograph on this page.

Breeding from an Albino Fighter

Another interesting *Betta* spawning concerns a rare Albino male owned by Mr. Gene Wolfsheimer (U.S.A.). Several attempts were unsuccessfully made to get this rarity to spawn but eventually a spawning was accomplished, using a fine Cambodia-type female as his mate. According to Mr. Wolfsheimer, however, it was anything but a normal spawning for he had practically to midwife the whole event. The pair had been partitioned off in the breeding tank until the bubble-nest was ready, then the partition was removed but, as on previous occasions, the male owing to his characteristically weak eyesight due to albinism, could not see the female at any distance. When she swam out of his limited range of vision, his spawning instinct immediately became quiescent. Fortunately this female proved very co-operative in eventually coming right up in front of the male.

With her help the pair very clumsily started spawning. When the eggs began to drop the male did not even seem to notice them and, of course, made no effort to place them in the nest. The female, on the other hand, just could not wait to see the eggs so that she might scoop them up and eat them. A long plastic tube and some Petri dishes were obtained; the tube was not only used to siphon out the eggs into the dishes but also as a weapon to push off the female, who tried desperately to get at the eggs. The spawning continued spasmodically over a period of about four hours, some two hundred eggs being transferred to the dishes. It was

believed that not all these eggs would be fertile as the female sometimes released eggs without the male being near her.

The collected eggs lay in about a ½ in. of water, to which a little methylene blue was added as a Fungus deterrent. The fertile eggs hatched out on the second day after spawning and approximately a third of the total eggs hatched and developed into free-swimming fry.

The chief behaviour points of this pair of fish again concerns the male's lack of spawning instinct but it may well be, in this case, that the drive was missing owing to the male's defective field of vision. It is both a well-known and accepted opinion that "sighting the female" plays an important part in arousing the spawning instinct. As to this second female, she was only too co-operative in her desire to be spawned, but obviously she was not influenced in her action by any driving procreative instinct but rather from a gourmet's urge for caviare, a common enough failing in the female *Betta*!

Unaided Release of Eggs

A final point is that the female released eggs without the male being near her. Mr. Wolfsheimer particularly emphasised in his own report that this is a matter which is still being argued about, though he personally knows of similar cases. I can verify his contention, for I, too, had the experience of observing a female *Betta* voluntarily releasing eggs whilst still divided from the male by a glass partition. In this case the egg-shedding may have been motivated by the sight of the male frantically displaying on the opposite side of the glass.

Sometimes, after spawning a couple of fish of a "hard-to-sex" species, aquarists will experience the eventual disappointment of a complete failure in that the eggs fail to hatch. When seeking a reason for what went wrong, the possibility of a "two-female" spawning should not be overlooked. Mr. L. A. White, secretary of the National Aquarists' Society, has related to me a perfect example of such a spawning. At one time he owned two fine specimens of *Corydoras æneus*, which shared a tank with a number of Guppies. During one evening it was observed that the two *C. æneus* had commenced the typical procedure of a *Corydoras* courtship, one fish excitedly swimming over and around the other. Naturally interest was aroused by this promising activity, though nothing further happened that evening. On inspection early next morning, it was found that a spawning had taken place.

The delighted aquarist now found himself in a quandary, for he realised that the Guppies should come out of the tank and he had to rush away to business. A plea was made to the lady of the house to get out the Guppies whatever happened and an agitated aquarist rushed away to more mundane matters. On returning in the evening he found the eggs still apparently in good condition but unfortunately there is a sad end to the narrative, for none of the eggs hatched out. On thinking the matter over, Mr. White came to the conclusion that this particular spawning had, in fact, been a "two-female" event. These suspicions were later confirmed when an authority on the *Corydoras* examined both fish and gave his opinion that both were females.

I can tell of a similar experience. Until fairly recently I possessed an apparently well-mated pair of Angel Fish. The assumption that they were a true pair was based on their behaviour over a considerable length of time and especially when they started a period of mouth-locking and leaf-cleaning activities, which finally culminated in an actual spawning. This event I had the experience of observing in full. Having chosen the upper surface of a large *Nuphar* leaf, the female swam slowly across it, depositing a few eggs on her way, whilst close behind came her partner who, instead of following her and fertilising the ova, chose instead to dine on the new-laid eggs. This performance continued with intervals for quite a while, neither fish interfering with the other's activities. Some weeks later the non-egg-laying fish died and examination proved it a female.

Supplying the Needs of Vivaria Inmates

4. A Suitable Enclosure for the Easily-tamed Toads

By Alfred Leutscher, B.Sc.

THE herpetologist has many kinds of reptiles and amphibians from which to choose, each with a different set of requirements according to its behaviour and food habits.

For a number of reasons I have always looked upon toads as my first favourites. These gentle and benign little creatures fit perfectly into the role of vivarium pets and, provided their simple wants are catered for, will live in captivity for many years. Ten years or more in the vivarium is not uncommon.

By nature a toad is usually a nocturnal creature, hiding by day, and hunting its prey after dark. It will spend long intervals in the same spot under a log, a wall or even inside a flower pot, wandering off at night in search of food, and returning to the hiding place on the following morning.

The Spadefoot or Digging Toad (Pelobates fuscus), *found in Europe. Photograph by L. E. Day.*

During the breeding season it is in the water, where jelly-covered strings of spawn may be found entwined among water plants. Our native Common Toad (*Bufo bufo*) will travel a considerable distance to reach its favourite pond. This mysterious migration has been known to naturalists for many years, and some recent field work done on toad movements in Spring by members and friends of the British Herpetological Society will be of considerable interest to nature lovers. It is hoped to publish an account of this in the Society's journal.

Distinguishing the Common Toad

The Common Toad may be distinguished from its relative, the Common Frog (*Rana temporaria*), by a more solid-looking body, shorter legs, blunter snout, and a dry, warty skin. The frog is usually more sleek, with longer legs and more pointed snout. Its skin is inclined to be smooth and moist. It should be pointed out that these differences are only superficial, and that other so-called frogs and toads are incorrectly named. The basic difference between the two is found in the skeleton. In a true frog, the shoulder

girdle is firmly united across the chest; in the toad it is separated and overlaps. This would mean that amphibians such as the Tree Frog (*Hyla*) and the Painted Frog (*Discoglossus*), are really toads!

In captivity, a toad will settle down well, either in a garden enclosure, or a vivarium. In the former, a wall of bricks, wood or tin sheeting should have an inside ledge along the top, about 2-3 feet above the ground, to prevent the creatures escaping. Toads are notorious climbers. Inside the vivarium, on a base of loose loamy soil, various plants may be grown. Hiding places are provided by laying out stone caves, small logs, flower pots and strips of bark. A shallow pond made of cement, or from a shallow tin or bowl sunk into the ground, must also be included, as toads like to use it for an occasional bath and may even breed there. Incidentally, amphibians "drink" water by soaking it up through their skin.

If the garden is escape proof so much the better. A few toads will act as valuable allies for the keen gardener, since they catch so many injurious insects and other garden pests.

Photograph] [*H. Bastin*

Toads soon become very tame, says the author. Here a specimen rests on its owner's hand.

Photograph] [*L. E. Day*

The Midwife or Bell Toad (Alytes obstetricans), *a native of Western Europe, which has been introduced to England.*

A toad in the greenhouse or conservatory will act as a useful controller of insects. It should be provided with some sort of cover, such as a small box of earth, and a shallow dish of water.

Here is a useful tip for the housewife who has trouble with ants in the kitchen or pantry. Simply introduce a toad for a few days! Ants figure highly on the toad's menu, and I have known them to disappear very rapidly when a toad was allowed to sit on the pantry floor.

The vivarium which I have now been using for many years (needless to say I call it "Toad Hall"), is a rectangular wooden house, measuring about 3 ft. in length, 1 ft. tall and 18 in. deep. The top is open, but has strips of glass fitted along the top inner edges, to form a jutting ledge. The back and sides have windows of perforated zinc, and the front is of glass which fits into slots. It can be slid in and out from one side. The bottom edge of this glass rests on a strip of 3 inch wood, as shown in the sketch. This strip acts as a barrier to the vivarium contents, which might otherwise fall out if the glass ran along at floor level.

The vivarium floor is covered with about three inches of loose soil (leaf mould, earth and sand mixed together), kept permanently moist. To protect the woodwork the vivarium floor has been lined with tin sheeting. Periodically this soil is stirred up to freshen and sweeten it. The usual bark strips, rock-work, flower pots, etc., provide the hiding places for the toad colony. Each hiding place should have an entrance, small enough to keep out the light, but large enough, of course, for the toads to crawl through. It will be found that, once inside, they always sit facing the doorway. A shallow dish of water will provide a bathing place.

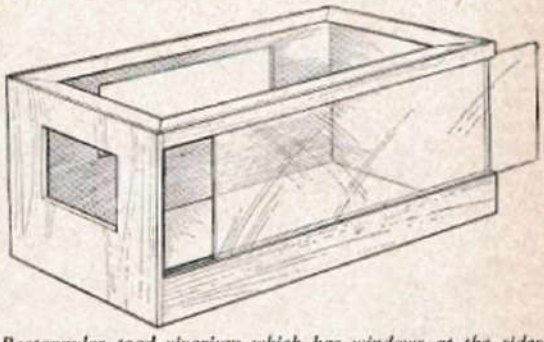
Plants in this "Toad Hall" are a matter of choice. I now avoid them, because I find that during their digging operations, the toads are likely to disturb them, or may crush them with their rather heavy little bodies. Sometimes during hot weather, a toad will dig itself right into the soil, and may retire for many days.

Toads do not usually enter water as frequently as frogs, and I have noticed that when they do this, it is a sign that they are about to slough. This is an amusing sight to watch. The moist skin splits along the back and, by a series of wriggles, the toad slowly peels off the outer skin by using its fingers and toes. The skin rolls up over the back, peeling off the legs and arms right down to the tips, then over the head, finishing as a tight ball just above the mouth. It is finally swallowed.

Interesting Feeding Habits

Even more amusing to watch is a toad eating a worm. Normally any smaller prey, such as an insect, is swallowed in one gulp, disappearing with a flash of the tongue. A worm has to be swallowed in stages, and during the process a kind of boxing match takes place. The little creature heaves and struggles with the wriggling prey, pushing and prodding at it with its fore-feet. This is actually a process known as the "cleaning action", in which the fingers are scraped along the worm's body in order to remove the dirt. Frequently the eyes are closed and, as the eyes bulge inside the sockets, they are pressed against the worm, helping to push it down the gullet!

Toads become so tame that they feed and perform even when handled. I had one specimen which would allow itself to be lifted on one's hand, so that it could catch flies crawling up the wall or window. Another well-loved pet, called Sally, would be taken out of her box every evening, and allowed to wander about my study table, but eventually she came to a sad end. During the night she took her usual fortnightly bath, and the next morning we found her there, drowned, after four years as a favourite among the family pets.



Rectangular toad vivarium which has windows at the sides covered with perforated zinc and a front panel of glass.

Novices Need Separate Classes at Shows

Experienced Exhibitors' Suggestions for Determining Status

THERE appears to be adequate evidence of the need to introduce separate classes at our shows for novices and more experienced exhibitors. Numerous opinions have already been published and there are still further points of view being put forward.

Mr. H. C. B. Thomas (well known as a society official in Bristol and secretary to the South Western Aquarists Societies' Association) writes:— "The time has come to consider schemes to encourage new exhibitors. One way would be to have parallel classes, novice and open. The scheme I have in mind has several positive merits, because it is easier to decide who is not a novice than who is a champion. It avoids a points system for deciding whether Mr. A. is a champion or not. It keeps the champions away from the novices but lets the novices compete with the champions if they wish to do so. Under the scheme, once an exhibitor has taken a first, second or third prize in a novice or open class for some variety of fish then he must exhibit in the open classes for the same variety at all future shows. As soon as an exhibitor has obtained a first, second or third prize in three different classes he must always exhibit in open classes for any variety of fish. A case can be argued for separating coldwater and tropical awards but, in my opinion, when an exhibitor has taken three awards in different varieties he knows his way around the show world, he can tell a good fish from a bad one and is definitely not a novice. I should like to add that I have no sympathy with junior classes. The introduction of this category can involve a show committee in the investigation of cases where Johnnie has accidentally shown one of Dad's fish. This raises the further point as to whether entries in novice classes could be accepted from the same house as an ex-novice but I think it would be wiser to gain a little more experience before pronouncing an opinion".

Mr. C. E. C. Cole (the Ilford Goldfish enthusiast, judge and lecturer, and one time assistant technical director of the Goldfish Society of Great Britain) thinks that the introduction of novice classes would stimulate interest in exhibiting:— "The membership of our societies is composed of a number of novices and a few champions. The majority of clubs aim to hold at least one exhibition each year, sometimes throwing the entry open to all clubs—often confining the entries to members only. At these exhibitions, most prizes are secured by the champions, and the novices are sometimes left without a single award. The establishment of separate classes should result in an increase in the number of entries, and a renewed interest in exhibiting by those who have been often discouraged and are about to give up in despair. The complaint of 'What's the good—I don't stand an earthly!' would be replaced by the hope—'With *them* out of it I stand a good chance!' A statement could be printed in the show rules to the effect that entry in any novice class is barred to anyone who has previously received a first award *for that class* in an open show. While barring the champions from novice classes this would leave the novices who really fancied their chances to enter the champions' classes. In some club shows it is only necessary to exhibit a fish in certain classes in order to secure an award. Quality does not count in these cases and in the majority of them no points are asked for or shown on the prize card. For this reason, it would be bad policy to class an exhibitor as a champion merely because in his own local club he or she had secured a few 'firsts'. Had he been a member of another club, it is possible in quite a few cases that not even v.h.c. cards would have been obtained. I make an exception, of course, in the case of membership of specialist societies where without really excellent fishes it is almost impossible to gain an award. If societies institute novice and champion classes for their closed shows, entries will be boosted, and more members will take an interest, but one of the first difficulties many clubs will experience will be the classification of their junior members. Separate classes are often included for these young enthusiasts and in going the rounds as a judge I have seen many fishes raised by juniors which compare favourably with those of their elders. When a 'champion junior' becomes a full senior member will he be a 'novice senior' or a 'champion senior'? In some societies after a long spell of winning, champions retire to give someone else a chance. If that is the sole reason for retirement, I do not agree with it. The public pay for admission to most exhibitions and to withdraw the best fishes is to rob them of part of their money's worth. With the institution of separate classes they would see the best—and the rest; with, as time passes, an increasing number of the best".

Mr. A. Ward (show secretary of Kingston A.S.) writes:— "We have introduced a championship class, the rule for it which we are endeavouring to keep, reading 'Any fish which has won three first awards in any interclub or open show will be classed as a champion and may only be entered in this class'. I think that the society is the first to embark on these lines. The first event at which the championship class was scheduled took place last March. It would be interesting to know the opinion of other societies on this innovation".

Mr. B. H. Gates (Wembley and District A. & P. A.) gives the other side of the picture, namely, the effect the scheme may have on the finances of unsubsidised shows promoted by societies:— "Before the death knell is sounded for open shows not financially assisted by Borough Councils, etc., consideration should be given to the clubs that run the shows rather than to the pride of the individual exhibitor who would gain a first in a novice class instead of a second or third award in open competition. Wembley and District has accepted for its open shows approximately 350 entries, has paid between £50 and £60 for the hire of tanks and equipment and has expended £35 to £40 on cups, plaques and medals. The size of the hall has prevented our accepting a bigger entry. To cater for two grades of exhibitor would have meant limiting the entries in each class but would have increased the financial outlay in that we would have had to provide twice the number of prizes. Were we to reduce the number of classes to balance the cost of the awards we might defeat one of our objects, for our aim as aquarists is to further the hobby and the show has been held partly for the benefit of the general public whose interest would wane if there were only ten instead of twenty to twenty-five classes. I think that collectors of first prizes should learn where to draw the line with their entries. If two grades must be introduced then, in my opinion, the scheme should be restricted to table shows".

Mr. W. A. Richardson (secretary of Bethnal Green A.S.) suggests that there is need for more standards to revive interest in exhibiting. He states:— "I have read with interest the views on championship classes but to my way of thinking we must first understand what is a champion fish. We have no show standards for tropical egglayers and that being so we do not know what our aim is when exhibiting them. Let us have standards first of all; then novices will stand a

(*Continued on page* 181.)

Suggestions for the Handyman Aquarist

By W. A. Baker

PRACTICALLY a novice at keeping and breeding tropical fish, I have noticed that it is difficult to obtain the correct wire mesh for making a spawning trap such as is used when spawning some tropical egglayers. After experimenting I thought of one of the glass substitutes (Windolite). This is made of a fine wire mesh (about ¼ in.) and covered or dipped in plastics. Its cost is reasonable. Any size tray, trap or basket can be made simply by folding a piece cut to size, as in Fig. 1. The corner piece can be held in shape with needle and thread, and a side view would be something like Fig. 2.

It is best to suspend the basket in the tank as the wire is not too rigid and is probably softened when the plastic is burned off. This latter job is best done *after* the folding—and out-of-doors—for the fumes are acrid and heavy.

I have made quite a number of aquarium appliances with the material and have had no trouble. The plastics burns very readily but leaves a deposit on the wire mesh. If this is boiled it will be found that, on drying, the deposit forms a powdery scum which can be easily brushed off with a stiff, dry brush or a piece of wire wool.

However, I am not in favour of the spawning basket idea

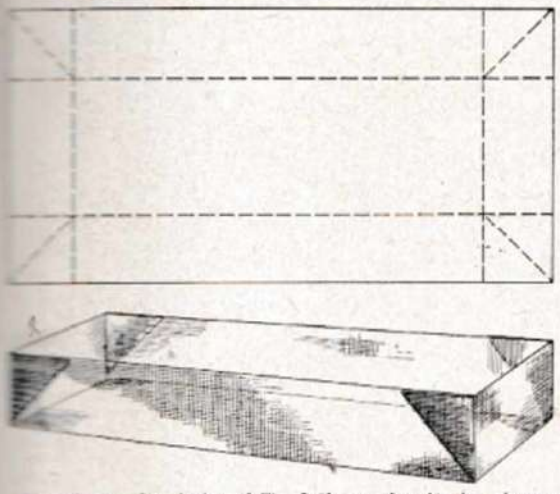


Fig. 1 (upper drawing) and Fig. 2 (lower sketch) show how to make a spawn trap from flexible glass substitute material.

as my experience has been that fish never properly settle down in small quarters suspended in a larger space. It may well be that the nervousness induced causes them to spawn in the great majority of cases.

A breeder friend of mine, with 30 years' experience, cannot account for the way in which his White Clouds behave—sometimes breeding readily with no apparent outside encouragement and at others ignoring all the water changing, aeration, temperature variations, special feeding, etc., at which he is undoubtedly a past master. His most successful trick, incidentally, is not to raise the temperature but to drop it suddenly by no more than two degrees. This can easily be done by a partial change of water. I have seen the results of this in the case of White Clouds and can vouch for its success. Yet another friend simply leaves breeding pairs alone in a well planted tank and gets good average

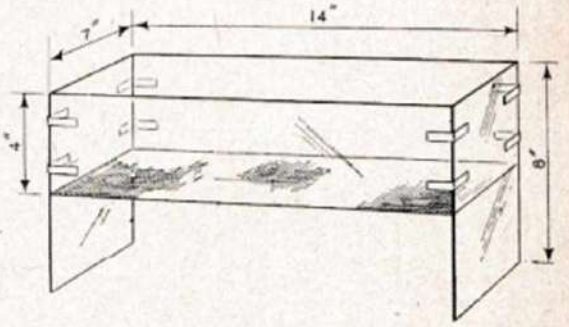


Fig. 3. Spawning basket made with glass sides (held together by aluminium strips fixed with Bostik) and a wire mesh base.

spawnings. I note, however, that once having found good spawners, he keeps them, which tends to suggest that individual fish breed more readily than others.

A better idea than a suspended basket it to fit a basket upside down in a small tank, or space suitably partitioned off. In this way there are no wire walls to hem the fish in. A basket can be constructed from glass substitute mesh, exactly the size required to fit the tank in use, or simply made in the form of a screen attached to a thin wooden frame, this being arranged to the required 4 in. from the bottom.

Similar screens can be constructed by anyone who cares to spend a little time and patience and who, like me, has not too much money to spare. In fact, spawning baskets or traps can be built with a few odd sheets of glass, a little aluminium and a tube of Bostik. Size is a matter of preference and the material to hand, but for illustration let us deal with a 14×7×4 in. basket. Four pieces of glass will be required, two pieces 14×4 in. and two pieces 7×8 in. These are then set up as per Fig. 3. This will ensure that the basket stands 4 in. from the aquarium floor at all times. The corners are held by four thin strips of aluminium bent to "L" shapes, and made secure with Bostik. The floor of the trap can now be considered. Many materials are suitable for this but I suggest the mesh from the glass substitute—held at the edges with Bostik. Lengths of bamboo cane, such as used by gardeners, and glass tubes and plastics rods are also ideal.

The combined mesh-and-plastics glass substitute is handy for tank covers instead of glass (it diffuses light better, incidentally). As partitions it is also effective—especially when it is required to really screen one fish from another. Filter trays can also be made simply by forming a piece of

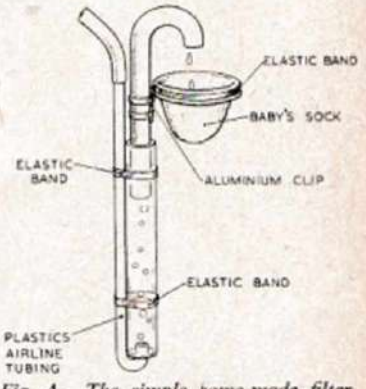


Fig. 4. The simple home-made filter unit described on the next page.

Windolite around a small round bottle, or block of wood should a square format be required. The seam can be made good by stitching, or sticking with any good quality cement or Bostik. The screen mesh at the bottom is another piece of Windolite with the plastics removed as previously described.

A baby's sock makes a good filter bag if held open with a strip of aluminium teased into a circle. The foot of the sock (the rest being cut off) is held to the metal band by an elastic band for easy removal. If the aluminium is cut with a small tag to it as Fig. 4A, the tag can be fastened to the glass or plastics tubing by another small elastic band. The airlift itself can be made adjustable in length simply by obtaining two pieces of glass tubing—one being a sliding fit inside the other (Fig. 4).

Plastics tubing can be bent in hot water, and glass tubing over a gas ring—care being taken to keep the tubing moving for the first few minutes. It can be cut by ringing with a good file and snapping in the fingers.

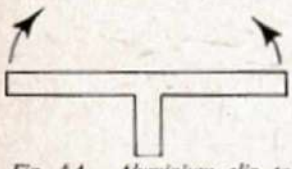


Fig. 4A. Aluminium clip to hold the baby's sock in the filter.

Aluminium can be angled in a vice if it is first cut into the required length strips—marked along the centre—and clamped between two pieces of thick angle iron (Fig. 5).

The strip is now tapped over flat—a hard piece of wood will avoid hammer marks. Should a rather long length be required, say, over a foot—it is best to run nuts and bolts through the end of the angle iron to prevent spring and whip. This will also hold the metal strip while the two angle irons are moved in the vice to obtain the full grip.

Quite thick sheet steel can be angled by the method I have set out, and the resulting strips used to make up small tanks (up to 18 × 10 in. is practical). There is no need to mitre the corners. They can be soldered or riveted simply by laying one length on top of the other where they meet. The uprights can be fitted to stand inside the resulting corners (Fig. 5A).

Angled aluminium strip is, no doubt, the best bottom for any form of spawning or breeding basket or trap. It should be coupled with one side slightly longer than the other and fitted as in Fig. 6. Viewed from the top, this presents a solid looking "floor" through which there is no visible means of escape. The obvious advantage is that fish settle down more readily if there is nothing to tempt or tease them, and the more insistent spawn-eaters—Zebras, for example—cannot see the eggs through those infuriating slits or holes, anyway.

Many aquarists would, I am sure, construct larger-sized tanks were it not for the prohibitive cost of ¼-plate glass. Three pieces of 30 × 15 in. ¼-plate, for instance, cost nearly £2. Salvage plate, besides being in short supply is not very much cheaper and is from two-thirds to three-quarters the price of new glass. There is, however, a never-ending and cheap supply in secondhand mirrors of suitable size. These can be picked up for a few shillings at local junk shops and who cares about the state of the frame or silvering on them?

Fig. 6. Angled aluminium strips for base of a home-made spawning trap or basket.

Thickness being the prime consideration, it is as well to examine the edge of the glass, if possible, but no despair should be felt if this cannot be done before purchase. If one places some small object—a pencil, coin, etc., against the glass itself it will be seen that the reflection "stands back" as it were, from the original object. That distance is the precise thickness of the glass or precise enough for practical purposes. Silvering and the protective paint is easily removed with a razor blade.

Do not be put off by such phrases as "special diamond cutters for plate", or "plate glass cutting should be left to the professional". I can do it with a 2/- wheel cutter, and there is none of the genius in me.

First clean the surface of your glass, next prepare a firm *flat* bed for it (I use the dining room table on a Saturday night. My wife goes out most Saturday nights!). An old blanket is ideal as a cushion between glass and table or, failing that, newspaper will do. Mark the points where the cut is to be, run the wheel across the glass, this being guided by a suitable straight edge, and a long scratch will result.

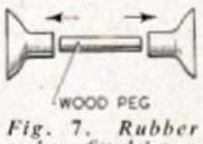
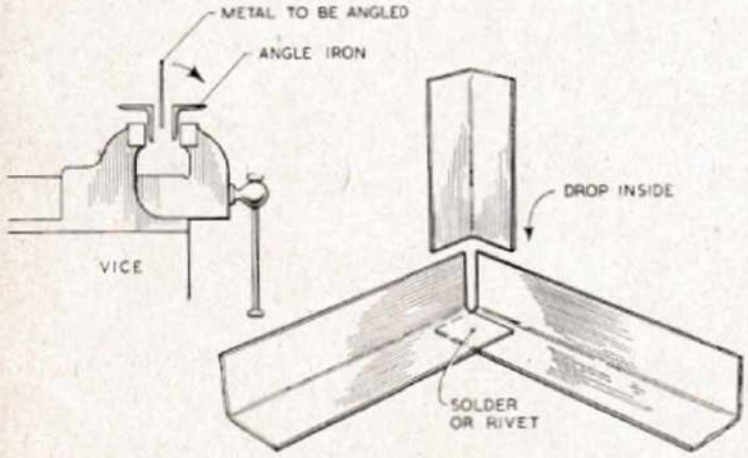


Fig. 7. Rubber suckers fitted into a short wooden peg.

I know, you will say, "He says run the wheel across the glass!" The whole secret is to keep the same angle, the same pressure (firm but not forced), the same speed, and your nerve. If you still feel shaky try your hand at cutting an odd piece of glass first, but do not be dainty about it and attempt to cut off thin strips—this is difficult. I would rather cut a ¼-plate six-foot mirror in half than a half-inch strip from, say, a two foot length of 32 oz. glass.

So having scored or scratched your glass, slide it over the edge of the table so that you can tap the scratch, with your cutter, underneath. Start at the edge nearest you, and tap smartly but not hard. Maybe nothing will happen but keep on tapping, calmly and deliberately, right on the spot where the scratch would be if it went through to the back of your glass. Sooner or later you will see the glass itself crack just underneath the scratch. Follow it up until the crack extends the whole length of the cut. Very little pressure from your strong right arm will now literally break the glass neatly and cleanly, just where you want it. My first piece came away so easily that I nearly flung myself on the floor with misdirected energy.

One more tip for the "humble". Home-made (or otherwise) apparatus can be held inside a tank by two suction discs pinned together with a small peg of wood (Fig. 7).



Left (Fig. 5), method of angling aluminium or sheet steel. Right (Fig. 5A), assembling steel strips for the making of a small aquarium up to 18 in. long.

Goldfish show. There were a few excellent Fantails (Scaled) which took a very long time to lose their bronze sheen and turn gold. From this spawning were obtained some superb Calico Fantails, some of them still classed as champion fish. Telescopic Calico Fantails, too, were in evidence in fair numbers but most surprising of all was the appearance of a few *single-tail* (Common Goldfish type) Moors! Many promising Moors later turned gold, much to the dismay of those people who obtained them. There were a great many deformities as well, perhaps as much as 60 per cent.

Difficulty in Breeding Moors

A related pair of Moors, selected as the best, were bred true a few months ago, after considerable trouble. It is the author's experience that Moors will not readily breed, but that male Moors prefer to chase gold females of other varieties rather than Moor females.

The outcome of this spawning, using pure-bred Moors, was most disappointing. Previous spawnings using male Moors and Fantail gold or bronze females gave much better results and a higher percentage of Moors. Less than 10 per cent have turned out Moors and more than 70 per cent were poorly shaped. Commonest fault was lack of an anal fin and defective dorsal fin, a mere vestige of what it should be. Many have remained bronze Fantails with short tails, despite the fact that both parents had fine long tails. A few have assumed a gun-metal blue sheen on their scaled bodies, and some of these have developed telescopic eyes and can be termed "blue Moors". They are regarded as unsightly and are not encouraged to breed.

The author has thus concluded that to obtain good Moors, a pure crossing is not always the best thing. Influx of strange blood, combined with more desirable points in body shape and finnage, gives better results when using active male Moors. This, of course, is only a personal opinion.

All Goldfish kept in Ceylon are subject to fungal attacks, more so when they are about a month old and kept outdoors and likely to experience a chill. Care has to be taken not to overfeed on egg yolk and prepared foods which encourage this Fungus. Methylene blue has been found to be the best cure.

I may be wrong, but I have arrived at the conclusion that once a baby Goldfish has suffered badly from Fungus when less than a month old it has little chance of becoming a champion fish. Under a lens, the clogging of the fin rays due to the Fungus has been observed. When the Fungus is got rid of after treatment, the fins seldom, if ever, are perfect again. Many dorsal fins thus affected have become vestigial and unsightly.

Prone to Fungus

Moors, in particular, are subject to fungal attacks even when fully grown. It is observed as a filmy white overlay on their black bodies. Death is rapid and certain if prompt action is not taken. If the Fungus reaches the gills there is absolutely no hope for the fish. Moors are delicate and require the cleanest possible water, preferably in dark surroundings, if they are to be kept successfully.

It is the ambition and intention of the author to breed and raise other varieties of fancy Goldfish, particularly Lion-heads, Orandas, pure Veiltails, Shubunkins and Celestials. It is possible that, with the increase in Goldfish exports westwards from the Far East, this will be a reality sooner than is expected.

— Know Your Fishes —

No. 34
Dwarf Croaking Gourami
(Trichopsis pumilus)

Photograph] [*G. J. M. Timmerman*

The majority of aquarium-kept Labyrinth fishes are large and strikingly hued. More modest in impact is the Dwarf Croaking Gourami (*Trichopsis pumilus*), reputed to grow to 1¾ in. long but usually around 1½ in. at maturity. Its pleasing colourings are not fully appreciated at a hasty glance, for it is not until the fish makes the leisurely sinuous movements typical of the Labyrinths that its metallic flecks glint under the top light. For that reason, and because it is only occasionally imported and rarely bred, this midget among bubble-nest builders is unlikely to enjoy great popularity. A pity, for there are few fish so quietly attractive or so peaceful.

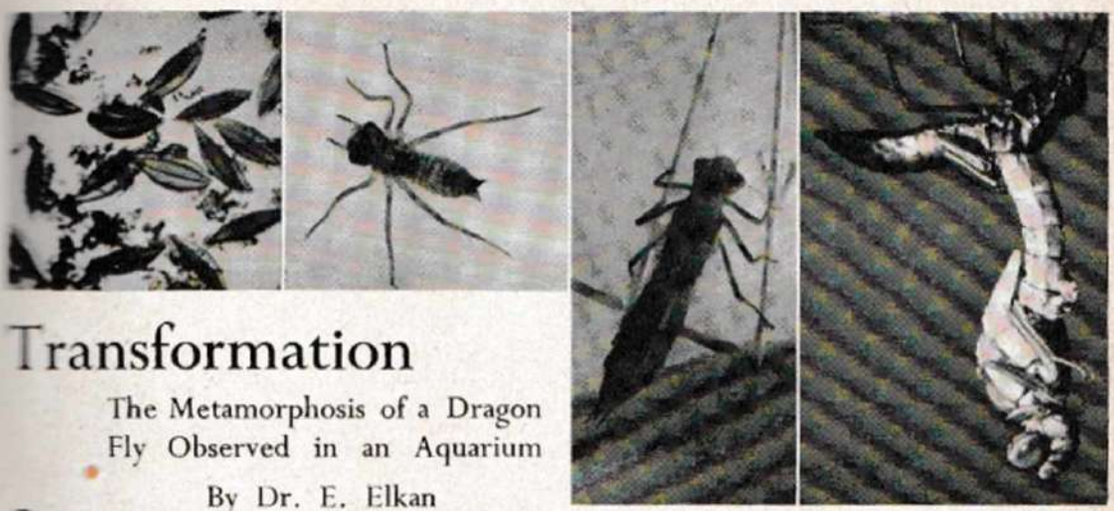
Body shape can, with justification, be described as typical of Labyrinths and more particularly akin to that of the Bettas for the body is shallow compared with the ovoid chunkiness of the larger Gouramies. Chief distinguishing colour character is a checkered lateral stripe running along from the snout to the caudal fin base, in the form of alternating blue-black and light spots. General body colour is olive green above, lighter in the lower parts. Here the description generally ends, which is unfair, for under a good light the body shows iridescence, mainly in the form of spangles.

Pectoral fins are colourless, pelvics yellow, but the dorsal, anal and caudal are greenish yellow with tiny red dots and very narrow red edges, particularly obvious in male fishes. The female is usually the less colourful fish and she is also reputed to lack the slightly pointed caudal fin of the male.

Small livefood is appreciated but dried food will be taken. The popular name of Dwarf Croaking Gourami is really a follow-on from the larger closely-related species *Trichopsis vittatus*, known as the Croaking Gourami. In the case of *Trichopsis pumilus* the title is not satisfactory, for whilst it is certainly considerably smaller than the 2½ in. of *T. vittatus*, there seems no record of *T. pumilus* ever emitting the "croaks" associated with *T. vittatus* at breeding time.

Breeding is not easy to induce although success has been achieved. Smallish tanks seem adequate and thick planting with fine-leafed subjects, together with the introduction of floating plants such as Water Fern, is advised. The male builds a bubble-nest beneath a floating plant and eggs are generally laid in the early morning. In 24-36 hours the eggs hatch and are tended by the male. Neither parent molests the eggs or youngsters provided adequate livefood is supplied. In line with most other Labyrinths a temperature of 80 deg. F. is suitable for breeding and a close fitting cover must be fitted over the tank. The young fish require small Infusoria initially and a constant water temperature is important in the early stages of their development.

Trichopsis pumilis is native to Siam, Cambodia, Cochin China and the Malay Peninsula. Class : *Pisces*. Order: *Percomorphi*. Sub-order: *Percoidea*. Family: *Anabantidæ*. Genus: *Trichopsis*. Species: *T. pumilus*.



Photographs] [Dr. E. Elkan

Extreme left: Dragon Fly eggs (just visible to the naked eye). Centre left: Enlarged picture of minute newly-hatched larva. Centre right: Large Dragon Fly larva the Summer after hatching. Extreme right: Larva leaves the water, its shell splits between the wing stumps and the adult insect emerges.

Transformation

The Metamorphosis of a Dragon Fly Observed in an Aquarium

By Dr. E. Elkan

SINCE our children have grown up and are away from home for long intervals, our garden pool has reverted to a comparative wilderness. Not only is it the place where the birds of the neighbourhood meet, drink and have their baths and a situation where newts seek refuge when about to lay their eggs, but it has also found favour with Dragon Flies. We were in complete ignorance of this latter fact until the day when the rightful owner of the pond returned and found his newt population strangely diminished. Nor was it difficult to diagnose the reason for this demise after a thorough search had produced two large, fat Dragon Fly larvæ. A newt baby is no match for these monsters of the deep and our two specimens were duly removed from the pond and housed in an aquarium covered with perforated zinc.

One Specimen Refused Food

One of them liked to be fed with White Worms. The other, which looked much darker though not larger, never accepted food and we now know why. The text books say that these larvæ stop feeding and become very sluggish just before their transformation into flying insects and indeed, one morning, after we had had this boarder for about a fortnight, it left the water, attached itself to the aquarium lid and stayed there. This happened at about 10 a.m. and I regret that on that memorable day very little work was done in our household until lunchtime when the fully-developed Dragon Fly left us.

My pictures, taken rather hurriedly, give an idea of what we saw. First the chitinous case of the larva split open in the region of the back between the wing stumps. The insect, hanging upside down, extricated its head, legs and thorax (chest). For about an hour it remained hanging by the abdomen which was still partly concealed in the old shell. When the abdomen was completely free the insect turned a semicircle and remained hanging by its own legs, head up and abdomen down, for the rest of the metamorphosis.

All this has to be seen to be believed. The wings which start as small grey insignificant lumps take a long time until they are ready for flight, but the rest of the body also

(*Continued next page.*)

Left: Adult insect with metamorphosis completed. The body hardens and shrinks and the wings grow in size and brilliance. Right: Empty larval shell left behind complete, except for split between the wing stumps. Metamorphosis took three hours.

Current Research

Relation of Dissolved Oxygen and Survival

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

THE importance of dissolved oxygen would scarcely seem to merit emphasis to experienced aquarists, and indeed the necessity of an adequate surface allowance (often translated into volume allowance) is one of the first "musts" instilled into the beginner. It is nevertheless of interest to note the observations recorded in the current issue of the *Journal of Experimental Biology* (1954, Vol. 31, 161-164) by Dr. Kathleen M. Downing of the Water Pollution Research Laboratory, Watford.

Dr. Downing's paper deals with "The influence of dissolved oxygen concentration on the toxicity of potassium cyanide to Rainbow Trout". The study arose from the practical consideration that industrial waste waters are often discharged into rivers in which the concentration of dissolved oxygen varies considerably. It is therefore important to know how this will affect the toxicity to fish of poisons that may be present.

Some 20 years ago it was reported that when fish were placed in a fixed volume of potassium cyanide solution (actually containing 0.11 p.p.m. of cyanide), the toxicity decreased as the concentration of oxygen was increased, but as air saturation was approached this rate at which toxicity decreased fell off.

In the present studies a Perspex tank, that permitted a continuous flow of water but in which the concentrations of oxygen and cyanide could be kept constant, was used. It was felt that periods of survival in tests made in this way would be less likely to be affected by the accumulation of metabolic waste products and by depletion of oxygen and cyanide. The desired concentration of oxygen was obtained by mixing suitable proportions of a stream of water saturated with air with a stream which had been deoxygenated by "scrubbing" with nitrogen. The cyanide was added as a solution at a constant rate and the poisoned water was thoroughly mixed before delivery into the tank. The test fish were yearling Rainbow Trout (mean length, 13.3 cm.) which were introduced into, and removed from, the tank through a valve in the top.

A series of 27 tests was carried out, each involving some 26 fish which had not been fed for 24 hours previously. In control tests in water that did not contain any cyanide, all fish survived for the experimental period without distress when the water contained 3.66 p.p.m. of oxygen. When the oxygen content was only 1.11 p.p.m., however, all fish turned over in 18 minutes. For the tests with poisoned water, survival time was shown to be increased with increase in the dissolved oxygen concentration between 10 and 100 per cent. of air saturation value. At the same concentration of cyanide (0.105 p.p.m.), survival time—taken as the time from the start of the test until the fish had lost equilibrium and lain without swimming movements for five seconds—could be measured in minutes when the concentration of oxygen was below 5 p.p.m., but in some individuals it was nearly 40 hours when the oxygen concentration approached 9 p.p.m.

Although these experiments had direct reference to cyanide poisoning, they are of extreme interest to fish physiology in general, and exemplify the importance of dissolved oxygen for survival, either in normal or adverse circumstances. Suitable methods of estimating dissolved oxygen were described over 60 years ago, and although they are obviously only applicable "on the spot", and not in samples submitted for analysis, they might be of value in the elucidation of certain conditions or in estimating the efficiency of aeration methods.

From Salt to Fresh Water

In the last contribution we dealt with certain aspects of the physiology of migration. The ability of certain fish (other than those that normally migrate) to pass from salt water to fresh water or *vice versa* has always attracted interest, and in a recent issue of *Ecology* (1954, Vol. 35, 75-78), Dr. William H. Massman of the Virginia Fisheries Laboratory deals with the marine fishes that are to be found in fresh and brackish waters of five rivers (the James, Chickahominy, Pamunkey, Mattaponi and Rappahannock in that State).

Dr. Massman records 18 marine species (exclusive of anadromous and catadromous forms—see WATER LIFE, June, 1954, p. 124) that have been collected from these rivers, and has examined possible reasons for their presence and survival. The transition from salt to fresh water in Virginia tidal estuaries is not an abrupt one. It is possible that very slight amounts of salt of marine origin may be present up to the head of the tide, but by conventional methods of analysis these trace amounts of salt become increasingly difficult to detect at increasing distances upstream.

Another factor seems to be that small amounts of salt water may become detached from the main body of salt water and be moved upriver by eddies. Attempts to estimate the salt content of tidal water indicate small erratic differences rather than a gradual decline, and it seems possible that the ability of certain marine fishes to survive in "fresh" water may be due to the presence of slight traces of salt.

Whatever the explanation, there are some marine species that are able to adjust themselves to life in "fresh" water. The degree of adjustment varies among the different species and age groups. Massman divides the marine fish found in the 5 Virginia rivers into three general groups, viz., (1) fishes commonly found in fresh water both as young and adults, e.g. the Mummichog, Glassy Silverside, Atlantic Needlefish and Mitchell's Anchovy; (2) fishes that occur in fresh water usually only as young, e.g., Hog-choker, Menhaden, Spot, Atlantic Croaker, Silver Perch and Grey Squeteague; (3) Fishes that are rarely taken either as young or adults, e.g., Spotted Squeteague, Winter Flounder, Atlantic Silverside, Naked Goby and, probably, the Four-spine Stickleback, *Apeltes quadracus*.

Transformation

(*Continued from previous page.*)

undergoes a great change. The head alters its shape, the abdomen becomes longer and longer and, as it gets thinner, drops of fluid exude from the vent. Even the colour of the insect, not very conspicuous at the start, is much more brilliant, and the surface more shiny, at the end.

At last, having kept us waiting all the morning, the wings, first folded over the back, spread out showing the beautiful lacework of the veins and we thought the time had come to take our guest into the garden and the sun.

It made no attempt to escape during the transit down the stairs and across several rooms, but once out in the open it soon took off and flew into a nearby tree. One might as well try to describe a rainbow or a sunset as the metamorphosis of a Dragon Fly. But the ponds are full of these larvæ and the thrill of watching this transformation is within everybody's reach.

Carrying Case for Tropicals

This Elegant and Easily Constructed Container Will Ensure that Fish Travel without Ill-effect

By R. N. Burges

EVERY tropical fishkeeper must at sometime carry fish to and from shows or aquarists' shops. For this to be done without causing damage to the fish, a reasonably rigid container incorporating some method of retaining heat and "blacking out" is required.

Many makeshift methods are used but if you prize and value your fish, a few shillings and a little time is well expended in the construction of a carrying case.

I have made and used a case described here with great success and found it retains the temperature for several hours even in the coldest of weather. It also has the additional asset of being easy to carry and not unsightly.

The following measurements for the pieces of wood are for a box accommodating two jars 4 in. in diameter and 7 in. high. The dimensions may be adjusted to suit your own particular jars.

Many small timber shops now have plywood offcuts and the following may be purchased at quite a modest cost. Cutting list: 2 pieces, $\frac{3}{8}$ in. plywood, $11\frac{1}{4} \times 8\frac{1}{2}$ in. (front and back); 2 pieces, $\frac{3}{8}$ in. plywood, $5\frac{1}{2} \times 8\frac{1}{2}$ in. (ends); 2 pieces, $\frac{3}{8}$ in. plywood, $11\frac{1}{4} \times 5\frac{1}{2}$ in. (top and bottom); 1 piece, $\frac{3}{8}$ in. plywood, $5 \times 6\frac{1}{2}$ in. (division).

On the top and bottom panels mark a line the thickness of the plywood in from the edge. Cut along these lines using a straight edge and sharp knife (Figs. 3 and 4). Cut off one "skin" or layer at a time to leave 2 layers or approximately $\frac{1}{8}$ in. tongue (see Fig. 4). The front and back are treated similarly but only their short sides are cut in this manner.

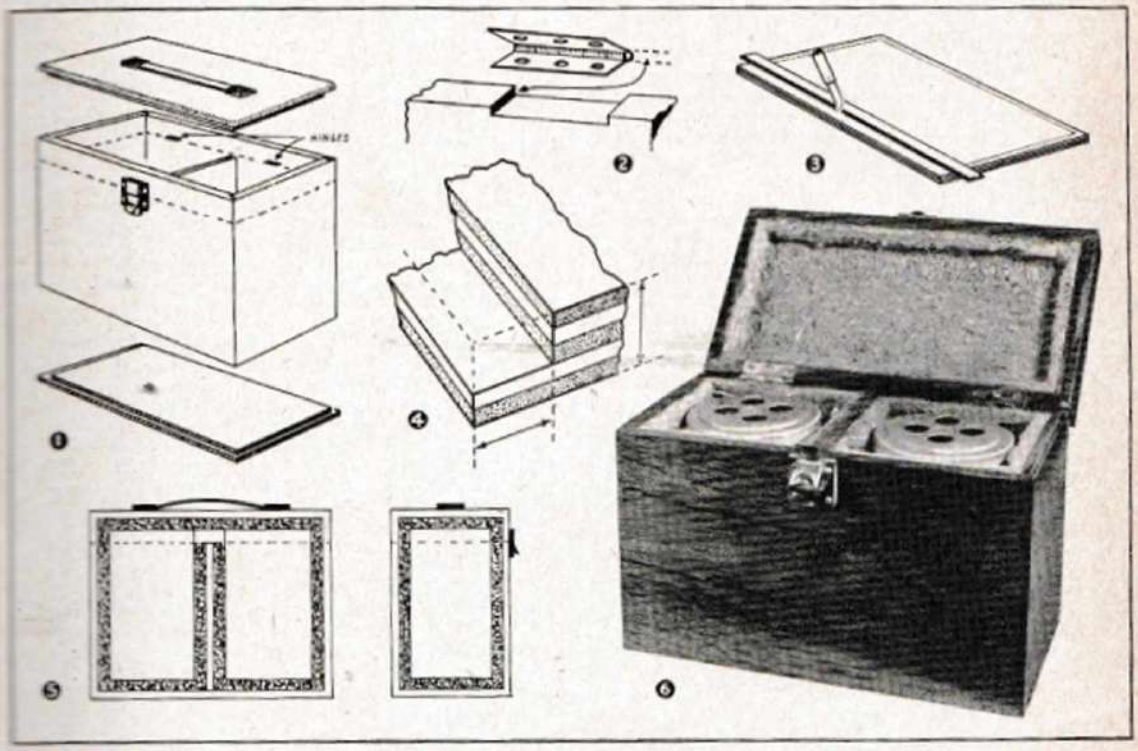
The whole box, including the top and bottom, may now be assembled using glue and panel pins as required. Allow time to set firm, then pencil a line $1\frac{1}{2}$ in. down from top edge (Fig. 1). With a saw cut round, taking care to keep to the line. This will give you a perfect fitting lid. Smooth off all surfaces with sandpaper.

The division can now be fitted in the centre and panel pinned through from front and back.

Next fit two $1\frac{1}{2}$ in. brass hinges by cutting out a recess in the back edge of the box the same depth as the thickness of the ball of the hinge (see Fig. 2). These will allow the lid to fit flush all round.

The box is lined with underfelt, which may be obtained in the form of three or four stair-treads from multiple stores.

A strap handle and fastener from any good tool shop completes the box, which may be painted or stained and polished to suit individual taste.



1, a stage in assembly showing construction of the various parts. 2, making the recess for a hinge. 3, cutting off layers of the plywood with a sharp knife. 4, layers of ply removed. 5, section (front) and section (side) showing the lining of simulating felt. 6, completed case with jars in position and clip affixed to the front. This box was stained and polished.

Tooth-carps of the *Aphyosemion* Genus

By F. Ba[illegible]

THE Genus *Aphyosemion* was created by Myers in 1925 when he brought together a number of species which had previously been included in the Genera *Fundulus*, *Haplochilus*, etc.

Members of this Genus have slim and elongated bodies (the body depth varies, according to the species, from one-third to one-fifth of the length). The body is roughly cylindrical but shows a tendency to lateral compression towards the caudal base. The head is shorter, more rounded and not so flattened dorsally, compared with the closely-allied Genus, *Epiplatys*. The dorsal and anal fins are set well back, the number of rays in the former ranging from 8 to 19 while those of the anal may number from 12 to 19. The posterior rays of these fins and the outer rays of the caudal are, in the males of many species, prolonged to form a streamer-like extension and it is to this feature that *A. australe* owes its common German name of "Ribbon-tail". The paddle-shaped pectorals are moderately large and set very low while ventrals are comparatively small and inconspicuous. In the females of various species the single fins are more or less rounded.

Division of the Genus

In 1933 Myers published a list of the species then known; he divided the Genus into three Sub-genera; *Aphyosemion*, *Fundulopanchax* and *Callopanchax*. This sub-division of the Genus was mainly based upon differences in dentition, structure of mouth and head and, what is perhaps of most use to aquarists, the number of rays in the dorsal fin. In the *Aphyosemion* Sub-genus these may vary, with the different species, from 8-12, in the *Fundulopanchax*, from 10-16 and, in *A. sjæstedti* (the sole representative of the *Callopanchax* section), 19. Myers' list enumerated the following species and sub-species:—

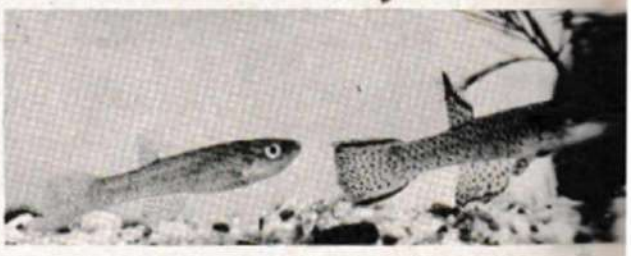
SUB-GENUS *APHYOSEMION*. 1, *A. australe*; 2, *A. calliurum calliurum*; 2a, *A. calliurum ahli*; 3, *A. christyi*; 4, *A. elegans*; 5, *A. exigeum*; 6, *A. ferranti*; 7, *A. lujæ*; 8, *A. libiense*; 9, *A. meinkeni*; 10, *A. æseri*; 11, *A. pachini*; 12, *A. schoutedeni*; 13, *A. vexillifer*.

SUB-GENUS *FUNDULOPANCHAX*. 1, *A. arnoldi*; 2, *A. batesi*; 3, *A. beauforti*; 4, *A. bitæniatum*; 5. *A. bivittatum bivittatum*; 5a, *A. bivittatum hollyi*; 6, *A. cæruleum*; *A. filamentosa*; *A. gardneri*; 9, *A. gulare*; 10, *A. gustayi*; 11, *A. lönnbergi*; 12, *A. multicolor*; 13, *A. pappenheimi*; 14, *A. riggenbachi*; 15, *A. rubrostictum*; 16, *A. splendidum*; 17, *A. splendopleuris*; 18, *A. spurrelli*; 19, *A. zimmeri*.

SUB-GENUS *CALLOPANCHAX*. 1, *A. sjæstedti*.

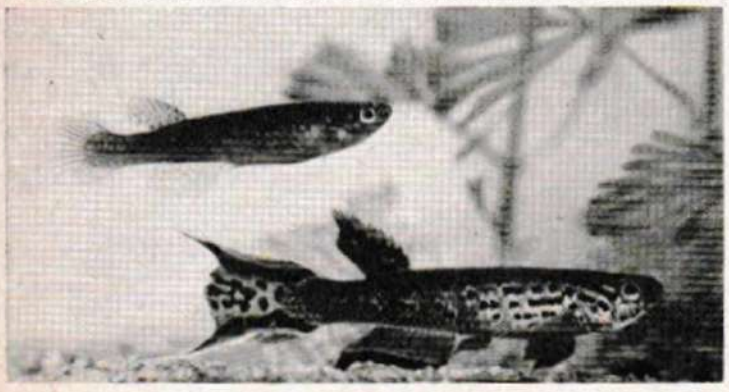
Thus it will be seen that the list included 33 species together with two sub-species but since that date at least seven new species have been described:—*A.* (*Aphyosemion*) *calabaricus*; *A.* (*Aphyosemion*) *roloffi*; *A.* (*Aphyosemion*) *escherichi*; *A.* (*Aphyosemion*) *cognatum*; *A.* (?) *margaritæ*; *A.* (*Fundulopanchax*) *unistrigatum*, and *A.* (*Fundulopanchax*) *fallax*.

It should be pointed out that German ichthyologists, while accepting Myers' classification in its broad outlines, sometimes differ from him in details. They place a number of species, including *Epiplatys petersi* and *E. senegalensis* in the Genus *Aphyosemion*. With reference to this it must be realised that any system of classification can only be the superimposing of an artificial and rather arbitrary scheme upon the result of natural evolution. Thus the Genus to which a given species is assigned would depend upon the relative emphasis which any system places upon the various features. It should also be noted that Myers had not the opportunity of personally examining specimens of a number of species but had only the original descriptions of these on which to base his conclusions.



Some confusion also exists among those species which are universally assigned to this Genus; thus the fish now offered in this country as *A. gardneri* appears obviously to differ from the fish illustrated and described by an American authority. Germans claim that their fish is the true *A. gardneri* and it has been suggested that the American fish is *A. filamentosa*. Again the suggestion has appeared in America that a number of *Aphyosemion* "species" are, in fact, hybrids but no real evidence to support the theory was produced. On the other hand one German writer has recently described two varieties of *A. arnoldi* in which the females are indistinguishable but in which the males differ in the colour of their fins. He goes on to state that fertile eggs are only produced if a male is mated with a female of the same strain but it does not seem to have been considered that these fish could be separate species.

The confusion which exists may account for some of the inaccurate naming of species but it can hardly be held to account for it all. For instance, when



One of the most beautiful Aphyosemions, A. australe. *The male is the lower fish. His fin colouring is most striking.*

ordering *A. calabaricus* I have received *Rivulus cylindraceus;* for *A. gulare* I have had *A. cæruleum* and for *E. singa, A. bivittatum bivittatum.* I do not for one moment question the good faith of the persons concerned but in these cases there must have been some lack of checking.

Aphyosemion species are distributed widely through most of the tropical rain forests and mangrove swamps of West Africa and their range appears to be confined to this area, with the exception of that species which Dr. W. Ladiges reports as having been found in East Africa. Thus their range extends from the Guineas in the North, through Liberia, the Gold Coast, Nigeria, Calabar, the Cameroons and Gaboon to Angola in the south and over to the Congo basin. It appears to stretch for at least seven hundred miles inland.

Much of West Africa, with its high temperature and rainfall, its excessive humidity and its extensive areas of swamps, which serve as breeding grounds for myriads of mosquitoes that are responsible for the spread of malaria and yellow fever, is particularly unsuited to Europeans and it is probably this factor which is partly responsible for the absence of many species from our aquaria.

Climatic Variations

It is obvious that in a territory so vast there must be a considerably variation in climate even if this may be chiefly a matter of variation in seasons but, on the other hand, there are climatic features which appear to be common to much of the area. In the north there are distinct wet and dry seasons but as the Equator is approached there are found to be two periods of maximum rainfall in March-April and September-October. In much of the area, however, the lack of rain in the dry season is largely offset by the extreme humidity of the atmosphere and this tends to reduce evaporation to a minimum and thus to prevent the drying up of small pools.

There is little seasonal variation in temperature; the difference in the mean temperature of the hottest and coolest months being only 4 deg. F. in much of the area, while the variation per 24 hours is 6 deg. F. The temperature of the water in which the Aphyosemions dwell rarely exceeds 75 deg. F. during the hottest months of the year. When the sun is overhead it is often blanketed by cloud while the masses of overhanging and floating plants afford deep shade and protection from the sun.

The theory has been expressed that the "soil breeders" of which *A. gulare, A. cæruleum* and *A. sjæstedti* are typical, are annual fish inhabiting the drier savannah areas where in the dry season the pools and small streams disappear and where the species only survive as eggs which hatch out when the pools fill at the beginning of the rains. No specific evidence to support this theory of geographical distribution has been given, however, nor have I been able to find any. Indeed, the contrary appears to be the case, as *A. sjæstedti* occurs plentifully in the Niger Delta, an area which is certainly not of the savannah type. It is perhaps of some significance that Dr. Ladiges states that the specimens found in East Africa were taken in a locality where the rainfall was sufficient to maintain a reasonable water level.

On the other hand, the first specimens of *A. gardneri* to reach Germany after the war were taken in pools which contained only one inch of water but all the fish caught failed to survive for long. A second importation, made later from the same pools which then held fresh rain water to a depth of 18 in., was much more successful and these fish lived and bred.

The theory was put forward to explain the long incubation period for the eggs of these *Aphyosemion* species and it was suggested that the breeding habits of the fish were similar to those of the Argentine Pearl Fish (*Cynolebias*). Now Dr. E. Meder, a leading German aquarist, reports that if *Aphyosemion* eggs are treated in the same manner as those of *Cynolebias* (that is, by placing them in peat and partly drying out) the incubation period may be greatly prolonged, the eggs only hatching when water is placed upon them (see page 195). This would certainly support the theory were it not for the fact that Dr. Meder's method applies to those species whose incubation period is 12-14 days, as well as to those which have an incubation period of three times as long.

Again the habit of spawning in the mulm is not confined to those species suspected of being annual fish but is encountered throughout the Genus. Thus *A. calabaricus,* whose eggs hatch out in about 14 days, almost invariably spawns in this manner and, even in well-planted tanks, I have often seen *A. australe* and *A. bivittatum bivittatum* behaving in this way. The tendency or habit of spawning in this way and the ability of the eggs to withstand drying out is so widely distributed throughout these species as to suggest that it is not a feature which has been enforced upon the species by environment but rather that it is a legacy from the past; in other words, they are features that have been inherited, to varying degrees, from some common ancestor which lived under such climatic conditions as now do the annual fish of the Argentine. Could it not be, therefore, that these may be inherited factors which, while no longer absolutely essential to the survival of a species, yet serve as a

Another Aphyosemion gem, the Blue Gularis (Aphyosemion cœruleum). *The strikingly marked male is the lower specimen.*

Aphyosemion arnoldi, *one of the less well-known members of the Genus. A pair of the species is shown, the quite unspectacular female being the left-hand fish.*

valuable safety factor allowing the particular species to survive when it occurs in conditions where the waters in which it lives are liable to evaporation? Conditions such as these undoubtedly do occur at times along the margins of streams and rivers which overflow their banks during the heavy rains and leave series of marginal pools.

Conditions in the equatorial rain forests, with their uniformly high temperatures and rainfall, are conducive to very rank and luxuriant plant growth with the result that there is always an abundance of dead organic material and the decay of this produces organic acids. Consequently the water will definitely be of an acid nature and it is also likely to have a low mineral content, although in those pools which tend to dry up, the percentage of inorganic salts will increase with evaporation.

In Terms of Aquarium Procedure

Having considered the natural conditions under which the fish live it now becomes necessary to translate these in terms of aquarium procedure. There appear to be three factors of importance so far as the water is concerned—total mineral content, the percentage of calcium present and the *p*H value. Since water analyses cannot be carried out by the great majority of aquarists and since water provided by the majority of the relevant authorities is effected by the addition of chlorine, etc. which takes place with our domestic supplies, it is desirable to begin our operations with either clean rain or distilled water. At times, water from ponds or streams is recommended but this is of a very variable nature and, because of the difficulty of analysis is, I think, best avoided although in pre-war days I did use water from the peat moors of the North, with very satisfactory results.

Returning to matter of rain water (or alternatively distilled water), to this I add 30 parts per 100,000 of sea salt which is readily obtainable from any chemist. There are various ways of doing this with greater or lesser accuracy but perhaps the simplest, for the average aquarist, is to add one half-ounce of sea salt to every 10 gallons of water. Many German aquarists use five or six times this quantity of salt and one writer states that it stimulates the production of mucus and that this tends to protect the fish from infection, particularly of the gills. He goes on to state, however, that, with an experienced breeder, this quantity of salt is not essential and, whilst I have experimented with the larger quantities, I have had little or no benefit from their use

Since I believe that a low calcium content is advisable with many fish, including the Genus now under review, I advocate the use of silver sand, a good sample of which is almost pure silica and contains little or no calcium. It will, therefore, not affect the water. Many sands, including some samples from the seashore, have a high lime content and are best avoided.

The correct *p*H value is obtained by the addition of two or three handfuls of boiled and well washed peat to the tank after the sand and water have been put in. Some peat is placed in a tin with about its own volume of water and then slowly brought to the boil. It is then placed in a dish which is filled with water and stirred by hand and the water run off. The washing and decanting of the water is repeated until, on ceasing to stir, the peat immediately settles to the bottom leaving clear water above it. This operation removes all the very fine particles of peat and now the water is finally drained away and the peat placed in the aquarium. It should be allowed to stand until a *p*H value of 6.6 or less is obtained; this should be in two or three days when the fish can be introduced to the tank. I have at times,, had species of *Aphyosemion* in water where the *p*H reading was below 5 and found them perfectly happy under these conditions.

Further details of aquaria conditions and information on breeding requirements will be published in the next issue.

Aquatic Plants — "Bacopa"

(Hydrotrida caroliniana)

A COMPLEX confusion of names for the plant most of us are happy to call "Bacopa" has no doubt not assisted in the wider use of this subject for aquarium decoration. Although already employed by many tropical fishkeepers, perhaps its praises have not been sung often enough on account of this nomenclature difficulty. The title accepted for the species we use most often is *Hydrotrida caroliniana*. This classification supersedes *Bacopa amplexicaulis*, *Herpestis amplexicaulis*, *Herpestis caroliniana*, *Monniera amplexicaulis*, *Septilia caroliniana* and *Obolaria caroliniana*, out of which sextet "Bacopa" has been salvaged as the most easily pronounceable name for general use.

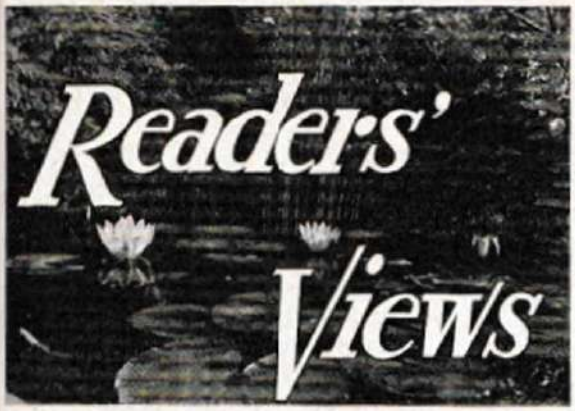
The plant has several points in its favour. First is the ease of propagation from cuttings. Poked into the aquarium gravel these soon root and make good progress throwing out occasional side shoots which, when several inches long, can be removed and themselves used as cuttings.

Boldly Upright

Another of the plant's desirable attributes is its method of growth which is arrestingly perpendicular. Whilst the stems of most water plants curve and twist "Bacopa" stands rigidly to attention—at least so far as its main stem is concerned. For this there must be a reason and it is quite simply that, whilst it grows very well when submerged, it is basically a bog plant and therefore it has a need of a more rigid structure. Its distinctive method of growth makes the plant ideal for modest use in furnished aquaria. A few sprigs positioned with care in front of a well-grown bunch of *Myriophyllum* are familiar to many viewers of competitive furnished aquaria.

Pairs of oval green, fleshy leaves are borne opposite to each other at regular intervals up the stem, each pair being at right-angles to the next. A fact worth noting is that hardly ever do the lower, older leaves show any inclination to decay and fall off. The flowers, blue in colour, are only likely to be produced in shallow water. Fairly strong light is needed to achieve good growth but water condition does not seem to trouble these plants unduly.

The species described here is a native of the southern areas of the United States, where it grows from 6 in. to 2 ft. tall, although some others are of more widespread distribution. In the F.B.A.S. ruling for competitive furnished aquaria these plants are classified for tropical tanks.



The Editor is not responsible for opinions expressed by correspondents

CAR BULBS FOR TANK LIGHTING

SIR,—The series arrangement of 12-volt bulbs connected across the supply mains, described by Mr. J. E. Edwards in the June issue, does not represent a greater safety factor than the usual mains lighting. In fact, it is more dangerous. The contention that a shock from this arrangement would not be lethal is incorrect. The full mains voltage is available to the ends of the bulb chain, and from parts of the chain to earth. As the fittings used are normally insulated for 12 volts only, the risk of shock to earth, especially where used near water, is very great indeed.

The statement that many garages and factories use this system of lighting is again incorrect; low voltage bulbs used in damp or dangerous situations are always supplied at low voltage from a suitable transformer, isolated from the mains. Only if the 12-volt lamps are connected in parallel as Fig. 1, (p. 120) and supplied from a suitable 12-volt transformer (not of the auto type) is the factor safety satisfactory, and risk of a shock truly non-lethal. The total current involved for 20 lamps at 12 volts is 40 amperes for 24-watt bulbs or 60 amperes for 36-watt bulbs. This involves the use of heavy cable for the main busbar connections.

The tanks should always be well earthed. If a mains bulb is connected in series with this earth lead, the tanks are always safe while it is out. Should it light up, an earth is indicated and can be attended to at once before any person handles the faulty tank and risks a shock. I have found this indication of trouble most useful.

Stafford. S. C. FUDGE

(Two other letters have been received on the subject, including one from Mr. C. W. Thomas, author of "Electrical Safety Measures", WATER LIFE, December, 1953, pp. 315-7. We hope to publish them in our next issue.—Ed.)

RAPID GROWTH OF MOOR FRY

SIR,—For a spawning of Moors, a brother to sister cross was used. The pair was selected from a batch of two-year-old fish. They were placed in a 24 × 15 × 12 in. tank and fed plentifully with Earthworms, plus a weekly supply of *Daphnia*. During the time that elapsed before they were ready for spawning another aquarium, 38 × 12 × 12 in. received a rigorous cleaning, all compost being removed. It was refilled with fresh tap water. A few large bunches of cleaned *Myriophyllum* were placed at either end. This tank, accommodated in an outdoor fishhouse, was then left to settle down. On the evening of June 4, four weeks after putting the fish together, the male was seen to be chasing the female somewhat lazily. Both were netted and placed in the larger tank. Spawning took place the next morning. The pair were removed at midday and the water temperature raised from 65 deg. F. to 70 deg. F. by means of a heater and thermostat. On June 10 a large number of fry could be seen adhering to the plants and front glass. Two days later most were free swimming and looking for food.

Whilst conditioning the adults, I had noticed numerous Rotifers attached to the *Daphnia*. It was decided to use these in place of Infusoria. A large net frame was covered with a piece of nylon stocking. This was then partially submerged in the tank of fry. *Daphnia* placed in the net were restricted, while the Rotifers escaped through the fine mesh to form a rusty coloured cloud in the water. On this diet, the youngsters made rapid growth, in fact, I was amazed to find that they were approximately ¼ in. long at the end of the first week. Due to their size it was possible at that early stage to sort them for divided caudal fins. All small and faulty fish rejected; the tank was cleaned out; fresh water was put in at the same temperature and the selected fry returned.

During the next few days, feeding consisted of *Daphnia* and chopped *Enchytræ* (White Worms). Growth continued at a good rate. At this period the water temperature varied between 75 deg. F. and 80 deg. F. Soon it became possible to regrade the fish. This was done on June 27, the fry being about ¼ in. long. By strict culling for size, divided caudal fins and double anals, the number of youngsters was reduced to twenty-four.

Those remaining were placed in an aquarium, 5 ft. × 15 × 12 in. bare of compost and plants. The temperature was controlled at 70 deg. F. In this tank, the rate of growth continues. The diet consists of *Enchytræ*, *Daphnia* and frequent feeds of a mash made from horse meat and porridge, with a little scraped cheese. The young fish simply gorge on this latter food. An occasional Earthworm is also offered. The aquarium water is changed each week, as the water discolours quickly, due to heavy feeding.

At the time of writing (July 12) the fish are five weeks old, ¾ in. to 1 in. long, fairly deep bodied, and two or three have high, rounded backs. Very soon I shall regrade them again and hope to have some good quality show fish left.

Erdington, Birmingham. F. W. ORME

UNUSUAL LOSSES AMONG GOLDFISH

SIR,—The article by Mr. E. E. Dennis in the June issue of WATER LIFE regarding toad tadpoles attacking fish is similar to my own experience, although in my case it was frog tadpoles.

Owing to a temporary shortage of tank space, I placed a London-type Shubunkin in a large earthenware crock which is used to rear frog tadpoles for a livefood supply. On going to the crock 24 hours later to take out the Shubunkin I observed that it was lying in a distressed condition on the surface, with a number of tadpoles attached to it.

Examining it more closely I found that its colours were very pale and that the skin was missing between the bony rays of the dorsal fin and also from part of the pelvic fins. The fish was placed in green water and given extra good food. Although the rays rotted away, they are now growing again. The fish has regained its colour and seems well on the way to recovery.

The moral seems to be, feed fish on tadpoles very sparingly or the tadpoles will feed on the fish.

Reigate, Surrey. W. LEACH,
Show Secretary,
Redhill & District A.S.

FURNISHED AQUARIA AT SHOWS

SIR,—There is a falling-off in entries for furnished aquaria classes at our shows. This is to be regretted, as it is this class which is so attractive to the public and because, since shows are expensive to stage, the hope is for good public support to recover the outlay. This is not being mercenary. It is plain commonsense. There must be several reasons for this falling off. Lack of transport to get the fish, plants, rockwork and compost to the show hall immediately comes to mind; also, the fact that one must be an artist to furnish an aquarium.

I would like to refer to the dissension over the rule that plants must have been in the possession of the exhibitor twenty-eight days prior to the show. What useful purpose does this regulation serve? Our shows are fish shows, not plant shows. The plants are used for decorative purposes, to assist in making the tanks more attractive, so why not allow a keen aquarist to spend a few shillings on some plants, without having to look up the calendar for the date?

I am going to stick my neck out a mile, and possibly some V.I.P. (F.B.A.S.) will behead me, when I ask, should it be felt that relaxation of this rule will give the "millionaire boys" an undue advantage in securing the 25 points allowed for plants, why not cut the number down and give more points for the creative aspect of aquarium furnishing? At the moment only 15 points are allowed for "design and general effect".

It would appear that the standards laid down for furnished aquaria are too much concerned with the quality of the goods employed. At present there are 65 points to be obtained outside the creative side, i.e., fish 25, plants 25, planting 10 and clarity 5, leaving only 35 (itemised) for the all-important design in layout.

Is a great picture judged by the quality of the paint, oils and canvas used? Is great music judged by the quality of the pen and paper used to write the score? Surely success in those fields comes from the fact that the individuals were able to translate

their deepest and innermost feeling on to canvas or paper. Why handicap a keen and conscientious aquarist with a restriction that possibly the not quite so conscientious does not observe? Has it become a habit to insert this 28 days nonsense? Let's scrap the daft restriction.

Harlesden, London, N.W.10.

W. S. L. MELLISH, Chairman, Willesden A.C.

BREEDING NEONS IS SO EASY!

SIR,—I am certain the following will be of interest to tropical fish breeders. I read quite a lot about Neon Tetras and have presumed they are very difficult to breed but a friend of mine, a Mr. J. Hammond of Handsworth (just a beginner but with a fancy for all kinds, cold and tropical) has a greenhouse containing about twenty-five tanks. These tanks contain a mixed variety of such tropicals as Angels, Swords., Rosy Barbs, Mouthbreeders, etc. Hitherto, he has not done any breeding other than with the common livebearers.

A short while ago he asked me to go and check on some young tropicals. To my surprise I found on arriving at his place that he had bred Neons under what I consider were impossible conditions. Inside the 24 in. tank were a pair of Neon Tetras, one full-size Rosy Barb and about twenty young Mouthbreeders a fortnight old. I also counted half-a-dozen young Neons just showing their colour. The tank has a very large number of snails. The water has not been touched for about six months and the space is crammed with Lesser Bladderwort which I always understood was detrimental to the rearing of young fry. I agree it wants seeing to be believed but here is a case of Neon breeding that would seem to upset all existing theories.

Sheffield, 9 J. R. TINGLE

COMPROMISE OR CHAOS?

SIR,—I find it most encouraging to realise that the Goldfish is gaining popularity at the rate it so obviously is and I should like to thank WATER LIFE, on behalf of many aquarists in this area for playing a prominent part in encouraging the keeping and breeding of varieties of this fish.

I feel, however, that I must reply to Mr. Webley's letter in the June issue. We must, of course, agree with him that chaos truly does exist with regard to various Goldfish standards but this state of affairs has been with us for some time now. Whilst it is pleasing to note that Nottingham A.S. have promoted a specialist section, how many judges do the society purpose to engage? One for G.S.G.B. types, one for fish conforming to F.B.A.S. standards, and one for the latest Bristol Shubunkins? Why should the Goldfish Society of Great Britain drop the Singletail? This variety had the same care and thoroughness devoted to it when the standards were being compiled as the other Goldfish varieties.

The Bristol Shubunkin (F.B.A.S. or Bristol A.S. type) is just as out of harmony to the Singletail as the Veiltail is to the Twintail, and so on. It may be appropriate to note here that the G.S.G.B. entries of Singletails still gain a handsome number of premier awards although they have to compete in a class for Bristol Shubunkins. It may not be out of the way to mention that the G.S.G.B. Singletail standard was arrived at from an actual fish which gained a premier award at a Bristol A.S. show. I seem to remember Mr. R. J. Affleck offering some reward to be given to charity if any fishkeeper in the country could produce such a fish as the Bristol-type Shubunkin (in any group) and as far as I am aware the challenge has never been accepted, so are we not "witch hunting" when trying to produce Bristol types that breed true?

Mr. Webley goes on to say that it would be interesting to be advised of the number of Goldfish breeders who are seriously trying to breed the tri-coloured metallic Singletails. Let me try and explain why the N.W. branch of the G.S.G.B. have not yet got down to this work. I think it may account for the position of other breeders as well. The G.S.G.B., through its technical director, Mr. E. G. Weatherley, has produced a breeding chart, its aim being to produce a good percentage of well-coloured Nacreous fish. This breeding scheme takes a number of years to achieve and as yet we in the North have not reached our goal. I think it will be appreciated that we are concentrating on the Nacreous type first as it is without doubt the most beautiful of the three groups.

Another most vital reason why the Singletail (in all three groups) must stay is that we believe that to produce Nacreous fish in both quality and quantity, the Metallic × Matt types must be used. It follows then that the Metallic fish must be of the same physical proportions as the Matt to produce like in the Nacreous and here again the pointing system of the present F.B.A.S. is out of harmony with this scheme (along with the other Goldfish varieties). If we are crossing any of the three groups, and I think that a great number of us, particularly those with ponds where controlled breeding is almost impossible, are so doing, what must we expect if we have, say, a Metallic male running with a Nacreous female?

The pointing for the four G.S.G.B. basic varieties is the same for each and for all groups, the only two qualifications being the manner in which the 19 points for colour are sub-divided for the Metallics and Nacreous groups and the allocation of points for the special characteristics of each variety. If we are going to allocate more points for colour, then the body shape and finnage is going to suffer. In the case of the F.B.A.S. Veiltail, there is a considerable difference of pointing between the colour and body shape of the Metallic (Scaled) and the Nacreous (Calico) and yet they are merely different groups of the same variety.

If we breed for body shape in one group and colour in another group we will finish up with two differently shaped fish and so are going to get nowhere. I wish Nottingham A.S. specialist branch every success but it must not think of dropping the Singletail.

Maghull, Lancs.

A. R. THOMPSON, N.W. Branch Secretary, G.S.G.B.

LAND AND WATER TORTOISES

SIR,—You were right in allowing Mrs. Monica Green to contribute her letter to your last issue on the above subject as her views and ideas were worth publishing. I now take advantage of your offer to let me reply to the points at issue. As you stated correctly in your footnote, when I revised the WATER LIFE book, "Land and Water Tortoises", I endeavoured to retain the style and character adopted by the deceased author, "Amphibius".

Mrs. Green says that the European Pond Tortoise (*Emys orbicularis*) can be kept indoors. That is a matter of opinion. Mrs. Green knows that I am a keen "outdoor" man, and like to hibernate my stock wherever this forms part of their natural lives. It makes for hardier pets. In this I have followed the views of "Amphibius". Turning to the illustration which is said to be (probably) *Pelusios sub-niger*, if I remember correctly this was a photograph from the library of the Zoological Society of London and they named it. This could do with a further check from their records In any case, identity of many terrapins from photographs is not easy.

Your correspondent takes me to task over the statement on conditions under which eggs will hatch. This is all part of the original material by "Amphibius", left more or less as he wrote it. Mrs. Green's note is certainly a valuable one, especially as she has bred this species, and worth recording. The observations on the hibernation of American Terrapins referred to on p.20 of the book are interesting. Here again we have a controversy—to hibernate or not to hibernate. I favour it, as did "Amphibius" (see also Hibernation pp.26-27, and p.28, para. 4).

I agree that since the war, the commonest Terrapin is the Elegant, whereas in the days of "Amphibius" it was the Painted Terrapin (*Chrysemys picta*). I also agree that the Generic name of the last three species mentioned on p.23 has been now altered to *Pelusios* from *Sternotherus*, although these terrapins are still popularly known as "Sternotheres".

Mrs. Green's seventh point is most useful. I have not kept the species mentioned so had to abide by what the author wrote. So far as her next, on hibernation, is concerned I have already said that this is a controversial subject, and I think can best be regarded as a matter of opinion.

My experience is that the Mississippi Map Terrapin is about as hardy as the others but I appreciate that Mrs. Green has had more experience in rearing these baby terrapins which gives weight to her contention. It would be interesting to have the opinion of others who have kept different American species.

Finally, Mrs. Green states that the caption to the photograph on page 29 is incorrect. I would say that baby terrapins are not easy to identify, especially from photographs, and would add that while Mrs. Green's method of telling the difference between the two species *Graptemys pseudographica* and *G. geographica* is useful it is not infallible.

Wanstead, London, E.11.

ALFRED G. LEUTSCHER

(Pressure on space has made it necessary to withhold a number of interesting letters. Included is one from Dr. E. Trewavas, Zoological Dept. (Fish), British Museum (Natural History), in reply to Mr. J. Brunning's comments on the models of Goldfish displayed at the Museum.—Ed.)

German Breeding Methods

Some of the More Difficult Characins

Hyphessobrycon ornatus and H. rosaceus are two further "problem fishes" with which German breeders have had repeated successes. It is therefore interesting to study some of their methods as revealed in the German booklets entitled ZÜCHTERKNIFFE.

These and similar species are natives of the Amazon basin and of British Guiana where they are mainly found in the savannah creeks and small streams which are fully exposed to the hot sunshine as the low growth on the banks gives little or no shade. Consequently these Hyphessobrycons require water conditions similar to their natural habitat, *i.e.* soft—even very soft—water and high temperatures, and will look their very best when given such conditions.

For breeding purposes it is best to choose a relatively large framed tank, say 20 × 12 × 10 inches or more. Scrupulous cleanliness of tank, gravel and plants is of the greatest importance for any success in a breeding attempt. The gravel ought to be boiled

Photograph] [G. J. M. Timmerman

Superbly-developed pair of Hyphessobrycon rosaceus. *Male is the upper fish.*

before use. The tank is filled with water consisting of equal parts of rain and distilled fresh water to which is added a bare teaspoonful of cooking salt to every two gallons of water. After the introduction of gravel and water the tank is left to mature for 8 days. It can then be planted, and the authors recommend the following plants:- some Water Fern in the corners, bushy *Myriophyllum* in the centre and the whole of the background darkened with *Cryptocoryne ciliata*. Floating Fern ought to cover the surface. All plants should be sterilised before being used.

The position of the tank should be chosen so that some early morning sun can penetrate through the row of Cryptocorynes but for most of the time it should be rather dark.

At a temperature of over 80 deg. F. the breeding pair can be introduced. The fishes ought to be at least 2 years old. As spawning will not begin until the fish have settled down for a few days, regular feeding will be necessary. For this a small amount of well-washed *Daphnia* or White Worms are the best choice. Under no circumstances should any snails be in the breeding tank.

As all Hyphessobrycons are avid egg-caters the parent fishes will have to be removed after the spawning is completed. The tank should now be darkened with layers of newspaper.

Hatching and rearing of the fry is similar to that of Flame Fish. The eggs hatch in 36 hours when the fry can be seen hanging on plants and glass. They become free swimming after five days and from then on they have to be provided with a good supply of Infusoria and nauplii. A hatching of several hundred fishes is not exceptional.

Hyphessobrycon heterorhabdus This species will thrive and breed under very much the same conditions as those described for *H. ornatus*, the main differences are that the water should be still softer, if possible. The authors also prefer an all-glass tank for this species. Sexing of *Hyphessobrycon heterorhabdus* is possible at a very early age, when it can be seen that the black band of the male is much narrower than that of the female, say about two-thirds of the width.

Pristella riddlei. This is another problem fish among the Characins. The requirements for breeding are:- An all glass tank, thoroughly cleaned, fresh rain water which has stood for eight days and some sterilised spawning plants, preferably *Myriophyllum*. The matured water is put into the tank and a few crystals of potassium permanganate are added, just sufficient to give the water a slightly pinkish hue. This will not only prevent the formation of any bacteria but has also proved itself to be highly inducive to a spawning.

The spawning medium should be weighted down with a clean glass rod. The tank ought to be in a well-lit position though not exposed to direct sunlight. As with all Characins the parents will have to be removed immediately they have completed the spawning. The tank should then be well covered up with paper and left for three days in darkness, after which time the fry can be seen hanging on the plants. At this early stage temperature of the tank has to be kept even as the fry are particularly sensitive to changes in temperature.

Feeding ought to start with small nauplii but great care must be taken not to give more than will be consumed readily.

Photograph] [G. J. M. Timmerman

X-ray Tetras (Pristella riddlei). *The caudal fin is reddish and the body is translucent.*

Any growing *Cyclops* might easily prove fatal to the rather slow developing fry.

Finally it may be mentioned as a peculiarity of *Pristella riddlei* that the young fish stop growing after about 12 weeks when they will stay stationary for about six months before recommencing to grow to their full size of 1¾ in. Consequently *Pristella riddlei* ought not be used for any breeding attempts until well into their second year.

Chelsea Show

THE Chelsea Show, an event which always ranks high in the estimation of horticulturists and amateur gardeners, was staged once more this year in the grounds of the Royal Hospital, Chelsea, London. An interesting facet of the show is the outdoor water-gardens created within a fortnight by many of the country's leading landscape gardeners. Formal and informal, they form focal points for all pond-owners.

The Show is always patronised by Royal visitors and among those present this year were H.M. The Queen Mother and H.R.H. Princess Margaret seen, left, beside the pool in Messrs. Robinson's Gardens Ltd. formal garden. Above: the rock garden of Mr. George Whitelegg with pools and miniature waterfalls. Besides the several diverse water gardens Messrs. Perry's Hardy Plant Farm had a magnificent marquee display.

Photographs by P.N.A. and WATER LIFE.

In and Around the Aquaria World

— By W. J. Page —

PUBLIC aquaria on the South Coast are not very many. There is the old-established one at Brighton, another at Hastings, one at Southsea and those at Paignton and Plymouth. In the not very distant future, Eastbourne comes into the picture. The general manager of the Entertainments Department of the Corporation has been asked to report on the suggestion that the Corporation should construct one. Let us hope that if the idea comes to fruition there will be special facilities for the serious student to examine the fishes on view as well as the normal opportunities to be given to the public.

* * *

WHEN referring in the April, 1954, issue to the proposed public aquarium at Durban, South Africa, I did an injustice to the President of the South African Association for Marine Biological Research by describing him as Mr. instead of Dr. G. G. Campbell. His degrees, in medicine and surgery, were taken at Edinburgh. Dr. Campbell recently travelled from Natal to Britain to receive the honorary degree of Doctor of Laws from his Alma Mater.

A colleague of his, Mr. K. B. Challinor, sends me more news of the project. Funds are being raised and it is intended to start building operations soon. Research in the extensive Indo-Pacific area can contribute much to our knowledge of marine biology and oceanography. The choice of Durban as the centre is a most suitable one. The actual site is almost on the shore of the wide bay swept by the white-capped rollers of the Indian Ocean.

The scheme has the backing of the Administrator of Natal and the research station, of which the aquarium will form an integral part, will have a programme that includes the collection of information on fishes that have food value.

For aquarists, the aquarium will be of considerable interest for tropical as well as temperate marine species will be featured.

* * *

LAST year, the National Aquarists' Society were unlucky, Coronation celebrations forming—contrary to general expectations—a counter-attraction rather than a boost to their annual exhibition and this year, although attendance was appreciably better, the total number of visitors was undoubtedly affected by the atrocious weather. With all the hard work put in by members of the Council and their small band of helpers, it was a pity things seemed against them. The daily papers seized on an exaggerated report about leaky tanks and so some undeserved adverse publicity was given to this important event.

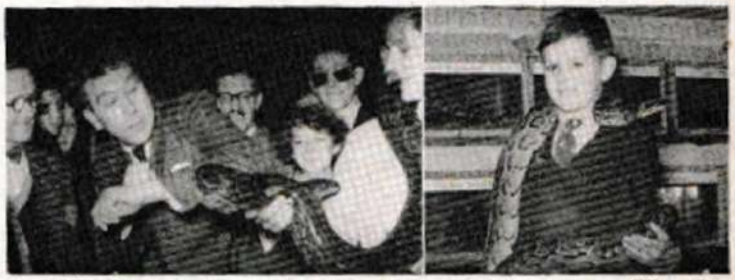
Certainly the percentage of leaks was high when the show was being set up but thanks to a herculean all-night effort by a team of enthusiasts, the show opened to time and there was little if any evidence of the water which seemed to be everywhere, less than twenty-four hours previously.

The opening ceremony was performed by Frankie Howerd, familiar to many as a B.B.C. and stage star. His short speech before the microphone, punctuated with some of his stock asides, which were expected, and further enlivened by his antics and his rapidly changing facial expressions, made everyone forget the preparatory troubles. But why did promotors permit a goldfish *bowl* to be presented to him? The pretty little girl chosen to hand it to him was too small to be seen and could not be heard and "Not on your Nellie" Francis did not know what to do with the round glass container. However, be that as it may, it was the comedian's next unrehearsed activity that caused most amusement. Obviously allergic in the extreme to snakes, he resisted all efforts made to get him to hold the specimens belonging to members of the British Herpetological Society. His natural clowning and undisguised apprehension combined to reduce the onlookers to fits of laughter. The photographs on this page, one of which shows his attempt to escape the attentions of one of the reptiles, puts him in a poor light compared with young David Odams, son of the society's treasurer.

In order to encourage catalogue sales, the names of exhibits were not shown on the tanks. This was a mistake, in my opinion, since it must be remembered that the public paid for admission and they look for some guide as to what they are seeing. Leave off the exhibitors' names by all means but not the common or scientific names of the contents of the tanks. It was this simple omission which, to my way of thinking, gave the air of a show for the know-alls only, not an exhibition to be enjoyed as much by the man-in-the-street as by the expert. It would not have been so bad had the catalogue been accurate. In some places it was misleading.

I should explain that these inaccuracies were not the fault of the competition secretary but his misfortune for there were those exhibitors who omitted to state on the entry forms the species they were intending to show, those who gave wrong names to their fish, those who substituted different specimens for those originally entered but did not notify the secretary of the change and, worst of all, so far as the behind-the-scenes paper work was concerned, those who, given consecutive numbers in a class for their exhibits failed to keep to the same order when staging them. In more than one instance, this necessitated the scrapping of signed prize cards and the preparation of others in their place. This sort of thing is by no means confined to the N.A.S. and other show secretaries may be glad to have the attention of exhibitors drawn to shortcomings which make show organisers go thin on top and exasperate those who have bought a catalogue after paying for admission. It is the show, not the offending exhibitor, that gets the bad name.

Among well-known aquarists who attended were quite a number from distant places and on the Saturday morning large contingents from the provinces were noted. Many of them disappeared during the afternoon to attend either the Assembly of the Federation of British Aquatic Societies or the A.G.M. of the Goldfish Society of Great Britain, only to come back again for the last hour or so before the show closed. There was quite an international flavour, too, for there were American, Continental and Asian visitors, including Mr. Henry A. Nichols of Santa Ana, California, Mr. C. O. Ericson of Sweden and Mr. H. B. de Silva of Ceylon.



Photograph] [WATER LIFE

Even the calm confidence of Mrs. M. Green, secretary of the London Group of the British Herpetological Society, cannot convince Frankie Howerd that the snakes at the N.A.S. Show were tame! David Odams thinks different as he readily lets one coil round him.

IT was a pleasure to renew my acquaintance with Mr. Nichols, while he was over here from America. Following his visit to the N.A.S. Show, he spent some days up in Lincolnshire, then went across to Holland, coming back to England before leaving again for America on July 11, via Canada.

Mr. Nichols, formerly assistant editor of "The Aquarium", is a knowledgeable aquarist and, by profession, a keen journalist who makes light of his troubles despite poor eyesight. He now has to have special binocular type spectacles for reading and writing, but despite the drawback he travels widely, types out reams of "copy" on a portable typewriter and finds it possible to pick out with accuracy the finer points of fishes. After leaving Philadelphia, in the east, he has been living for some time in California on the west coast and now hopes to take up residence in South Carolina. I learned over the lunch table that he is grateful to his hosts in Peterborough and London who accommodated him, including Mr. R. Whitehead of Whittlesey and Mr. R. W. Andrews of Harringay.

* * *

I WENT to an undertaker's premises in Fulham Road, London, S.W., the other day, not as cold customer (!), but as a visitor to Mr. H. Duncan, the chairman of Chelsea A.S. He showed me a novel idea for staging fish for table shows. Space permitting, the simple apparatus will be described in the next issue. Mr. Duncan has two ranges of tanks set up in recesses in his lounge with polished wood facias

that give a pleasing and neat finish. In the dining room he showed me another tank which has a movable surround made for him by a friend. No ordinary wooden framework, it is intricately carved with fishes in relief round the top and with an appropriate phrase from the Bible carved round the bottom edging.

* * *

REFERENCE was made in the last issue to the meeting held after the 1954 WATER LIFE Show by the Aquaria Section Committee of the National Exhibition of Cage Birds and Aquaria. This was followed by another meeting of that committee on June 16.

Shortly afterwards (July 1), the main show committee met at the Cafe Royal in London's famous Regent Street, under the chairmanship of Mr. F. W. Batchelor. He deputised for Sir Richard Haddon who looked in for a short while against doctor's orders. Sir Richard was taken ill in January, at the time of the last Show, and the trouble proved persistent. A sea voyage to South Africa and back helped in his recovery but for the time being he has to cut down engagements.

The committee examined the balance sheet of the 1954 event, which shows a surplus of £348 7s. 3d., after a turnover of more than £8,200, and discussed the allocation of that money. A review of the last event, including the aquaria section, was followed by suggestions for the next, which is to take place on January 6, 7 and 8, 1955, in the National Hall, Olympia. This time, it is proposed to stage the aquaria section in the gallery where there will be more space. A better show than ever should result.

* * *

HENDON A.S. is one of those societies that has been able to enjoy show promotion in conjunction with exhibitions sponsored by the local civic authorities. This year the event was brought forward from August to June, not that that meant any change from the inclement weather that always seems in vogue when this particular show is held.

The aquaria show was well staged and, after I had spent ten minutes gazing at scantily clad trapeze artistes risking their necks in the open-air (last year it was the Dagenham Girl Pipers that held my initial attention) I made my way to the tent where Mr. and Mrs. Skipper and their fellow members had set up a remarkably good display.

Since Hendon had to alter their plans to fit in with the new date of the Borough Show they are to hold a second event, this time for individual fishes, on August 6 and 7. Am I right in thinking that they are going to be embarrassed by the number of entries they receive?

* * *

SINCE we had to go through Staines on the way to Bagshot one Sunday in July, my colleague, Mr. C. W. Brown (Advertisement Manager of WATER LIFE) agreed that we should "kill two birds with one stone" by calling in at Wraysbury on the outward journey. Our object was to see the progress made on the new extension of Queensborough Fisheries and it was not a wasted detour.

Mr. A. Rous, who has hitherto concentrated on his Shepherds Bush branch, and his Picton Place manager, Mr. D. Larkin, helped by other members of the staff and friends, were working hard converting the property. Already two large fishhouses were nearing completion. When the time comes, I must review this establishment for it promises to develop into more than a branch of a flourishing business. It will be a place which clubs will want to visit. A whole day's outing could easily be arranged, part spent in seeing the fish and, for garden lovers, in inspecting the flowers and part in bathing in, boating on, or walking along the banks of the nearby Thames.

From Wraysbury, we drove back to Staines and, after rejoining the A30 road, soon reached Bagshot, passing Virginia Water on our right. Our destination was the cafe at the junction of the Southampton and Basingstoke roads, owned by Mr. H. G Rundle, one of the hobby's most jovial participants. A report of the gathering appears on page 201. Fine weather, pleasant surroundings and good hospitality contributed to the success of a party of aquarists from a wide area, long visualised by our genial host.

* * *

A PROMISE made as far back as two or three years ago, was met at last when I went down south one day in July to spend a few hours at Southampton A.S. Open Show. A warm welcome was given me by Mr. and Mrs. M. Y. Davidson, the chairman and his wife, by Mr. E. C. Golesworthy, show secretary, and Mrs.

The President, Mr. R. J. Stranger, C.B.E., M.C., (centre), presents the F.B.A.S. Shield to Mr. D. S. Paul at Southampton A.S. show. Also in the picture is Mr. M. Y. Davidson, Southampton society chairman.

Golesworthy and by Mr. H. J. Gilbert, the society's secretary.

Geographically, Southampton is favourably placed for it gets support from Bournemouth in the west, Portsmouth to the east and, inland, not only Winchester but as far away as Basingstoke and Farnham. There were good entries in all classes and, as at other shows, the breeders' section drew some well-matched teams.

Two fish that particularly caught my eye were the colourful marine Scorpion Fish (*Pterois volitans*), a non-competitive exhibit, and the red-orange hued young *Trichogaster leeri* in the Labyrinth Class. This latter fish was typical in shape but so unlike the usual Pearl Gouramies in colour that it stood out a mile. The owner hopes to breed from it but whether he gets a strain of *T. leeri* var. *auratus* (or *rubra*) remains to be seen.

A glimpse was caught of Dr. R. C. C. Clay who exhibited in the amphibian and reptile section. He came over from Fovant, some miles away, and was busy answering questions about the white and normal (black) Axolotls on view. The fact that he was sporting a steward's badge was due to Mrs. Golesworthy, who roped him in to help while he was at the show.

While at Southampton, I learned that Mr. Golesworthy had visited Mr. [illegible] Meadows, of Enterprise A.S. and an F.B.A.S. judge, now in Barnet Hospital nursing a broken leg. The Golesworthys are great friends of Mr. and Mrs. Meadows and often stay with them when visiting shows in London. "Pop" Meadows, a master builder, had the misfortune to meet with his accident whilst at work. The latest report is that he is cheerful though naturally despondent at the thought of a three-months stay in bed.

* * *

ANOTHER broken leg is reported, this time from Redhill A.S., the victim being Mr. J. O. Edwards, the club secretary. He was all right when I was with him at the society's annual dinner but on July 9 when I went down to give a talk to the society, he was getting around with a pair of crutches. Although he doesn't do so physically, he is, metaphorically, kicking himself. An insurance agent by profession, he has sold many personal accident policies but had not taken out one for himself!

Before going into Redhill for the meeting I was first entertained by Mr. W. Williams, the chairman, who has a well-filled fishroom behind his house at Reigate with, adjacent to it, an aviary where budgerigars are being bred. The youngest member of the family, still a toddler, is following the family tradition of wanting to keep live creatures for he likes to feed the half-a-dozen tortoises that roam the garden at will.

In one tank, three male and six or seven female Dwarf Gouramies were living contentedly but only because of an understanding reached—a gentleman's agreement, so to speak. Each male guarded a surface nest, one to the left, one to the right and one in the middle. So long as each kept to his chosen third of the tank all was peaceful, but as soon as one invaded another's territory he was sent packing about his own business back to the nest he had built. The males had to restrict their excursions amongst the plants but the females enjoyed unlimited movement. Was I seeing things? It seemed that one not so demure member of the fairer sex was deliberately enticing first one and then another of the males into the next gentleman's territory, then retiring to watch with some amusement as the occupier attacked the intruder until he made an undignified withdrawal to his own domain.

* * *

THE article by Mr. N. E. Perkins on page 173 should be read in conjunction with the notes on Goldfish standards on page 202. A contribution by Mr. Affleck scheduled for the next issue will prove an interesting follow-up. Bristol A.S., who now come to the fore in regard to revising or merging the different standards now recognised, has made an interesting move in connection with its next open show. In the past, accepted judges (usually from the F.B.A.S. panel) have been engaged for the coldwater classes. This time the awards will be placed by a panel of members (Messrs. Paul, Coombs, Jones, Davies, Rudge and Grimston). The tropical classes are to be judged by Mr. W. L. Mandeville of Birmingham. Since Bristol attracts numerous coldwater entries from as far away as London and the Midlands it will be worth while watching the results of the experiment. Will there be as big an entry as usual and will the awards meet with general approval?

Aquatic Press Topics ***By L. W. Ashdown***

Flying Fox Becomes a Pal

Photographs] [*G. J. M. Timmerman and G. Wolfsheimer*

Left, Flying Fox or Pal (Epalzeorhynchus kallopterus). *Above, the sex-changed Guppy described by Mr. Wolfsheimer. The fish retained its olive body colour*

A TOOTHSOME name of *Epalzeorhynchus kallopterus* is something of an encumbrance for any fish but when it has an appearance and habits that make it a fine fellow for the fish tank then something has to be done about it. British aquarists got over the difficulty quite well by tagging the fish, Flying Fox. Fishy men in the States have seen species for the first time this year and Mr. Wm. T. Innes, writing in THE AQUARIUM, also found himself confronted with the polysyllabic scientific name and suggests Pal as a suitable popular appellation. Certainly it is a jolly fellow, dashing here and there with glorious abandon. His streamlined body seems intended for hasty movement. Colouring is striking. A bold black lateral stripe runs from the snout, through the eye, and along the body to the tail fin fork. The back is dark but between it and the lateral stripe is a line of brilliant gold. Underparts are white. Erect fins, particularly the dorsal, anal and pelvics, show a distinct black mark but are not averse to a smattering of red for good measure. Specimens seen in this country have not exceeded 5 in.—quite large enough for the average-sized aquarium.

GENE Wolfsheimer, California (U.S.A.), brings the subject of sex-change in Guppies a stage further. Remember it started here in our April-May issue when Orange Free State scientists said mature females had changed to males, male colouring developing as well as anal fin modification. Mr. W. G. Phillips (Kenton, Middx.) came forward for the June number and suggested that these so-called females were nothing more than late maturing males—an idea to which I subscribed. Mr. Phillips said "a 'revert' Guppy (female to male) only shows the change by the presence of a gonopodium and never shows any of the colours associated with the male Guppy".

The fish which Mr. Wolfsheimer photographed, and which is shown here, was bred by Mr. W. Hildemann at the University of California. After giving birth to young she changed sex slowly and developed a gonopodium. "She did *not* take on the colours of a male Guppy", says Mr. Wolfsheimer. "Her normal olive colour remained with yellowish dorsal and caudal". This fish at least agrees with the idea of Mr. Phillips and adds further weight to his reply to the South African scientists who had their findings published in NATURE (G.B.).

The Hildemann fish seems worthy of entry on the longevity roll suggested in the last issue, for Mr. Hildemann and Mr. Wolfsheimer worked out the age of the Guppy to be over 3½ years when it died recently.

MR. A. J. HOLLOWAY (London, E.13) secretary of the Guppy Federation and well-known exhibitor in A.O.S. Livebearer classes, has also written to let me know that he and his wife had a female Yellow Wagtail Platy which reached the ripe age of 4 years 2 months before dying in June of this year. It seems that this ability for long life might have been a brood characteristic for the Lemon Wag.'s sisters also lived for about 3½ years. In addition a female Mosquito Fish (*Heterandria formosa*) still swims in the Holloways' aquaria, although 4 years old. Can you beat it?

From Continental Journals ***By H. O. Munro***

Transporting Semi-dried Fish Eggs

IN the May issue of DIE AQUARIEN-UND TERRARIEN ZEITSCHRIFT (DATZ) Dr. E. Meder points out the possibilities of transporting fish eggs of certain species in a semi-dry state which, if successful, should make importation of some tropical fish very much easier. In particular the eggs of the Egglaying Tooth-carps are suitable, both those which deposit their eggs in the ground and those whose eggs are attached to plants, etc. The eggs of fish such as *Cynolebias*, *Aphyosemion*, *Rivulus*, *Panchax*, *Aplocheilichthys* and *Epiplatys* species can endure considerable periods in a semi-dry state. In this state their hatching is considerably prolonged beyond the usual period. According to Dr. Meder the eggs of the above-mentioned fishes can be mixed with almost dry peat and can then be despatched wrapped in cellophane bags. He suggests the following procedure: Peat is boiled and then soaked in hard water. A ½ in. layer of the peat, so prepared, is used as a bottom layer in a breeding tank. After the fish have deposited their eggs in the peat the water is removed and the wet peat left in glass dishes for some 20 days at a temperature of 65 to 68 deg. F. After this period the peat is put into a fine net and carefully squeezed dry. The peat is then returned to the glass dishes, loosened and left for another two to three days in temperatures up to 77 deg. F. until it is almost dry. Then the peat containing the eggs is ready for putting into cellophane bags for despatch. It is important to mark on the labels of the bags the earliest natural hatching date which, according to Dr. Meder, is sometimes 50 days after spawning. An addition of soft water will encourage the eggs to hatch. If the eggs are brought on to hatch prematurely this will result in weakness and malformation of the fish. On the other hand it will do no harm to exceed the natural hatching period by many weeks.

With those Tooth-carps which attach their eggs to plants and other objects the procedure will be slightly different. The eggs have to be removed carefully and put into a glass dish and left in soft water for 8 to 10 days. Then they are mixed with moist peat and left to dry as described above. The eggs are then ready for despatch. As, by then, the minimum hatching period for these fish—usually only two weeks—has been exceeded the eggs can be safely hatched at any time. This is again done by the addition of suitable soft water at the correct temperature for each species.

If this method of preserving and transporting fish eggs is as successful as the author claims it should certainly open new possibilities for the cheap importation of all types of Egglaying Tooth-carps amongst which we find some of the most beautiful and interesting tropical species.

As an afterthought, in the July issue of DATZ, Dr. Meder suggests this method of conserving eggs of the Egglaying Tooth-carps as a suitable way of "bottling fish alive" as the eggs can be kept for long periods without taking up much space. Hatching can be brought about at almost any time desirable and convenient.

WITH aquarists once again collecting *Daphnia* from natural ponds there is the possibility that *Hydra* may be accidentally introduced into tanks. In a club notice appearing in the April issue of the DATZ I found an original idea for eliminating this pest. The aquarist in question, whose tank was absolutely alive with *Hydra*, connected copper wires to the two poles of an ordinary torch battery and by putting the open ends of the wires into his tank, electrocuted the pests very rapidly. He does not report whether any fish were in the tank during the treatment.

News from the North-west *By "Aquaticus"*

Reptile Escapees in the Liverpool Area

SUMMER is the period for societies' outings, and, even if there has been plenty of water about this season, there have been some interesting trips. Last Summer I mentioned finding some of the interesting aquatic plants growing on the bed of Llyn Idwal in Snowdonia. This Summer we visited another high tarn in the North Wales mountains which should interest the aquarist.

Ffynnon Glas, the larger of the two lakes in Cwm Glas above the Llanberis Pass, is 2,500 feet or more high but even at this height Common Newts, frogs and mayflies were breeding in its waters, while growing on the bed of the Llyn or Lake were such interesting aquatic plants as Water Lobelia, Water Starwort and Quillwort.

I was asked recently about the status of the Least Water-parsnip, or Marshwort, *Apium inundatum*, in Cheshire, because of the impression being given by some people who found it in a pond in the Weaver valley at Dutton that it was rare. Although not so often seen as the larger Common or Procumbent Marshwort, or its other relative, the Wild Celery, it is far from rare in ponds and ditches, including Frodsham marshes, Willaston, etc., but it is often overlooked if it is half-submerged, for it also "creeps "along the mud.

Snakes in the Streets

Following the increased number of Grass Snakes offered in the dealers' shops, there has been an increase in the number of escapees in and about the towns. As many as six have been found in Liverpool streets this Summer, all of the Continental forms with their characteristic longitudinal lines down the body. I do not think many amateur herpetologists appreciate how small a hole a snake can squeeze through. At Salisbury Street School, in the heart of Liverpool, I was shown an astonishingly small crack-hole in a glass vivarium through which the snake had squeezed by flattening itself almost like a postage stamp. Fortunately the escaped snake was later found curled up in the same store-room but it was a long time before it was appreciated that its liberty was not due to the children, so tiny was the hole through which you would not even attempt to push a pencil.

Despite its situation in one of the most congested parts of Liverpool, miles from open country, Salisbury Street School's nature study room had a very praiseworthy show for its recent "parents' day". This is due to the efforts of one of the staff, Mr. W. J. Thornley, a keen aquarist, who has instilled a great enthusiasm for the subject amongst the children to whom he came from Peterborough, where he learned his hobby. Not only has he six tanks of coldwater fish and pond life, two new tropical tanks with Guppies, etc., and two vivaria, but small aviaries, rabbit hutches, guinea-pigs and a wild flower table in his nature study room. To this, he aspires to add an observation bee-hive. Outdoors at week-ends, he takes the children pond-hunting in the Cheshire countryside at Thurstaston, from which they have already added carp, newts, and other inmates to their tanks.

Restricted Habitat

A query which has arisen is whether or not the Smooth Snake (*Coronella austriaca*) inhabits the west Lancashire dunes, and has been overlooked. This suggestion has been made by a well-known Westmorland naturalist on the assumption that because the Sand Lizard is still well established there at Ainsdale, and it forms the chief prey of the Smooth Snake on its Dorset-Hants heaths, "a close look-out should be kept for the Smooth Snake". After a life-long experience of these dunes I can say there are no snakes there at all, excepting any escaped pets. As the nature notes in the Lancashire County Handbook and the Southport Handbook point out, there are Common and Sand Lizards, Natterjack and Common Toads, and Common Newts in the Ainsdale area of what is the largest continuous track of sandhills left in England. There are only two wild snakes in Lancashire—Adders on the northern moors (they used to dwell as far south as Simonswood Moss but have long been exterminated from there) and Grass Snakes in the damper river valleys. Native Grass Snakes are very rare in south Lancashire where most of the reports are of the escaped Continental varieties.

There are many comprehensive natural history societies which include a group of aquaria enthusiasts to whom a section of the society activities is devoted. Sooner or later, however, the section is bound to feel the desire for independence, especially if its specialist members increase in numbers. They find that only a portion of the time is devoted to their interests whereas an independent society could give them full-time attention, and perhaps more value for their subscription and their interest. This is particularly so where people are essentially fishkeepers rather than field-naturalists, for not everything in natural history, or in pond-life, is so frightfully interesting as its publicists would have us believe!

Last year I mentioned the activities of the aquaria section of the 57-year-old Preston Scientific Society. This has now broken up and no longer has any connection with the Preston Scientific Society, and a new aquaria society has been formed in the town. There have been several changes in Preston lately. After a brief career, the Preston Natural History Society, formed the other year with over 100 members, but soon falling to 60-odd and then being unable to form a committee, has amalgamated with the Scientific Society.

This is not, of course, the first time Preston aquarists have been independent. At one time Preston boasted no less than four or five aquaria societies! The present move started in March when the aquarist group organised within the Preston Scientific Society by Mrs. B. R. Mills, of Ashton-on-Ribble, decided it was strong enough to launch out on its own account. "We therefore formed a new society in the town," Mrs. Mills told me, "which has been founded primarily for aquarists and is, we feel, more in keeping with the size of the town." The Preston and District Aquatic Society, as the new body is named, is now believed to be the only aquarium society in this town of about 120,000 people. It is affiliated to the F.N.A.S., and meets on the first Thursday evening of each month in Grimshaw Street Hall. Its chairman is Mr. L. K. Gaunt, and its vice-chairman is Mrs. M. Thompson of Ashton (who, like Mr. G. E. Bowman, a committee member, has been active with former Preston aquarium societies). Mr. A. McCann of 105 Todd Lane North, Lostock Hall, near Preston, is the new secretary, with Mr. A. Porter as the honorary treasurer. Mrs. B. R. Mills and Mr. C. Sparks are also on the committee.

Club Programme

An outing to Blackpool Tower Aquarium has already been enjoyed and the future programme consists of quizzes, table shows, lectures on breeding fish and a demonstration of setting up a tropical aquarium. Half an hour is devoted at each meeting to answering beginners' questions and problems. This part is conducted by volunteers from among the veterans. Interest in marine aquaria is also being aroused and this should certainly prove practical in the area, for members are within easy reach of the Prawns (*Leander*) in Morecambe Bay, Lesser Weever Fish at Southport, and any amount of Hermit Crabs and Starfish may be dredged from the channels in the Ribble Estuary if one goes out in a fishing boat.

Mr. H. Hall, who has been in the trade in the town since 1938, and has known all the societies in their ups and downs, assures me that the hobby is still as popular as ever it was.

Bury Aquarists' Festival

CONSISTING of 483 exhibits, the Bury Aquarists' Festival attracted entries from as far away as London, Leeds, Hull and Stoke, and was supported by 107 competitors. Very ably filling the gap left by the absence of the large-scale show at Belle Vue, Bury's organisers must be congratulated on the excellence and smooth running of all their arrangements. Fifty-one classes were scheduled and these were subdivided into twelve sections.

PROUD PRIZEWINNER
Mr. C. A. Blake, member of Rochdale A.S., receives his cup and book prize for gaining the best fish in show award at Bury. The fish which Mr. Blake showed with such success was a Molly.

Section A contained all classes for furnished aquaria and in almost all cases there were two obvious errors, the first being the absence of matching rocks and gravel and the second the unfortunate fact that many of the plants were marred by rotting or damaged leaves. Class and section winner was Wharfedale A.S.

Section B was for Guppy classes with some very fine exhibits. Section winner was Mrs. M. Mittoe (Bolton A.S.) with a fine Scarftail.

Section C was for A.O.S. Livebearers. Some of the exhibits in the Platy class were very good for shape and colour. The section winner also took the award for the best fish in the show and the exhibit thus honoured was an excellent male *Mollienesia velifera* owned by Mr. C. A. Blake of Rochdale A.S.

In Section D, for Labyrinths, there were some outstanding Leeri Gouramies. Section winner was Mr. W. Swailes, of Rochdale, who exhibited a Thick-lipped Gourami.

Section E (Barbs) was won by Mr. W. Dann (Blackpool and Fylde A.S.) with a large unusual type—*Barbus filamentosus*.

Section F for Characins was headed by Mr. J. R. Shaw of Oldham A.S. with a large *Metynnis* species.

There were several outstanding Cichlids in Section G, the winner being a very aggressive male Firemouth owned by Mr. G. D. Grimshaw (Bury A.S.).

Among the A.O.S. Egglayers in Section H there were two very good quality male *Aplocheilus lineatus* that must have run the best fish in the show very close. They were both owned by Mr. W. J. Leeming of Bury. Also on show was an unusual fish having a jet black body and a cherry red caudal fin (? *Labeo bicolor*).

Section I, breeders' classes, was very well represented. Some of the exhibits showed exceptionally good growth for age. The very worthy winner of this section was a team of perfectly matched and unusual Celebes Sailfins (*Telmatherina ladigesi*). These were in such excellent condition that they reflected true credit upon the breeder, Mr. Z. Fic of Burnley A.S.

The best coldwater exhibit in Section J was a large Veiltail owned by Mr. N. A. Brown (Wigan A.S.) and the best plant in Section K was a *Cryptocoryne* owned by Mr. W. Dann.

Among the visitors to the show were Messrs. Holloway, Johnson and White who travelled overnight from London as representatives of the Guppy Federation and also five members of the same body from its Hull and E. Yorks. section.

Interclub Shield Won by Twenty Club at N.A.S. Show

Outstanding Black Mollie Takes Suregrow Trophy

THIS year's exhibition of the National Aquarists' Society, the seventh annual event, attracted over 900 entries in 46 classes, including some fish of extremely good quality although here and there were exhibits which we thought could have been bettered. Perhaps the explanation for this patchiness lies in the fact that some entries had to be refused through lack of space, so possibly depriving us of seeing the best and only the best that the hobby can put on view. It may not be known how near we came to having no N.A.S. Show this year for, a short while ago, the organisers learned that the firm from which they had hired the tanks each year was giving up that branch of their business. A Council meeting was hurriedly called and, although it drained most of the Society's resources, the necessary tanks were bought and held in readiness for this and future events. It was unfortunate that shortage of time and lack of labour meant that some of the tanks could not be serviced before the show and that they leaked when the setting up was in progress. However, the lesson has been learned the hard way and it is unlikely that there will be a repetition next year.

General view of the show which filled the R.H.S. Hall at Vincent Square, Westminster, to capacity. The draped staging added to the neatness of the general appearance. (WATER LIFE *photographs*).

The show was reasonably well supported by the trade, including the makers of "Es-Es", "Windmill" and "Glen" products, the manufacturers of "Mero" and "Suregrow" fishfoods and South Western Aquarists, W.C. Cleveland and WATER LIFE. It was a pity that more revenue was not forthcoming from professional aquarists, there being space for more stands. Non-competitive displays included the marine tanks put up by the London Aquarium (South Bank) and the herpetological section shown by members of the British Herpetological Society (London Group).

JUDGE'S PANEL

This time, the panel of judges consisted of established names with one newcomer, Mr. E. Bowler, the South Bank Aquarium's curator. It was made up as follows:— Goldfish (excluding Veiltails and Moors), Mr. A. Boarder. Veiltails and Moors, Capt. L. C. Betts. Coldwater Fishes, Mr. W. Dacre. Tropical Livebearers, Mr. C. R. Looker. Fighters, *Hyphessobrycon* Species and Catfish, Mr. S. Harker. A.O.S. Labyrinths, Danios, etc., and A.O.S. Tropicals, Mr. J. H. Gloyn. Barbs and A.O.S. Characins, Mrs. B. Robertshaw. Cichlids and Dwarf Cichlids, Mr. P. Hewitt. Guppies, Mr. H. S. White. Breeders' Classes were judged by the following:— Tropical Livebearers, Messrs. Hewitt and Looker. Egglayers, Mrs. Robertshaw, Messrs. Harker and Hewitt. Coldwater, Capt. Betts, Messrs. Boarder and Dacre. Plants, Messrs. E. Bowler and W. Cleveland. Furnished Aquaria, Tropical, Mrs. Robertshaw, Messrs. Bowler, Gloyn and Hewitt. Coldwater, Capt. Betts, Messrs. Cleveland and Dacre. Novice Goldfish, Mr. Boarder.

The inclusion of a class for novices open to all who had not won an award in any open show was an experiment that deserved better support. It is to be hoped that the small response will not discourage the promotors from keeping this class in the schedule. Perhaps a bigger entry would have been made in a similar class for Tropicals. The fine array of plaques and medals offered by the N.A.S. was amplified by cups and trophies which were won by the following:— Inter-society Shield, Twenty Club (74 pts), followed by Bethnal Green A.S. (25) and the Gloucester and Cheltenham branch of the F.G.B.S. (24). Irene Cup, best individual furnished aquarium, J. H. Franklin, 77 pts (coldwater). Plantsman Cup, best A.O.V. Tropical Plant, W. H. Snaith (*Aponogeton ulvaceus*). A.T.A. Cup, best Trade stand, "Glen" Products. Strachan Kerr Trophy, best Calico Veiltail, J. H. Franklin (the schedule inadvertently stated that this cup was for the best Scaled Veiltail but it is a perpetual trophy for the best Calico form of this variety of Goldfish). Blair Trophy, best breeders' team, F. D. Balaam (Calico Veiltails bred 30.8.53). Suregrow Trophy, best Mollie, Mrs. E. B. Fawcett (with an outstanding Black female).

The coldwater section seemed, on the whole, to be better than the tropical, the breeders' teams especially commanding attention. It is felt in some quarters that there is a steady revival of interest in the coldwater fancy and, at this exhibition, the quality of leading coldwater entries was certainly high, as was seemingly borne out by the fact that the Irene and Blair trophies were both captured by coldwater exhibitors.

COLDWATER SECTION

There was a marked difference in quality between the leaders in the class for Common Goldfish and those at the bottom. The winning fish shown by W. F. Walters was of pleasing shape and good colour, beating the runner-up staged by W. E. Gawler on finnage, but only by a few points. Great interest was shown in the Bristol Shubunkin class where the first four cards went to P. J. Upchurch, son of the G.S.G.B. stalwart B. J. Upchurch, (1st and 2nd) and R. H. I. Read, also a G.S.G.B. member (3rd and 4th). Specimens shown by other leading breeders of this variety, including exhibitors from Bristol, were unplaced. Probably the judge who, we thought, was a little lenient with the rather heavy looking 2nd winner, took note of the drooping dorsals and caudals of some of the entries. He is neither a member of Bristol A.S. or the G.S.G.B. and so his awards were examined with especial interest. A serious challenge from Bristol (C. Harper) failed to displace S. J. Freeman's well-known London Shubunkin from the top of its class, better body colour and cleaner cut finnage giving the old-stager its lead. V. Capaldi (Bristol) put down the type of Fantail this judge likes and so scored over another Bristolian (A. W. Rudge) whose two entries (2nd and 3rd) were a little inferior in colour and had less shapely bodies; the third also displaying its dorsal and caudal fins less well. The entries of Common Goldfish in the Novice class were of reasonable quality but with the simple condition governing eligibility to compete in this section we should have thought there would have been many more entries with better class fish. First came A. H. Pringle with a specimen of good colour and size but fair finnage, followed by Mrs. J. A. Tye with another of equal shape but not quite the colour.

The class for Veils. and Moors attracted almost equal numbers of Moors, Scaled Veils. and Calico Veils. Moors really require a class on their own and on this occasion the need for such a division was obvious, not one of them qualifying for a place in the cards. Good Moors are hard to get and consequently exhibitors of this variety are at a great disadvantage when having to compete against breeders of Veils. First was J. H. Franklin's Calico Veiltail, a beauty for shape and deportment, though not outstanding for colour, taking the Strachan Kerr trophy which had been held by the same exhibitor last year. A good Scaled Veiltail shown by G. Foster came a close second, followed by a Calico (S. J. Freeman) which was beaten on shape. Two classes were provided for Coldwater fishes, one for British and the other for Foreign species. There was some doubt about the separation of Common Rudd (shown in Cl. 7) from Golden Rudd (placed in Cl. 8). Where there are two classes, perhaps the least confusing division would be native species (and naturally occurring or cultivated varieties of those species) in one and foreign species (including any variations of them) in the other. With either ruling, would not the Mirror Carp entries (Cl. 8, Nos. 12 and 13) have been more correctly entered in Cl. 7? In the British class, a Green Tench exhibited by E. Pilsbury, rather modest in size and showing only fair colour when we saw it, headed a Common Rudd (C. Leveridge) and two more Green Tench (G. R. Minson and C. R. Parslow). The former's fish appeared better than the leader and, in our opinion, gave the Rudd a run for its money. In addition to a Golden Rudd and the Mirror Carp, Cl. 8 contained Catfish, Peacock-eyed Bass, Bitterling and some shapely Sunfish, four of which last named species took all the prizes (1st Leveridge, 2nd E. G. Harris, 3rd and 4th A. H. Charles). The leading fish was of extremely good quality and in fine condition.

TROPICAL SECTION

Pre-eminent position here undoubtedly went to Mrs. E. B. Fawcett's female Black Mollie. Its size and quality make it the finest female fish of this colour we have seen on the show bench in post-war years. W. E. Smyth's Sailfin was second. This was a beautifully developed fish and unfortunate to have to compete against the leader. First prizewinners in both the Swordtail classes were Albinos (R. W. Hall and F. H. West). Both showed the influence of the new standard which calls for no colour in fish of this variety. This means passing over fish showing colour on their sides which often adds to their attractiveness. Incidentally, both classes had Red-eyed Reds in second positions (both shown by R. W. Hall). They were of a genuine red tone and showed up by contrast the orange-tinted colouring of the normal Reds in the same class. Change of fashion in the fish world could be seen in the female Platy class. Moons, out of favour since Wagtails came along, swept back to first and second positions for Deamer Bros. Both fish were of exceptional size but the leader had better red in the dorsal and its moon marking was superior. Congratulations to the same exhibitors whose Blue Speckled gained a fourth. First among the male Platies was R. C. Harvey's Red. Excellent colour for this variety.

Some of the menfolk who helped run the N.A.S. Show: — Messrs. Wismark, White (secretary), Macdonald (joint competition secretary), Willson, Odams (treasurer), Marjoram (joint competition secretary) and Katterns (President).

N.A.S. Show—*continued*

The Fighter class led by a Red shown by L. E. Baker was not exceptional but fifty entries in the A.O.S. Labyrinths provided strong competition. A well-developed Leeri shown by F. H. West came first, with a *Belontia signata* (F. A. Ahrens) second. A pity that No. 19, a Leeri, did not show its colouring to the full until the second day. Unusual first in the Danio, Rasbora and White Cloud class was a *Rasbora elegans* (F. S. Taylor) of magnificent size and very good condition. Second was P. E. Woodward's Harlequin, put down in faultless condition and showing its colour to the full. In the almost 60-strong Barb class, Tigers, Cherries and Niggers were not showing well. First, second and third, were Half-banded (A. Whatford), Schuberti (R. G. Fowler) and Rosy (W. Norcross). All were good fish, showing their colour particularly well, especially the leader. Among the tropical Cats. was a number of unusual specimens including a so-called *Corydoras auratus* (could this be a golden form of *C. aeneus*?) and another entered as *C. reticulatus*. A large *C. paleatus* (G. W. Morford) led with *C. myersi* (C. Strelley) second and *C. julii* (K. D. Fawcett) third. No. 27, a *C. aeneus* seemed unlucky not to get a place. Here was one of those instances where, in a large class, the organisers might consider allowing a "highly commended" card to be awarded by the judge. Mrs. W. M. Meadow's *H. rosaceus* led the *Hyphessobrycon* class; excellent size and nicely developed. A fine large-sized Glowlight was second for R. H. Fuller and an *H. serpa* (R. Skipper) with good deportment—so often a failing in this species—third. A *Metynnis schreitmilleri* gained first for A. Whatford in the A.O.S. Characin class. It was in impeccable condition.

Many large fish were shown in the Cichlid class. First went to a well-sized Angel (R. Walford) of excellent size and shape but with anal and caudal filaments a trifle faulty. An exceptionally large Marbled Cichlid was second (C. P. Stoker) and a fine *C. severum* (C. P. Stoker) third. Among the Dwarf Cichlids an *Apistogramma reitzigi* (G. A. Mills) of superb colour and showing well developed fin filaments was first. Second and third were *A. ramirezi* (S. Riches). Judging the A.O.S. Tropical Fish class must have proved a headache, with the exhibits ranging from Egglaying Tooth Carps to Flagtail Guppies, Australian Rainbow Fish, Scats, Archers and Monodactylids, etc. L. F. Clements' *Aplocheilus lineatus* deservedly headed this strong class with *Panchax playfairii* (P. Marriot) second, *Monodactylus argenteus* (F. A. Ahrens) third and *Scatophagus argus* (W. E. Smyth) fourth.

GUPPY CLASSES

Generally speaking, the standard here was moderate. The Veiltail class, led by a presentable specimen, shown by P. C. Pavitt, lacked good finnage. Much better were the Scarftails, topped by P. Marriott's shapely winner. Exhibits in the Female classes were mediocre, even the winning Coloured (Mrs. G. G. Poynter) losing points on size. A Cofertail (A. Maher) led the class for Roundtails, Robsons and Cofertails. The class of Speartails and Pintails was disappointing. The first two (Pintails) were shown by R. G. Mealand and W. R. Burwell. The next two, both shown by R. G. Mealand, were judged as Speartails, though we have seen better. But the rest in the class, presumably entered as Speartails, were considered to be Scarftail stock with narrowing caudals! A Doublesword (D. C. Bentley) won the D.S. and Lyretail class and F. Humpidge's and T. F. Daden's Bottomswords were well in front in the class for Top- or Bottomswords.

BREEDERS' CLASSES

The three breeders' classes were supported in force; in fact, that for Tropical Egglayers was perhaps stronger than any other seen before and the judges tried, unsuccessfully, to persuade the show secretary to allow them to give an extra prize. Prime achievement here was the winning team of *Hyphessobrycon heterorhabdus* (bred 6.1.54) entered by D. R. Butler. Three pairs of Lyretails (L. Franklin) were second and a well-matched team of Neons third (F. G. W. Parsons). Perfectly matched Leeris (R. Walford) came fourth. Any of these could have led similar classes at most other shows. Such competition would seem to suggest that division of this class might be considered when drawing up the schedule for future events. Attractive entries out of the cards were Penguins, Firemouths, *Pelmatochromis kribensis*, *Belontia signata* and various Cats. An interesting entry was that of a team of hybrids between *Brachydanio rerio* and *B. albolineatus*. A really well-matched team of Albino Swordtails (F. H. West) led the livebearers, with Weisbadens (R. Yexley) second and *Platypoecilus variatus* (J. E. B. Brand) third. Both the tropical classes consisted of teams of six. That for Coldwater fish consisted of four only, a number apparently favoured by the judges and the exhibitors. Certainly, this smaller number permitted breeders to put in remarkably well-balanced quartettes almost identical in shape, colour, finnage development and size. It must have been most difficult to put F. D. Balaam's excellent team of Calico Veils ahead of the equally promising Scaled Fantails shown by P. J. Upchurch. Four sizeable Moors entered by C. Frier came a creditable third in strong competition, their size and colour being good for their age. Quality throughout the class was extremely good.

Photograph [WATER LIFE

Mrs. B. Robertshaw and Mr. P. Hewitt discuss the merits of a furnished aquarium during judging.

PLANT SECTION

Giant Sagittaria, lovely specimens, gained first in the *Vallisneria* and *Sagittaria* class for R. G. Mealand. Twisted Vallisneria with fine growth but unexceptional twisting were second (A. A. Beardsley). In the fine-leafed plant class T. G. F. Oakes' entry of *Cabomba* gained first; fine leaf size but rather widely spaced on the stems. Second (P. Bryant) was another *Cabomba* entry with leaves a little smaller but somewhat closer. In the Cryptocorynes, competition was not as keen as usual. The leaders were good, *C. Griffithii* (Mrs. E. Arnold) was first, with a smaller specimen of the same species, but in flower, second for R. E. Churchman. Some thought that this might have come first by reason of it being in flower but the judges presumably contended, quite correctly we think, that the achievement of getting the plant to bloom was not sufficient to override the advantages the winning plant had over the runner-up in other points. An interesting and quality class was that for A.O.S. Plants. First was a magnificent flowering *Aponogeton ulvaceus* (W. H. Smith) with lengthy, clean "Bacopa" (*Hydrocotyle*) second (R. G. Mealand) and *A. undulatus*, third (H. W. Whittaker).

FURNISHED AQUARIA

Forty-six entries were received for the club tropical class and all but one or two were completed in time for judging. Willesden A.C. (74 pts), which club has tried to attain this position for a long time, came first with a courageous and somewhat unorthodox effort which got away from the overplanted effect. An artistic eye was necessary to make such a tank pleasing and on this occasion the departure from the usual layout was more than justified although we did think the back "screen" a little on the thin side, revealing too much of the black backing to the tank. Only five plant and one fish species (*H. rosaceus*) were used. Second came Greenwich A.S. (72 pts). This tank was excellently planted but one rock piece was a little overpowering. A mixed collection of quality fish. Third, Leyton A.S. (71 pts) with a thoughtful design; a peninsular of plants to the left was set off by a bank of Cryptocorynes on the right. The 4th award (70 pts) went to Hendon A.S. who appeared to make too much emphasis of a big clump of Red Myriophyllum providing over-contrast to the normal green plants and to the fish. Stoke Newington A.S., who have done well in furnished aquaria competition during the past year or two, were easily the winners in the coldwater class (80 pts) with good planting and carefully placed rockwork, showing off to advantage two medium-sized Calico Veiltails. Hampstead A.S. (65 pts) were second with Bristol Shus. in a rather overplanted tank that gave the feeling of lack of depth; not enough room was left either in the foreground or towards the back centre to give the impression of adequate swim space. Third were Twenty Club (64 pts) with Calico Veils, of good quality but looking just a little large for the tank; a better setting of the plants to the left and the choice of smaller specimens in greater number would have permitted a more natural picture. Surrey A.C., 4th with 62 pts had a nice tank but rather overplanted and not showing to full advantage the moderately sized Golden Rudd. Coldwater fishes, native or foreign rarely give so imposing a picture as do the fancy varieties of Goldfish in the set-up tank. In the class for individual tropical furnished aquaria, the first winner (H. A. Hallett) had some nice plants that formed an effective contrast with the bottom layer (although the rockwork looked marine) and with the fish (Characins). A good impression of depth was achieved in a small tank. In the small class for individual coldwater furnished aquaria, quality was high both in fish and plants though the tendency was to choose fish too big for the size of the aquaria. J. H. Franklin (77 pts) created a happy combination with his Veils, followed by C. R. Parslow (76 pts) and E. G. Harris (61 pts).

Rochdale Entry Up

ON May 29-30 Rochdale A.S. staged its third and most successful show in the Fire Station Hall, Maclure Road. Number of entries (399) was up by 25 per cent on last year's event, and fish came from as far afield as Surrey.

Opening the show was Mr. Barney Colehan who was accompanied by his wife and their daughters. Mr. Colehan paid tribute to the well-arranged layout.

Judges were Messrs. R. E. Legge, H. W. Pollard, A. Taylor and T. G. Warburton. The promoting society led the Club Trop. Furnished Aquaria with Mr. Anderton of Rochdale first in the Open Trop. Individual Furnished Aquaria and Mr. I. M. Fletcher first in the coldwater class. Members' Senior Furnished Aquaria class was led by Mr. L. Anderson with the comparable junior class headed by Mr. B. Bottomley.

Best fish in the livebearer section was Mr. C. A. Blake's entry in the Mollie class. Other first prizewinners here were Mr. A. E. Bloom (Guppies), Mr. and Mrs. Wilkinson (Swords.) and Messrs. A. N. and K. Rycroft (Platies). Heading the Barb classes were Messrs. T. Smith, B. Whitworth and J. R. Taylor, first in the Nigger and Tiger, Cherry and Checkered and A.O.S. classes, respectively. Mr. T. Smith's fish was adjudged best Barb.

Section winner of the Characins was Mr. B. Pengilley, who led the A.O.S. Characin class. Mr. A. Holmes' exhibit was first among the Hyphessobrycons. Best Fighter was Messrs. A. N. and K. Rycroft's with Mr. A. Morgan first prizewinner in the A.O.S. Labyrinth class and also gaining best fish in Labyrinth Section award.

Angel fish were led by Mr. P. Galimore's fish but it was Mr. A. E. Bloom's entry in the A.O.S. Cichlid class which was adjudged best Cichlid. Mrs. I. M. Fletcher's exhibit was first among the A.O.S. Tropicals.

Coldwater classes had first prizewinners staged by Mr. and Mrs. Wilkinson (Fantails, Veils., and Moors class), Mr. J. Dodsworth (Shubunkins), Mr. W. Burgum (Commons and Comets) and Mr. T. Crossley (A.O.V. Coldw. Fish). Mr. Burgum's entry in the Common and Comet class was the best fish of the coldwater section.

Mr. C. A. Blake took first three places in the Breeders' Tropical Egglayers. Messrs A. N. and K. Rycroft were first in the Breeders' Livebearers and Mrs. I. M. Fletcher, first in Breeders' Coldwater.

WATER LIFE Diploma for best fish in show went to Mr. C. A. Blake, and one for the best Characin to Mr. B. Pengilley.

Hendon Borough Show

BACKED up by interesting non-competitive displays by members, the furnished aquaria classes at Hendon A.S. show, part of the Borough Show, made an attractive event. The competitive classes were judged by the following:—Coldwater: Messrs. A. Boarder and C. J. Saunders, B.Sc. Tropical: Messrs. J. Carnell and C. W. Creed.

Stoke Newington A.S. won the interclub coldwater class with 74 points, followed by Hampstead A.S. (66), N. London A.S. (63), West Middlesex A.S. (61) and Greenock A.S. (57). The last mentioned was prepared by Mr. D. O. Carr, who travelled down to London to set up his customary herpetological display. Calico Veils, in the leading exhibit were shown to advantage in a tank where numerous good plants did not look overcrowded. Hampstead's Calico Comets and Shus. had a background of varied plants including some red and green *Myriophyllum* but little rockwork.

The interclub tropical class was topped by West Middlesex A.S. (80 pts.) after which came Stoke Newington (78), Hampstead (75), Colindale A.S. (71), Spelthorne A.C. (70), Wembley & Dist. A.S. (67) and Staines A.S. (66). It is interesting to note that although the order is different the three clubs in the lead here did well in the coldwater section. West Middlesex had a mixed bag of Barbs, Harlequins and Bloodfins all in top-top condition and the excellent layout of the first-class plants made it the winner. Stoke Newington also favoured a number of Barbs and had good rockwork and skilful planting to set them off, with perhaps individual plants a little on the big side.

The individual coldwater class went to T. Hobday (86) who won the Warden Trophy. He repeated last year's win, using Tetras and Barbs to effect, some good plants, especially the *Myriophyllum* and well-weathered rockwork. Behind him came 2nd and 3rd, H. A. Hallet (79, 77) and 4th and 5th, Mrs. B. Robertshaw (77 and 76). The second tank was rather thinly planted but earned good points because of the quality of the plants and fish, a number of Characins including Glowlights. The third tank had what appeared to be rock covered with algæ but we were told the "rocks" were really pieces of coal. First prize in the individual coldwater class went to A. Sutton (78) with S. C. Wingrove (72), J. H. Franklin (71), F. Oliver (69), and A. Stevens (65). Red Fantails in the leading tank had a gnarled tree trunk to keep them company, looking like a miniature prehistoric monster. Green coloured rockwork, a preponderance of *Elodea* and good design made a pleasing picture for the second tank which contained Metallic Red Fantails. Small Calico Fantails graced the third tank spoilt, we thought, by the precise symmetry of the rockwork.

Southampton Event

LITTLE space was left to spare after the exhibits were staged at the fifth annual Southampton A.S. show in the Avenue Hall, opened by the Mayor, Alderman R. E. Edmunds. Messrs. C. E. C. Cole and C. W. G. Creed judged the coldwater and tropical classes, respectively. Southampton won the Rundell Hill Bowl for tropical furnished aquaria (Glowlights in a well-balanced tank), beating Winchester A.S. (badly positioned rockwork), Portsmouth (inferior design) and Basingstoke A.S. (Angels at a disadvantage through rough planting). R. Lewin won the trophy for best individual tropical furnished aquaria. H. Gilbert used two well-matched Red Common Goldfish in his coldwater furnished aquarium to win the Gilbert Lewin Cup, beating R. Lewin, whose three good quality Comets were in a sparsely planted tank. The novice class was led by a tropical tank (A. R. Cooper), followed by R. Shelley's coldwater entry. Aquaria entered by schools were interesting efforts, the shield going to Portswood Secondary Mixed School.

A Doublesword (J. Robinson) won the male Guppy class, the female class being headed by a big specimen shown by Mrs. Poynter. Swordtails, varying in quality, had a big female Albino in front (W. J. Smith). Blacks won three of the Mollie prizes, first going to J. Robinson (Suregrow Trophy). H. G. Rundle's entry gained the premier Platy award. Among some nice Barbs, F. Parsons won with a Rosy; we thought the 4th, Mrs. Gilbert's Cherry, might have gone higher. Reds took all Fighter prizes (1st, J. Robinson), the remaining Labyrinths being headed by F. Parsons' large Pearl Gourami (WATER LIFE diploma, best tropical). In this class A. R. Blandford showed his unusual Leeri sport, red-orange in colour. Some good Characins were entered (1st, F. Parsons' Black Widow). Most of the Cichlids were moderate in size but the quality of Dr. Clay's *C. festivum* earned it the premier card. A.O.S. Tropicals was won by a Scat (H. Howell). J. Bartlett's Red Wagtails came top in the tropical livebearer breeders' section closely followed by J. Robinson's Variatus. The 4th award (E. C. Golesworth) qualified for the S.D.A.S. Members' Shield. The class for egglayer teams was won by C. A. Allen's Lyretails, some well-developed Pearl Gouramies (H. G. Rundle) being runners-up. The 3rd award (Mrs. H. J. Gilbert) took the Wingate Shield.

Among the Goldfish, Bristol Shubunkins attracted a few of good quality among some also rans and A. W. Meacher (1st and 3rd) had a hard fight to keep the lead from D. S. Paul. The winner gained WATER LIFE diploma (best coldwater fish). Comets had a class on their own and the red coloration of the 1st, apart from its shape, gave H. Gilbert's specimen a deserved win. D. S. Paul's Red Metallic Fantail had a rather deeper body than usual but its colour surpassed that of H. Gilbert's, and so gained the F.B.A.S. Shield. W. H. Angell's Metallic Veiltail came a lucky first in the A.O.S. Goldfish class, being pointed higher than A. W. Meacher's shapely Calico Veil. A Sun Bass in the A.O.S. Coldwater class (H. Gilbert) was of very good quality. The coldwater breeders' class included promising teams of Moors (D. S. Paul), uncoloured Fantails (A. W. Meacher) and Shubunkins (D. S. Paul.

The members' competition, for five-starred fish, was won by H. Gilbert (coldwater section) and E. C. Golesworthy (tropical classes).

Chester's First Open Show

EXCELLENT public response for the first open show of Chester A.S. on June 11-12 augurs well for a bigger show next year.

Special prizewinners were Mr. P. Millington (Russell-Allen Trophy for Members' Furnished Aquaria and first prizes for best collection of fish and plants), Mr. R. Scott (Mottershead Trophy for best fish in show and plaques for best breeders' exhibit, best egglayers and best A.O.S. Tropical), Mr. C. Morrison (WATER LIFE Diploma for best Characin), Mr. J. Lyon (Parbo Trophy for best coldwater fish) and Mr. H. Moulsdale (Plaque for best Barb). Mr. Cadman gained most points in the open classes.

Leading class exhibitors were: Members' Trop. Furnished Aquaria, Mr. P. Millington; Junior Members' Trop. Furnished Aquaria, Messrs. H. Dennett and M. Hughes (tie); Mollies, Mr. D. Cadman; Platies and Swords, Mr. H. Moulsdale; Female Guppies, Mr. P. Shobbrook; Male Guppies, Mr. C. Morrison; Danios, Mr. R. Scott; Characins, Mr. C. Morrison; Barbs, Mr. D. Cadman; Fighters, Mr. M. Hughes; A.O.S. Labyrinth, Mr. C. Morrison; Cichlids, Mr. H. Murray; A.O.S. Trop., Mr. R. Scott; Trop. Breeders, Mr. R. Scott; Coldw. Breeders, Mr. E. Lyon; Common Goldfish, Mr. H. Crook; A.O.V. Goldfish, Mr. J. Lyon and A.O.S. Coldw. Fish, Mr. D. Evans.

Lichfield Exhibition

MR. T. L. DODGE judged the exhibition staged recently by Lichfield A.S. and which was opened by the society's President, Alderman F. W. L. Salloway. Leading the prizewinners were Messrs. C. and A. Butler who took the Founder Committee Cup in the Senior Trop. Furnished Aquaria Class and the Douglas Trophy for best tropical fish with a Black Mollie, and Master B. Wolfe, who was awarded the Founder Members' Cup in the Junior Trop. Furnished Aquaria.

Among the coldwater exhibits Mr. F. Wolfe's furnished aquarium won the Lock Challenge Cup. Miss V. Garmstone was awarded the Garmstone Challenge Cup for the best coldwater fish with a female, Goldfish. The best junior coldwater furnished aquarium was shown by Master B. Baker who therefore qualified for the Society Cup.

Goldfish Society's A.G.M.

ANNUAL general meeting of the Goldfish Society of Gt. Britain was held in Westminster, London, on June 12. The chairman, Capt. L. C. Betts, spoke of the recent increased interest shown in Goldfish. After business had been dealt with, Capt. Betts gave an illustrated lecture on "Filtratson" whilst Messrs. C. J. Saunders, B.Sc. and Wilson judged a table show for Twintails and Globe-eyes. Mr. C. F. Whitehead won the Read Cup and took the first three places in the Twintail Class, whilst Mr. Collins came first and second in the Globe-eye class and also won the Shaw Cup with Mr. C. F. Whitehead in third place.

In the business part of the meeting there was some discussion on the accounts but they were adopted, as presented, by a large majority with votes of thanks to the treasurer, secretary and auditors being recorded. It was agreed that the election of chairman and lay-member be decided by postal ballot.

The society will put on a small display at the Guppy Federation's show in the London Zoo on October 2.

Scottish Enterprise

FOLLOWING a visit to the United States by Mr. J. Kean, one of the partners of Scottish Fisheries, which has its headquarters in Edinburgh with a branch in London, Scottish Fisheries (America) Inc., has been formed with a depot at 297 Mercer Street, New York 3. This venture should result in the firm doing much business with aquarists in that country.

Catch Them Young

JUST before the annual general meeting of the Wilmslow Guild Aquarium Society (Cheshire), there was a pet show for juniors. This was organised by the society with an eye to future membership and to offer real assistance and advice to any young folk with pets.

Novel Air Pump

IN a recent edition of the Inventors' Club programme on B.B.C. television an aerating pump, suitable for use with aquaria, was demonstrated. It is unusual in that it utilises only water from a mains supply solely for its operation.

At the time of going to press we learn that there is a likelihood of the apparatus being produced commercially.

Family Reunion

FROM Southborough, near Tunbridge Wells, Kent, to Wagin, near Perth, Western Australia, is a long journey which is to be undertaken with an understandable degree of eagerness by Mr. and Mrs. W. P. Bradley. They leave Britain on September 1 to visit their daughter and her doctor husband and their three children. It is rumoured that a selection of Guppies may be taken out for members of the local society. The return to England will be in the Spring of next year.

Mr. W. P. Bradley.

Mr. Bradley, whose innumerable friends will join us in wishing him and his wife *bon voyage*, is one of the pioneers of the hobby in this country. To many he is best known for his long connection with the East London A. & P.A., of which he is a past President and a life member. A more select band appreciate his work as secretary of the Fish Culturists' Circle, an organisation whose members have, behind the scenes, done much to formulate the policy of the organised hobby and which is regarded by some as the forerunner to the F.B.A.S. Mr. Bradley's versatile tastes in fishkeeping are reflected by the fact that he is a member of both the Goldfish Society of Great Britain and of the Federation of Guppy Breeders' Societies.

Club Notes and News

The Editor invites clubs to send brief reports of meetings and announcements of forthcoming events. Items for the October-November issue should reach this office by Monday, September 13.

MEETINGS of **Nuneaton A.S.** are now held on the first Monday and third Thursday of each month at the Liberal Club, Stratford Street, Nuneaton. Recent speakers have been Messrs. W. L. Mandeville, T. L. Dodge and Brooks. The annual show will be held on August 2 when a WATER LIFE diploma will be awarded for the best furnished aquarium.

A NEW society has been formed in Preston under the title of **Preston and District Aquatic Society**. Meetings are held on the first Thursday of each month at Grimshaw Street Hall. It appears that the aquaria group within the Preston Scientific Society has now disbanded and this new organisation is the only one at present active in the town. Secretary is Mr. A. McCann, 105 Todd Lane North, Lostock Hall, Near Preston, Lancs.

NEW meeting place of **Hampstead A.S.** is the Parish Hall, Fleet Road, London, N.W.3. The club gained a second and third place in the club furnished aquaria classes at the recent Hendon show. October 19 is the date for Hampstead's own annual show.

THE **Chingford A.A.S.** is contemplating running a series of interclub table shows with neighbouring societies.

AMONG the twenty-one classes which comprise the annual show and open exhibition of **Halifax A.S.** are two for individual furnished aquaria. Both are open and a first prize of £5 will be awarded in each. The club's eight trophies will be up for competition and, in addition, there will be two WATER LIFE diplomas. Details can be had from Mr. J. Wheelwright, 7 Avondale Place, Manor Drive, Halifax. At the July 1 table show first prizes went to Messrs. P. L. Crighton, A. J. L. Rashley, D. Shields and C. Forrest.

MESSRS. E. J. DRUCE and T. L. Dodge have given lectures at recent meetings of **Shirley & S. Birmingham A.S.** Competitive furnished aquaria were staged on July 24 in conjunction with the Shirley Horticultural Society's event.

ON July 1 Mr. Rouse, of the General Electric Company, gave information on lighting and heating aquaria to **Kingston A.S.** members. Interclub table shows have proved a successful innovation.

KEW Gardens has been visited by members of the **Aylesbury A.A.**

"BALANCED AQUARIA" was the title of a talk given by Mr. A. Fraser-Brunner at a meeting of **Midland A. & P.S.**

IT is hoped to form a society in the **Penistone** district near Sheffield. Anyone interested should contact Mr. V. Robinson, 61, Victoria Street, Penistone, Sheffield, Yorks.

FROM September 1-4 the **Stoke Newington A.S.** is staging its annual show.

AT a recent meeting of **Hounslow A.S.** fish which had been awarded first prizes during the year competed against each other and Mr. B. C. Boult's Neon Tetra was awarded first prize. Mr. G. Vance's Leeri Gourami and Rosy Barb gained second and third awards.

ON July 23-24 the **Blackburn A.S.** put on displays of tropical and coldwater fish at local agricultural and horticultural shows.

ANNUAL show of **Kettering A.S.** is arranged for September 22-25 in the Co-op and Labour Institute, Kettering. Four classes are open. These are for tropical furnished aquaria, coldwater furnished aquaria, breeders' livebearers and breeders' egglayers. Engraved plaques will be given to the first three prizewinners in each class and a challenge cup will go to the society gaining most points. Schedules can be had from Mr. S. D. Simons, 52 Church Street, Burton Latimer, Kettering, Northants. The annual outing took place on June 20.

THE following prizes were presented at a recent meeting of **Plymouth A. & P.S.**: President's Cup (home furnished aquaria), Mr. T. Easterbrook; Junior Cup, Mr. D. Baldry; Annette Trophy, Mr. Ryder (Black Mollie), Junior Cup (best livebearer and egglayer), Mr. D. Baldry; Coldwater Award, Mr. Hedger and Plant Special, Mr. Skidmore. Mr. Henderson gave a talk and demonstration on the use of glass at the same fixture.

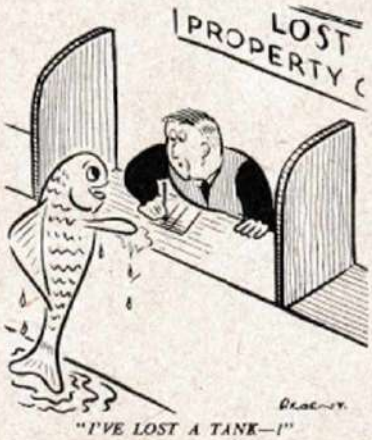
IN connection with the local Carnival Week, **Hastings & St. Leonards A.S.** put on a display at the Hobbies Exhibition.

MEMBERS and friends of **Wilmslow Guild A.S.** visited Belle Vue, Manchester, on June 10.

ON September 4, **High Wycombe A.S.** is staging the aquarist section of the High Wycombe show. The aquaria will be staged in The Rye, High Wycombe, and judging will be performed by F.B.A.S. judges. Entry forms can be had from Mr. R. G. Adkins, 7 East Drive, Totteridge, High Wycombe, Bucks. Mr. D. L. Barrett, "Craignarn," Bolter End, High Wycombe, is the new secretary.

CHESTER Zoo has been visited by members of **Oldham A.S.** A feature of a recent meeting was a Bring-and-buy sale.

A VISIT has been paid by **Coventry P. & A.S.** to the South Bank Aquarium, London. The society's show is scheduled for September 22-25. On July 12 the garden pool and home aquaria competitions were held.



"I'VE LOST A TANK—!"

THE **Portsmouth A.C.** stages its third annual open show on August 19-21. Venue is the R.E. Drill Hall, Commercial Road, Portsmouth. Thirty-two classes are listed on the schedule, copies of which can be obtained from Mr. G. F. Elverson, 24 Bertie Road, Milton, Southsea. Final closing date is August 14, but entries received after August 5 will not appear in the catalogue.

A WATER LIFE diploma will be up for competition at the **Urmston A.S.** annual show on August 2.

NEW secretary of **Bolton A., P. & M.S.** is Mr. A. Sewell, 36, Eskrick Street, Bolton, Lancs. At a club show held on July 9-10 Mr. and Mrs. N. Wilkinson won a WATER LIFE diploma with their miniature furnished aquarium. The society hopes to stage an open show some time in September.

FIFTH annual show of **Banbury A.S.** will be staged in the Town Hall, Banbury, from September 16-18. The Midland Association is supplying judges and two WATER LIFE diplomas will be up for competition.

A THREE-COUNTIES aquaria exhibition is being staged by **Oxford A.S.** and the Reading and High Wycombe societies. It runs from September 30-October 2 in the Town Hall, Oxford. The opening will be by the Rt. Hon. Lord Sandford and Mr. George Cansdale will present the prizes. There are 22 classes and schedules can be obtained from Mr. V. H. Lewin, 21 Halliday Hill, Oxford. They should be returned not later than August 20.

RECENT activities of **Blackpool & Fylde A.S.** have included a talk by Mr. T. G. Warburton on "Birth and Evolution of Fish," a quiz, the annual outing to Bolton Abbey, an auction sale and a lecture by Mr. E. Battersby on "Genetics." The fourth annual show runs from July 31-August 8 in Victoria Street Congregational School.

ON August 13-14, **Nelson A.S.** stages its annual show in the Carr Road Baptist School, Nelson. There are 14 classes and an engraved cup will be awarded for the best member's fish in the show.

RECENTLY-FORMED **Blyth A.S.** has Mr. K. Middleton, 8 Fifth Avenue, Blyth, Northumberland, as its secretary.

W. SURREY P. & A.C. has changed its title to **Guildford Aquarist Club.** On June 9, members heard Mr. R. Birkenhead speak on "Breeding Singletails" and, on July 14, there was a table show for livebearers. From October 2-9 a non-competitive exhibition will be staged in Guildford House, High Street, Guildford, Surrey.

MRS. J. D. PULLON, 50 Luttrell Way, West Bridgford, Nottingham, is now the secretary of **Nottingham A.S.** Mr. L. Kirchin is the assistant secretary.

MR. J. P. BROWN spoke on "Maintaining Marine Aquaria" at a recent meeting of **Bexhill A.S.** On June 3 there was a table show for Characins in which Mrs. Good's Glowlight won first prize. Mr. Walker, who was the judge, also gave some hints on breeding methods for Characins. McLynn's Aquarium, Ewhurst, was visited on June 20.

A GOLD pin was presented to Treasurer W. Layzell at a recent meeting of the **Eastern Counties Section of the Guppy Federation.**

Club Notes and News—*contd.*

NEWLY-APPOINTED vice-president of **Dunstable A.S.** is Mr. J. H. R. Leggett, secretary of the F.B.A.S., Mr. R. O. B. List, addressed a recent meeting on the subject of "Show Organization." He also judged a table show in which Mrs. J. M. Bean was the prizewinner.

MEMBERS of the **East Midlands Section of the Guppy Federation** are planning to make up a party to visit the F.G.B.S. annual show in London on October 2.

FROM August 8-15 the **North of Scotland A.S.** is staging its annual show in the S.M.C.A., Union Street, Aberdeen.

CHESTER Zoo has been visited by members of **Derwent A.C.** A feature of a recent meeting was a Brains Trust Session.

TWO London clubs, **Chelsea A.S.** and the Ministry of Works A.S., held an inter-club show at the former's headquarters on July 13 when Chelsea won with approximately a 10 per cent margin of points. The judging apparatus described on page 193 was used by Mr. P. Hewitt.

THE **Riverside A.S.** plans to put on a show in the Hammersmith Town Hall. Other future activities include a selling class show and a show for male Guppies.

MEMBERS of **Rochdale A.S.** gained 19 places (apart from the best fish in show award and a WATER LIFE diploma) at the recent successful Bury show. An inter-society table show and quiz with Bury A.S. was scheduled for July 1.

SECRETARY of **Wembley A. & P.A.** is Mr. R. W. Smith, 41 Rosewood Avenue, Greenford, Middx.

THE **Bethnal Green A.S.** is staging its fifth annual show on September 10-11. Mr. Henderson has lectured on "Pond Life."

MESSRS. T. BARTLETT and A. Elliott, of the Bristol Zoo, gave talks at the June 14 meeting of **Bristol A.S.**

CAPT. L. C. Betts and Mr. C. W. G. Creed officiated at the open show of **Bath A.S.** which was staged in the Concert Hall of the Pump Room at Bath on July 22-24.

IN an interclub table show between **Hendon A.S.** and the Willesden society, Hendon were the winners.

THE Harrow A.C. film and three others showing the development of the trout, Rasbora, and the Dogfish as a vertebrate were shown at a recent monthly meeting of Carlisle A.S.

MEETINGS of **Feltham A.S.** are held on alternate Tuesdays at the Railway Tavern, Feltham, Middx. An outing to a large fish-breeding establishment at Colchester was enjoyed by members.

SECOND annual show of **York A.S.** ran from June 23-July 3. Exhibits were judged by Messrs. E. Chapman and J. Stott.

THE **Malvern A.S.** has been inaugurated and Mr. R. T. Clooney, 94 Madresfield

LADY SIMON presented the prizes at the open show of **Northenden (Manchester) Community Association A.C.** held on June 10-12.

NEW secretary of **Peterborough A.S.** is Mrs. Y. J. Stockdale, 2 Home Place, Eastgate, Peterborough. First prizewinner in the home aquaria competition, judged by Messrs. F. C. Wright and B. Budding, was Mr. R. Newson. Talks on "Microscopic Pond Life" were heard at the June 21 fixture. The annual outing to South Bank Aquarium and Kew Gardens was held on June 27. The society's annual open show will be held from September 9-11 at Boroughbury Methodist Church Hill, Russell Street, Peterborough. Mrs. Y. Stockdale, 2 Home Place, Eastgate, Peterborough, can supply schedules. Entry forms have to be returned by August 9.

Mr. H. G. Rundle points to some fry literally caught by the bucketful from a corner of his very large, well-stocked pond at Bagshot. In the photograph, taken by L. E. Perkins, are a few of the many guests who enjoyed a sunny Sunday afternoon in his neatly arranged garden. The pool is teeming with Goldfish and has a wealth of submerged plants as well as the Water-lilies and other subjects seen breaking water surface.

IN July **Lowestoft A.S.** provided a display aquarium for the Gt. Yarmouth exhibition.

ON June 18-19, **Hornchurch & District Aquarium Society** combined with Dagenham A.S. in staging a show at the Methodist Church Hall, Becontree Heath.

SENIOR table show Challenge Trophy and Junior Trophy were presented to Mr. Davis and Master D. Hall, respectively, at the A.G.M. of **Hawick A.S.** At this meeting Mr. W. F. Davis was appointed President and Mr. B. Elsdon, treasurer. The new secretary is Mr. J. M. Bonsor, 116 Silverbuthall, Hawick.

AN AQUARIST club has been formed within the **H. J. Heinz Company Ltd.** organization. It is appropriately called the **57 Club** and its secretary is Mr. J. Curtis. He can be contacted at Messrs. H. J. Heinz headquarters in Waxlow Road, London, N.W.10.

NEW secretary of **Lambeth A.S.** is Mr. D. G. W. Page, 18 Clive Road, West Dulwich, London, S.E.21. The annual show will be held in St. Luke's Hall, West Norwood, S.E.27, on September 18.

RECENT lecturers at meetings of **Stourbridge A.S.** have been Messrs. J. Brady, M.P.S., and W. L. Mandeville.

AT the A.G.M. of **Smethwick A.S.** Mr. R. V. Noble was presented with special prizes for gaining the highest number of points in table shows over the previous year. Messrs. W. Downes and D. Stokes tied for similar honours in the coldwater section.

IN June members of **West Middlesex A.S.** had an informal discussion on keeping and breeding fish. First prizewinner at the

At an earlier meeting there was a Questions and Answers Session under the chairmanship of Mr. A. J. Hayes. The table show on this occasion was won by Messrs. P. Woodward and A. H. Charles.

THE well-known Guppy breeder, Mr. W. G. Phillips, spoke at the June 18 meeting of the **W. London Section of the Guppy Federation.** First prizewinners in the table show which followed were Messrs. S. E. Lattimer, T. Cross, P. Redsull and G. Druce.

First the Pond — Then the House

WELL over fifty aquarists, with their wives and children, accepted an invitation to an afternoon party at his Bagshot home, extended by Mr. H. G. Rundle, chairman of North Hants A.S., committee member of Staines A.S. and member of Slough A.S. All three societies were represented and among others present we noted Mr. and Mrs. Golesworthy, accompanied by Mr. and Mrs. W. J. Smith, from Southampton, Mr. and Mrs. L. B. Katterns from Feltham, Mr. and Mrs. N. E. Perkins and Mr. and Mrs. L. E. Perkins, both of Dulwich, and Mr. and Mrs. O. L. Carrington and Mr. J. N. Carrington of Dorking. The gathering was the outcome of a wish our host expressed some time ago to give aquarists an opportunity to enjoy themselves in the open air.

H.G.R. has a personality that attracts attention, and no wonder, in view of his experiences years ago. He was an ardent racing cyclist and won many prizes at N.C.U. and other meetings including a number on the Continent. Later he turned to running a night club and at one time enjoyed the precarious and expensive pastime of playing at casinos in the South of France and elsewhere. Now retired, he still lives at Bagshot where he opened a café catering for main road traffic that branches off there, left for Southampton and right for the West.

It is fifteen years since he first started to construct his remarkably well stocked and very large garden pond on what was then a piece of waste ground. During that time, the ground has been converted into a pleasant garden. Now that active management of the café has been handed over, Mr. Rundle lives in a house built to his design and specially sited after the pond had been established. Flanking the house is a fishroom containing tropicals, indoors are tropical tanks and at the back of the house is a lean-to conservatory from which a full view of the pond and garden is obtained.

Mr. Rundle, who welcomes visiting aquarists, takes active interest in local club activities and is known as a keen exhibitor. His name has appeared several times amongst those competing at the N.A.S. and other premier shows. His hospitality on July 11 was overwhelming and Mr. Katterns expressed the opinion of all present when he moved a vote of thanks not only to Mr. Rundle but to the helpers who prepared the excellent refreshments that were provided. All present hoped that the activity

Guppy Federation's Show

ANNUAL show of the Federation of Guppy Breeders' Societies will be a one-day event on October 2 in the Pavilion Cafeteria, Zoological Gardens, Regents Park, London. It will be open from 12 noon to 6 p.m.

Twenty-seven classes are scheduled, 20 of them for F.G.B.S. members only, six for non-members and one which takes the form of inter-section furnished aquaria. Numerous trophies are up for competition and these include the Pengilly Trophy and Open Challenge Trophy for the best exhibit in show, the Brossam Cup for the best breeder's achievement, the E.C.S. Trophy for the best fish in the members' classes, a plaque for the best opposite sex and an Aggregate Points Trophy for overseas and provincial members.

Entry forms can be obtained from Mr. W. Howe, 24, Kerfield Crescent, Grove Lane, London, S.E.5. They must be returned by first post on September 5. A bumper response is confidently expected and the target is 1,000 entries.

News comes to hand that a team of Guppies might be flown from South Africa. They may arrive in time for the annual show but in any case they will meet several Sections in active competition.

Eastern Counties staged their show at East Ham on June 26. There were 325 entries and Mrs. Smith (N. London) took the best fish in show award with a Scarftail. A Gold female owned by Mr. W. G. Layzell (Eastern Counties) was adjudged best opposite sex. Section points winner was Eastern Counties. Class winners were Mrs. Smith and Messrs. E. Russell, Collings, W. G. Layzell, C. R. Looker, A. J. Holloway, Tansley, D. Johnson, E. Whitmee, Boyles and Richardson.

Second issue of the comprehensive members' list has been issued by the Federation.

Underwater Town for Fish

A TWELVE-DAY British Food Fair, to be held at Olympia in September, is being sponsored by the *Daily Express* and organised by the Food Manufacturers' Association. Apart from the many exhibits on things edible, three attractions will be a scene of the Thames frozen in the 17th century, summer activities of old rural England, and what is described as "an aquarium with hundreds of colourful fish swimming in and out of their own underwater town with shops, cinemas and even a motor race track". The last mentioned may be amusing to see but we doubt whether aquarists proper will be encouraged to emulate this fishkeeping fantasy. We express surprise that the sponsors cannot show us a beaver busily building a dam across a brook. Surely that would be a more appropriate side-show?

Goldfish Standards

Bristol's Readiness to Meet the F.B.A.S.

NEWS is published in the first number of the journal of the South Western Aquatic Societies Association of a further move to improve the position in regard to Goldfish standards. Bristol A.S. is to collaborate with the Federation of British Aquatic Societies in reviewing their respective sets. A preliminary report is expected soon.

Ultimately, it would seem there will be one set of standards and, although the siding of Bristol with the F.B.A.S. might indicate a widening of the gap between those two organisations and the G.S.G.B., that need only be regarded as a transitional stage. On the whole, we believe that the research now being carried out by the G.S.G.B., coupled with a series of controlled breeding experiments, will be rewarded by their aims gaining sympathy from all who concentrate on breeding Goldfish. We will have to wait some time for that stage to be reached.

Fossilised Oyster Shells

THE re-discovery of the bed of fossilised Oyster Shells (*Ostrea vesiculosa*) at Chapel Copse, Wiltshire, has brought Mr. Ernest Chapman some interesting correspondence. Following the report in the June issue of WATER LIFE, Mr. Chapman had a further communication from Dr. L. R. Cox who writes:— There was a four days excursion of the Geologists' Association to the district around Shaftesbury, when we saw an exposure of the same bed, with myriads of specimens of the oyster, in a large roadside quarry near Fovant. One interesting point not noted previously is that all the oyster shells are silicified; that is, the calcium carbonate of which they (like modern shells) were originally composed has been entirely replaced by silica in the course of fossilisation, so that they do not effervesce and dissolve away when treated with acid. They resemble modern shells so closely that it is difficult to realise that this great change in their chemical composition has taken place.

F.B.A.S. Affiliations

AT the last General Assembly of the Federation of British Aquatic Societies, thirteen societies terminated their affiliation and nine cessations of membership were announced. This total of 22 was partially offset by four new affiliations, making the total of member societies 107, round about one-quarter of the societies known to exist in Great Britain. Expenditure (6 months) amounted to £279 13s. 6d., the cash in hand being £269 14s. 3d. The Judges and Standards Committee's report referred to new standards. Messrs. A. H. Boughton* and T. J. Horeman representing the Aquatic Traders' Association addressed the Assembly and set out the policy of the A.T.A. in its attempt to better the relationship between aquarists and traders.

*We regret to announce the sudden death in July of Mr. Boughton and express condolences to the family of this well-known trader and aquarist. His many interests in the hobby were referred to in the August 1953 issue (p. 217).

Midland Association

AT a delegate meeting of Midland Association of Aquarists' Societies held on Saturday, June 19, Mr. A. Fraser-Brunner was elected the first President. In his reply, Mr. Fraser-Brunner spoke of his appreciation of the honour accorded to him and said he would aim to further the interests of M.A.A.S., which now has 19 affiliated societies. He would be happy to serve as a link between the Association and the many other bodies of standing in the aquatic world with which he was associated.

It is intended to organise an Association Rally to be held at Dudley Zoo in September.

Television Stars

NOT only will there be a colourful aquarium on view to the public at the 1954 Radio Show at Earls Court but the tank will be shown in the internal circuit of television programmes used to advertise the merits of the sets displayed. The tank will be supplied by Fish Tanks Ltd.

Market Place Sales

IN his capacity of President of the Midland Association of Aquarists' Societies (referred to above) and as an official of the Federation of British Aquatic Societies, Mr. A. Fraser-Brunner, F.Z.S., refers to a letter from Coventry P. & A.S. read at the last M.A.A.S. Assembly. The letter complains about conditions in which fish offered for sale are kept in markets in certain Midland areas and the M.A.A.S. calls on aquarists to protest to the traders and, in extreme cases, to lay complaints before the R.S.P.C.A. Perhaps this is the kind of thing the Aquatic Traders' Association could be asked to investigate. Another remedy of course is to report incidents to the local authority who issue the offending trader's licence under the Pet Animals Act.

New Australian Body

THE Aquarium Society of Western Australia has recently been formed. Secretary of the group is Mr. Gerloch, 84 Gloster Street, Subiaco, Western Australia.

Aquarists' Internationale

Further Items from Correspondence Received by Mr. R. W. Andrews

MME. DU BREUIL (Hong Kong) sends some interesting news of local matters. The weather in late March was temperamental—temperature in the low sixties in the morning, warming up in the afternoon and turning colder again by late evening. Seemingly, it was not the weather for local fishermen as an early morning walk around the market showed the catches were very poor, the only items of interest being a large sized Sea-horse and a mound of small octopods, unfortunately all dead.

Mme. du Breuil states that she likes living near the fishing fleet for—small as it is—there is always something going on. Whilst on a recent fishing trip by sampan, she caught quite a nice mass of Groupers for soup. But the water was so clear and visibility so good that she was much more interested in watching the sea urchins on the rocks than her fishing line.

Goldfish Maintenance

MR. R. J. AFFLECK, M.Sc., President of the Goldfish Society of Great Britain, lectured to members of Bristol A.S. on July 12 on "Goldfish and their Maintenance". He had some specimens of new types with him and, although he purposely refrained from referring to the merits of the different Goldfish standards, his remarks on possibilities in breeding were carefully noted, especially those showing the limits that control shape and coloration.

Bermondsey Exhibition

FOUR aquaria classes are being run in connection with an exhibition organised by the Borough of Bermondsey at the Central Library Hall, Spa Road, S.E.16, on August 27-28. One class is open, this being for furnished aquaria (coldwater or tropical), a WATER LIFE Diploma going to the leading exhibit. Other classes are for livebearers, tropical egglayers and coldwater fish. Schedules can be had from Mr. P. F. Petto, Municipal Offices, Spa Road, S.E.16.

Late News

AT the July 12 table show of **Worcester** A.S. Mrs. V. Carter's Pearl Gourami gained first prize. Mr. R. J. Munslow was the judge. Officers elected at the A.G.M. of **Ilford** A. & P.S. were: President, Mr. A. L. Jarvis; treasurer, Mr. A. Atkins; show secretary, Mr. Peverley; librarian, Mr. J. R. Charter and secretary, Mrs. D. M. Wilson. Mr. Peverley has won the home aquaria competition for the third year in succession. There was a discussion on breeding tropical fish at the July meeting. Mr. C. Smart has been appointed President of the **Arnold Aquarists (Wembley)**. Messrs. Cave and Allies have been recent lecturers. At the summer show of Brighton and Hove Horticultural Society on July 7-8 the **Southern** A.A. had a tank of tropical fish displayed. On August 20 and 21 the **Welsh National** A.S. show will be staged in the Park Hotel, Cardiff. It is open to all aquarists resident in Wales and Monmouthshire. Entries close on August 4 and forms and schedules can be had from Mr. W. Vokes, 1a Clare Gardens, Riverside, Cardiff.

Plan for Judges

THE observations by Mr. J. W. Davies (June issue, p. 136) have brought a reply from the Aqua-Ring of Societies, consisting of Forest Hill A.S., Lambeth A.S. and Pisces A.C. (Dulwich). Details of co-operation between these clubs will be published in our next issue.

Luxembourg Conference

BELGIUM, France, Germany, Holland and the Saar were represented at a conference convened by the Grand Duchy's Federation of Aquarists at Luxembourg recently. Another international conference, this time at Antwerp, Belgium, has been called for September 11-12, when Mr. P. S. Campkin will represent British aquarists. We hope to report on these gatherings in the next issue.