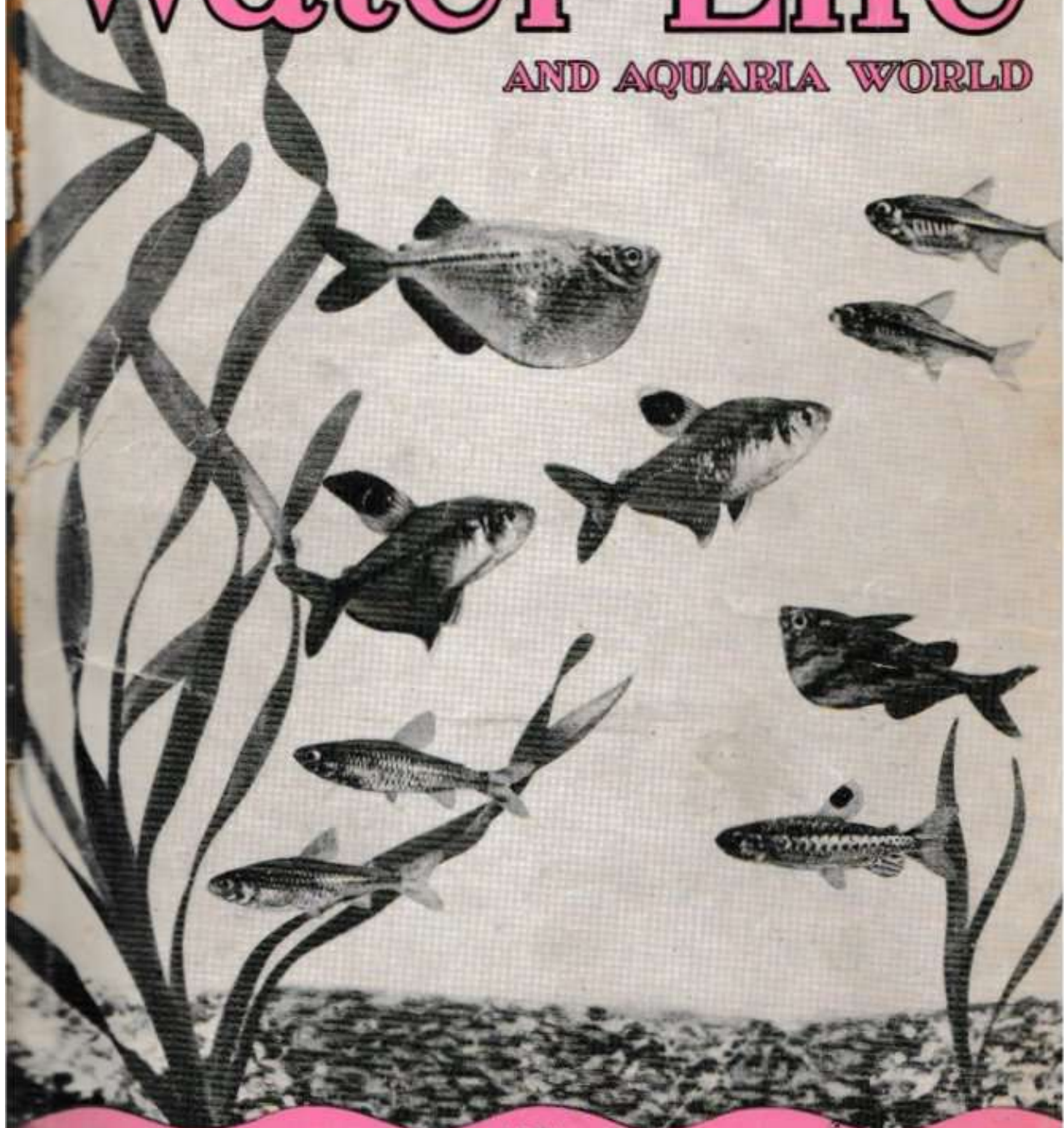


Water Life

AND AQUARIA WORLD



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TWO SHILLINGS & SIXPENCE

Water Life

AND AQUARIA WORLD

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FRONT COVER: SIX CHARACIN SPECIES.

Top left, *Gasteropelecus levis*; top right, two Belgian Blue Fish (*Hyphessobrycon heterorhabdus*); centre left, male and female Rosy Tetras (*Hyphessobrycon rosalia*); centre right, *Carnegiella strigata*; bottom left, two Red-mouthed Tetras (*Hemigrammus rhodostomus*); bottom right, male *Arnoldichthys spilopterus*.

[G. J. M. Timmerman

EDITORIAL

Healthy Constitution

FOR some weeks now, societies affiliated to the Federation of British Aquatic Societies have had in front of them a copy of a draft Constitution and, during that time, have had the opportunity to instruct their delegates to vote for it as it stands or to put forward suggested alterations. It will be discussed at this month's General Assembly. If it is acceptable in the main, it can be ratified without delay. Should there be major modifications, however, there will still be time for these to be considered and the new Constitution made operative with effect from the proposed date, i.e. 1st. January, 1952.

The present draft has been presented by the Federation's Executive Committee and a good effort it is. Due credit must be given to Mr. J. H. Gloyn and Dr. F. T. Hamblin.

What is the reason for this move to replace the existing regulations? It is nothing more than the natural outcome of the Federation's growing influence and widening policy. Provision is made for the delegation of more work and responsibility by the Executive to the technical committees, such as that appointed to consider standards and to look after the interests of the recognised judges.

National Status

Our recommendation that an area scheme should be introduced seems to be bearing fruit and the feeling about this, as expressed by the secretary, is that the Federation is slowly being looked upon as "the National organisation and not just as a federation of a few affiliated clubs". To our way of thinking, this view has long been that of the Federation and undoubtedly its decisions in the past have been framed on that assumption. Now the view is officially taken by the Federation and its policy has been based on it, as is reflected in the draft, not forgetting its title.

Representative overseas societies have contacted the F.B.A.S. The Federation believes, as we do, that much benefit is likely to come from closer international co-operation, and provision is made for it in the proposed aims and objects.

Position Regularised

The draft regularises the position of the Federation, gives due recognition to the fact that it is a federation of societies democratically controlled, rather than an arbitrary organisation, and sets out clearly and succinctly the obligations of all societies who are accepted for affiliation. Above all, it does not discourage co-operation with non-affiliated clubs and has as one of its main aims the promotion of the interests of the aquatic hobby as a whole.

Those who have prepared the draft are to be congratulated and the societies who accept it can feel that they are not going to be tied down by any unreasonable or cumbersome methods of procedure. On the contrary, ready acceptance of the draft will serve to ensure that the F.B.A.S. possesses a healthy constitution.

Species of Characins Old and New

By Elizabeth Harrington

(Continued from previous issue.)

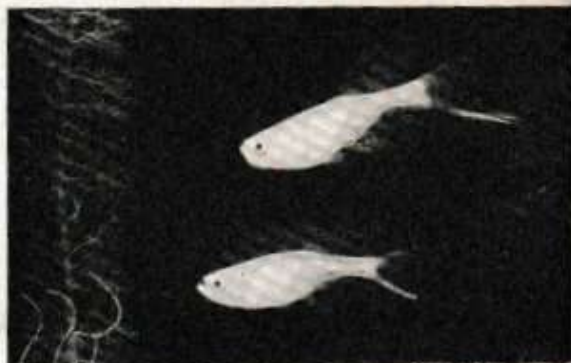
A REALLY comprehensive article on the Characidae would reach book-length and so I am forced to deal briefly with each species. In the first part of my contribution on this large Family, which appeared in the last issue of WATER LIFE, I outlined some of the more important of the many interesting facts about this popular group. In continuing the article, and before going on to describe further members of the Family, it would be opportune to say once again that not all the fish referred to are obtainable in Britain at present. Mention is being made of Characins that have been kept here or abroad so that when those not so far seen, find their way here, something will be known of their habits and requirements.

Distinctive Immature Fingering

Colossoma nigripinnis (Guiana, Amazon and Brazil). Length 4-6 inches. Several species of the Genus *Colossoma*, which are akin to the Genera *Mylossoma* and *Metynnis*, have been kept in aquaria but of them I know only one that has been properly identified in aquaria circles, namely *C. nigripinnis* (also known as *Myletes* and *Piaractus nigripinnis*). The length is given as above in reference to young fishes such as have been kept in large tanks but some members of the Genus are said to grow up to 15 or 16 inches. That, I expect, is the reason why so few are offered to aquarists. A deep-bodied fish, laterally compressed, *C. nigripinnis* is of a silvery ground colour when young, with large brownish spots on the body which disappear gradually as the fish get older and larger. Other species, it is believed, lack the spots altogether.

The fins in young specimens are distinctive, the dorsal and caudal being a dull yellow colour at the edges, with red at the base. The anal fin is a bright red. This colour changes as the fish grows, turning to a dark colour, sometimes going almost black. Rather aggressive by nature, *C. nigripinnis* will eat pieces of shedded white fish, livefoods and tinned shrimp. Temperature range 70-80 deg. F.

Corynopoma riisei (formerly *Stevardia albiginnis*). Sword-tail Characin, previously called Paddlefin Characin. Length 1½ to 3 inches. (West Indies and Colombia). What fascinating fish these Characins are! The strange shape of the male's tail and its filament-like "paddles" and the pair's



Photograph] [G. J. M. Timmerman
Male (top) and female Swordtail Characins (*Corynopoma riisei*)

breeding habits are of considerable interest, deserving mention at length. Although a fairly newcomer to the list of frequently available species in this country, they were first described nearly one hundred years ago. Both males and females are of a modest coloration, mainly silvery to silver-brown, with, in some specimens, irregular spots of a more brownish hue on the sides. The male is easily spotted when true pairs are offered. For one thing, the fins of the female are smaller, the dorsal being relatively insignificant and the caudal is almost normal V shape, with a slight thickening of the lower half. In the male, the dorsal fin is not only bigger but it is held high and the rays are not webbed at the top as they are at the base. The male's caudal fin is a most unusual shape in that the lower lobe is greatly extended, three of the rays being so prolonged as to give the "sword" from which the generally accepted common name is derived. Both sexes lack the adipose fin.

Iridescent "Paddles"

Another feature of the male fish is its possession of a long filament on each side of the body, attached to the edge of the gill plate and reaching back almost to the tail. At the extreme end of the filament is a small spot-like disc or paddle. This spot is iridescent and shows up much more than the filament itself.

The Swordtail Characin has been bred on a number of occasions although, so far, I have not had any success. However, my failure should not discourage you for others have seemingly experienced no difficulty in getting these quaint Characins to produce families. The thing that intrigues me is to find out just what happens prior to the laying of the eggs for little is known about the actual mating. I have followed the advice of different authorities and have set up well-planted 24 in. x 12 in. x 12 in. tanks, using *Sagittaria* and *Cryptocoryne*, with the water about ten inches deep but I am sorry to say that though eggs have been laid they have not hatched out. I must try once more, when I propose to reduce the water depth, increase the temperature and reduce the stock dried food in favour of more livefood, especially Infusoria.

Observations of Mating

The male waves its "paddles" during courtship and circles round the female but does not seem to embrace her, or if he does then it is but a momentary contact. He is the one who encourages the courting. Usually, the female passively awaits his advances but occasionally she resents his attentions and seems to sort out the "paddle" discs whereupon he lowers them and retires for the time being. This display,



Photograph] [Kathleen Cooke
Moenkhausia pittieri, a member of the Family which has been bred successfully. It will be dealt with in a later article.

showing and general showing-off, continues for some time before anything serious happens.

I have watched several pairs for long periods, at the expense of my housework, but have never witnessed anything which seems to approach actual mating. Perhaps I should not be surprised, for Mr. Wm. Innes, in his book "Exotic Aquarium Fishes" writes, "There is no embrace and the eggs do not appear at this time, but, from what subsequently happens, it seems as though the female is now carrying the sperm of the male in her mouth." This account of the procedure is acceptable to Mellen and Lanier for in their volume "1001 Questions Answered About Your Aquarium" they state: "It is said she fertilizes them herself, after placing them in the spot selected, with the sperm of the male which she carries in her mouth." Opposed to that theory, which is not a quite feasible, C. H. Peters writes in "Life and Love in the Aquarium" "It is our belief that internal fertilization takes place and that the eggs adhere to the vegetation." Confused and not definitely, I may, perhaps, use the expression "The eggs are money and yer takes yer choice."

The female, when about to lay the eggs, can be seen hovering round the plants and picking out some of the leaves which are suitable for the next stage. First she rubs the underside with her mouth but whether this is merely to clean them or to deposit some of the male's spawn, I cannot say. Next, she swims over the chosen leaf and lays a few adhesive eggs. This procedure is repeated a number of times until all the eggs are laid.

After a short time, the female moves the eggs to other leaves but, and this is worth noting, does not go through the process of cleaning them first. She keeps guard over them all the time and voluntarily gives up feeding while under-lying the tank. The male does not take part in these proceedings and because of this, in the hope of getting a successful spawning, I have on two occasions removed him to another tank. No sign, I have found the eggs to be infertile and to be covered with fungus after a few days but none has been seen. It has, however, been said that the eggs will disappear and they may have done in my case had they been fertile but, in view of my experience to date, I am unable to say whether the parents do occasionally like a change of diet in this direction.

Normal Diet of Livefood

Apparently, the eggs hatch out from 24 to 36 hours after spawning, the fry being very small, even several days after the yolk sac has been absorbed, and they are completely free-swimming. Infusoria is essential for the young and it is supplied by the adults who always need a varied livefood diet. *Daphnia* is snapped up eagerly whenever provided. The temperature range is 70 to 85 deg. F., with an average of 76 deg. at spawning time.

Congorosa bent. (Bolivia and Venezuela). Length 2-3 inches. Specimens have been bred on the Continent and if we get imports of this fish we can probably emulate our German and Dutch fellow aquarists. The eggs are, apparently, laid at periods after fertilisation. The eggs are deposited on leaves and after up to 36 hours hatch out but remain attached to the plants for a day or so. The development is very quick for the first few weeks; then, it is said, it is relatively slow and maturity is gradually reached but not till after they are fully grown at about

seven or eight months. Temperature range 70-76 deg. F.

Cretoichthys affinis. (Amazon). Length 3-4 inches. From information I have received, it would seem that this species, which, so far as I know, has not reached this country, is one which is extremely interesting, because of its pugnaciousness. It is a colourful fish and is said to be very lively. Breeding habits are not yet known but a single pair in a reasonably large tank could no doubt be watched carefully and, eventually, the conditions they require, provided. I am always keen to obtain new species and to try to create surroundings such as they would naturally find. Much time may be lost in working on the wrong lines but seeking for the correct method is half the fun of fishkeeping. Temperature range 60-75 deg. F.

Ctenobrycon spilurus. Silver Tetra or Spilurus (Guiana to the Amazon). Length 3-3½ inches. The male which is slightly smaller than the female does not possess the red tint on the anal fin. It is said that minute "hooks" on the anal fin of the male are a sure sign of the sex. Certainly, from reports I have seen, there has been no mention of similar hooks on the anal fin of the female. As pairs come into condition, they become especially active, and their interest in each other has been likened to "dancing."

When the male is ready, instead of being the less aggressive, he changes his attitude from one of inferiority and starts to chase and drive the female. She takes refuge in the thickest clump of plants but the male seeks her out and spawning then takes place, the eggs being laid on the leaves. Large tanks are necessary as there is much chasing and in a confined space the fish will refuse to breed. The eggs hatch out in three to four days. The parents have a particular liking for the eggs and the young so their removal soon after spawning is essential. Temperature range 60-80 deg. (70-75 deg. for breeding).

Distichodus noboli. (Equatorial East Africa). Length 3 inches. Here is one of the few species which do not come from the New World. It is somewhat Barb-like in body shape though it has the Characin characteristic of an adipose fin. There are no records, so far as I know, of it having been bred or of species reaching America. Here we saw one or two specimens, I am told, in a consignment which reached us some years ago via Germany. The colour is bronze to olive with silvery underparts. A dot is seen near to the base of the tail. The fins are almost transparent, with a slight reddish tinge. If we see specimens over here later, we must be prepared to watch our well-planted tanks for it is said that these fish have a liking for young shoots. Livefoods are required and both mosquito larvae and *Daphnia* are eaten in quantity.

Epiplatys microlepis. (Brazil and Argentina) 3 inches. This species was first recorded in this country, I believe, in a pre-war issue of WATER LIFE when Mr. Wm. Gannett contributed an article on their habits. Apparently, they were first called Brass Tets, a name sometimes given to *Hyphessobrycon bifasciatus*, another Characin. In fact, they are not unlike *H. bifasciatus* in some respects, having a yellowish colour, a typical compressed body shape, long anal fins, and flattened heads. A greenish lateral stripe is noticeable as are small dots and streaks.

(To be continued.)



Photograph

[W. S. Pitt

Silver Tetra or Spilurus (*Ctenobrycon spilurus*) from Guiana.

Effect of Light and Heat on Shubunkins

Excess Light is Not Dangerous, But
Heat Can Cause Functional Disorders

By K. M. Smith

WHAT are the effects of light and heat on Shubunkins? It has often been asserted that bright sunlight is detrimental to fry and affects their coloration; while a correspondent in the April (1948) issue of *WATER LIFE* considers that it might have been the cause of the loss of two spawnings. From experience I cannot agree that light is detrimental to either fry or their colouring and I cannot accept the idea that excessive light is a cause of death.

Before the war I used a greenhouse, since destroyed by enemy action, for hatching and rearing fry. This was fully exposed to the sun and consequently the temperature of the water was frequently over 95 deg. F. by late afternoon. Since the house was unshaded the rearing tanks were often green with unicellular algae, which provided a certain amount of shade and food for small fry. I experienced no losses due to excessive light, nor did the effect of the light appear to be detrimental to the colouring of Shubunkins which I consider, from experience, to be hereditary and not affected by external circumstances.

Fry showing good mottling do not always make fine fish, but shading the tank will not alter this as I have proved, since 1945, by keeping fish under conditions where plant life requires artificial light to maintain even indifferent growth. It must be remembered that Shubunkins are man-made fish from natural mutants and it is probable that "fading" or pale fish are the results, not of excessive light, but indifferent selective breeding, and greater care should be taken in the selecting of parent fish.

Shubunkin fry can stand a wide range of temperatures, but it must be remembered that the higher the temperature the higher the rate of metabolism and consequently more food is required.

Once the fry begin to grow great care should be taken to avoid overcrowding, since the warmer the water the less oxygen it contains. It is probable that many of the losses attributed to bright light are actually due to oxygen starvation.

The effects of heat on fish beyond the fry stage is another point which should not be ignored. I have observed a condition arising when fish in a well-planted tank have been subjected to bright sunlight, and a consequent high temperature of 90-100 deg. F., when the increase in temperature has been sudden, such as during a hot bright afternoon after a cool cloudy morning.

The finnage of fish under such conditions often appears to contain small bubbles of gas while the fish themselves seem to suffer a considerable amount of discomfort and distress and are not capable of proper swimming control. Now I have heard people say that this condition is due to too much oxygen in the water but, from my knowledge of the human respiratory system, I say that this is incorrect.

Methods of Gaseous Exchange

The lungs of the human-being perform the same functions as the gills of a fish, i.e. the exchange of oxygen and carbon dioxide between the atmosphere (in the case of fish, the water) and the bloodstream. The atmosphere consists of approximately 78 per cent nitrogen, 21 per cent oxygen and 1 per cent other rare gases, and it is an established fact that the human lungs are incapable of utilising more than 4 per cent of an inhalation. This 4 per cent is the oxygen which is

exchanged for carbon dioxide and the exhaled breath contains 78 per cent nitrogen, 17 per cent oxygen and 5 per cent carbon dioxide and rare gases. If the body requires more oxygen, as is the case during physical exertion, the respiration increases in volume and frequency, but the 4 per cent exchange in any one inhalation remains constant.

Although I know of no records of the oxygen requirements of fish, it is reasonable to suppose that the exchange rate is a constant percentage; the amount of oxygen required controlling the action of the gills.

Reason for the Condition

Having disposed of a fallacy, we must now endeavour to find the cause of the bubbles.

The condition of bubbles in the body fluids, which is more apparent in the semi-transparency of the finnage, can be accurately described as "bends". This is a condition which often arises in the bodies of divers, workers in pressure chambers (such as tunnellers) and in members of air-crews in high-flying aircraft, when the change of pressure is sudden. Much research on this subject has been done during recent years, as a result of the war. Now divers and air-crews may seem a long step from aquarium fish but if the condition is to be understood, the cause of "bends" should be explained.



Photograph]

[Kathleen Cook

The interior of a professional fish and plant propagating establishment. This building has a glass roof and is fully exposed to natural daylight.

It has been proved by medical men, both in Britain and America, that when a body is subjected to a rapid reduction of pressure the body fluids give off bubbles of gas which increase in volume and frequency as the pressure is reduced the bubbles being composed of nitrogen, oxygen, water vapour and carbon dioxide—nitrogen being in the greatest proportion.

It is widely known that a diver never comes straight up to the surface after working at a considerable depth (except in an emergency) but ascends by stages, this is to allow the body fluids to adjust themselves to the gradually reduced pressure; after an emergency ascent he must be placed in a compression chamber in which the pressure is gradually decreased. In the case of aircrews, where the work is to be done at a reduced pressure, it is not possible for the adjustment to be made gradually owing to the time and fu

measured and so other methods are used, which include over-light saturation in oxygen (often mixed with one of the inert gases such as helium or argon) since the elimination of nitrogen does much to overcome this condition.

Having explained the cause of "bends" and the nature of the bubbles, we must see how this applies to fish. When water is heated it becomes less dense; since it is less dense it exerts less pressure at a given depth than when it is cold. Hence a considerable sudden rise in temperature will give a sudden drop in density and reduced pressure; consequently the condition is such that the body fluids of the fish will start to bubble.

The condition most, of necessity, only arise under certain circumstances, such as when the aquarium is relatively small, less than thirty gallons, or even in a small exposed pond where the depth is less than about fifteen inches, since greater volumes of water will heat up more slowly allowing

the fish to become gradually adjusted to the reduced pressure. These figures should not be taken as "tried and proven facts" and are used only to indicate that small shallow volumes of water heat more rapidly when exposed to the sun's rays than larger and deeper ones. It is the rate of rise, rather than the comparative increase of temperature, which brings about the condition in the fish.

Since we know the cause, the cure is simple. Allow a trickle of cold water to flow through the tank at the rate of about one gallon per minute, this will cool the water and increase its density and, in due course, the bubbles will be reabsorbed into the body fluids. When this condition is observed, apply the treatment without delay as the fish will be suffering and it may even prove fatal. Do not remove the fish to an aquarium containing cold water as the shock may kill them. I have effected a number of successful cures of this condition, but I must admit that I found the cure long before I understood the cause.

Phenomenon of Hibernation

Various Aspects of the "Winter Sleep" in Cold-Blooded Creatures

By Alfred Leutscher, B.Sc.

THE word hibernation is a familiar one, both to the layman and to the scientist. It figures in the writings of Julius Caesar and where he recounts his campaigns through Britain and Gaul he often speaks of legions "taking up their winter quarters". Hibernation comes from the Latin *hiberna*, meaning "winter quarters".

In modern usage this word has come to mean a condition of winter sleep, rather than merely spending the winter in a particular situation, and the emphasis is on the act of sleeping. The zoologist implies this but is cautious in his use of the word as a scientific term where animals are concerned. The fact that some animals, such as the squirrel, beaver and bear, may sleep for days on end during a cold spell, does not necessarily mean that they are hibernating. Often, their tracks may be found in the snow.

How Animals Under Wintry Conditions

Hibernation is much more than a mere sleep during the cold season and it can only take place in lands where winter conditions prevail. Most animals which live there have no choice in the matter, and are forced into hibernation during seasonal winter. This is because they are "cold-blooded". All invertebrate animals, and all vertebrates except mammals and birds, are cold-blooded.* The temperature of their bodies is the same as, or very little above, that of their surroundings, and it varies with it. This is important since the process of life, called metabolism, is controlled largely by temperature.

The metabolic rate of life is greatest at high temperatures and lowest, almost at a standstill, at low ones. There are limits to this. A temperature over 100 deg. C. seems fatal to most animals, when the proteins of living tissues congeal, and at freezing temperature or below, life cannot be sustained for very long. Fish and amphibians will sometimes survive at ice, but only for short periods.

As winter approaches the cold-blooded animals become less and less active as their "rate of living" slows down. Gradually they become quite torpid, often huddled up in attitudes of sleep and usually hidden away in some retreat. The heart beat slows down, there is little or no movement, and respiration almost ceases.

Hibernation is, in effect, a compulsory act in the cold-blooded animal (the dormouse and certain other warm-

blooded animals also hibernate but are curious exceptions), and it is interesting to note that there is often a fixed routine in the animal's behaviour before it settles down to this condition. One obvious act is the effort made to go into hiding. Many insects crawl away into nooks and crannies, and are not seen again until spring. Among freshwater fishes there is a tendency to retire into deeper water and, as it were, "hole up" in a hollow in the pond or river bottom. Some fish, such as the Tench, Carp and Eels, may even burrow into the mud or plant debris. This is certainly the case with some amphibians. In Britain the Common Frog, and frequently the newts, will burrow into the bottom of the pond or ditch, from which they are sometimes dug out during clearing and ditching operations. The fact that they are able to survive under tons of water without suffocating suggests that their rate of respiration is very low. What little dissolved oxygen is required by the frog is respired through the skin, which in Amphibia is naked, often moist, and acts as a kind of third lung.

British toads, on the other hand, prefer a place on the land for hibernation. The Common Toad finds a hole in a wall, a flower-pot, pile of rubble or even a cellar, where it is sometimes found in mid-winter, whilst the Natterjack digs a tunnel into the soft ground, or sand, in the areas where it lives. Snakes and lizards burrow into heaps of debris and vegetation, such as woodpiles, brick dumps and piles of hay and leaves. Winter dens of snakes are sometimes exposed to view, and in them tight balls of the serpents are found (Rattlesnakes in America and Adders in Britain), the creatures having come together prior to hibernation.

Advantages to the Creature

This going into retirement has certain advantages in tiding the animal over the cold winter months. Firstly, any risk of sudden temperature changes, which may occur in exposed places, is avoided. In a hole in a wall or log, or below ground, the temperature is much more stable and rarely reaches the danger level of zero. Those animals among invertebrates with an aquatic stage somewhere in their life-history usually hibernate in water (e.g. insects). There, in winter, is a temporary prison when ice lies on the

* The correct term for this condition, as used by zoologists, is poikilothermous (from the Greek, *poikilos*—various; *therme*—heat.)

surface, but a safe one. The bottom water will not fall below 4 deg. C., its maximum density, unless the whole pond freezes up, which it rarely does.

Another danger from exposure, coupled with that of freezing, is desiccation. Water is vital to life, especially in a hibernating animal which cannot go in search of it and is continually drawing upon its own resources. In its place of hiding the air is still and humid, even at low temperatures.

Thirdly, retirement means safety from enemies at a time when a hibernating animal is asleep and cannot escape. Fourthly, food is at a premium during the period. Nectar and plant juices are no longer available to the vegetarian insects. These creatures and other invertebrates, the food of the carnivores such as the frog, lizard and newt, are themselves asleep.

It is a paradox that the more severe the winter, the safer is the hibernating animal. It is well hidden, whereas the active, warm-blooded mammal or bird is the one which suffers from exposure to cold and lack of food. The mild winters are the danger periods for the winter sleepers. Lured into the open on a warm winter day they become active for a while. Butterflies and bees emerge into the winter sun, snakes bask at the surface and frogs swim about in the water. This awakening is only temporary, for there is a sudden frost and many a reveller is caught in the open, only to die from exposure.

A late spring frost can also be dangerous to air-breathing animals which hibernate in water. Frogs, newts and insects become active at the first signs of spring and their rate of respiration increases. Suddenly the source of oxygen supply (i.e. the atmosphere) ceases as a layer of ice forms on the surface. The demands for oxygen, which were slight during sleep, are now far greater and the animal suffocates. This may explain the high number of deaths among frogs and toads, and even fish, where ice forms in late spring. Dead bodies may be seen in hundreds after a late thaw, as was the case after the late winter of 1946-7.

One important influence which a winter has on many plants and animals occurs at the egg or fruit stage. Botanists and horticulturists know that a period of rest is necessary before a seed can develop. In Britain this usually occurs during the dormant winter period. No less important than the rest is the low temperature to which the seed is subjected as it lies in the earth. Among aquatic plants there are many which produce so-called "winterbuds", or turions. These fall from the main plant, which dies away, and rest on the pond bottom. A spell of low temperature is required if they are to develop into healthy plants. Aquatic animals, such as *Daphnia*, produce "winter eggs" in autumn. This is the result of a sexual act between the female, and the male which only appears at this time. The winter egg can resist the rigours of cold, and will not hatch until it has done so. A classic example among insects of this necessity to hibernate is found in the silk-worm moth. If the egg (which normally passes through a winter) is kept warm it fails to hatch.

Hibernation also has an important influence on the sexual cycle of some cold-blooded animals. The reproductive act is part of a mechanism which is so adjusted to the life of a particular animal that its baby is brought into the world at a time of year which is most favourable to its survival. This

is usually in springtime. One can appreciate the reason for this—a season of plenty, with long days and mild temperatures. It is the cause which is still a puzzle. What is it that stimulates the breeding behaviour at a particular time of year? People who breed amphibians from year to year are aware that a newt, which normally hibernates, will fail to breed if not allowed to do so. Male newts, which spend an active winter in the warmth of an indoor aquarium, will fail to produce their crests and the females will show no desire to lay eggs. If already out of water they may even refuse to enter it at the breeding season. Anatomical dissection of frogs in late autumn will show that they are already in full breeding condition—the sex organs are ripe and the fat bodies swollen with reserve food. The clasping reflex of the male is present and yet, if placed together, a pair will not mate. Pairing and egg-laying only occurs where the frogs are allowed to hibernate. The author has had similar experience with Sticklebacks. Here again, if they were kept indoors at warm temperatures throughout the winter, the males showed no desire to build a nest.

It is believed that some external stimulus is necessary to start the chain of events which culminate in the breeding act. At the floor of the brain is a small but important gland—the anterior pituitary. This secretes a powerful chemical

hormone which is discharged into the blood stream. This awakens the sex organs to activity, thereby bringing about a physiological change which is so striking that for part of the year the animal, especially the male, takes on an entirely different mode of life. Colour, sexual adornment, behaviour and many other characters are greatly affected, and the stimulus which leads up to this may well occur in hibernation.

Because of the above many readers who keep specimens of fish, reptiles and amphibians which normally hibernate, are faced with the annual problem of what to do as winter approaches. It can be stated that in most cases no harm will come to

the creatures if they remain active during winter, as will be the case if they are kept indoors at a warm temperature. In this case, however, they must be fed throughout that time. Those kept outdoors will hibernate naturally, the fish in their ponds (where ice forms this should be broken), and the amphibians and reptiles in their reptiliary, in cracks and holes, in leaf-mould or under other suitable cover, away from frost. Newts, terrapins and frogs will even bury into mud and debris under water. Land tortoises are best stored away in boxes containing dry leaves or hay.

The important point is that if successful breeding is to continue, the animals in question must be allowed to rest, at least for some weeks, at low temperatures. Of all cold-blooded creatures it is probably the Goldfish which has so far produced the most constant and satisfactory results in the sphere of breeding. It would be interesting to hear what the Goldfish breeders have to say to the following questions. Do they keep their breeding stock under natural conditions during winter, by placing them in outdoor tanks or ponds, or by allowing the fish-house to cool down? Alternatively, is heat maintained throughout winter so that the fish, in effect, live through an everlasting summer? In other words, is hibernation encouraged or not and, more to the point, which method produces the better results at breeding time? My personal view is that nothing can better Nature where she is allowed to take her natural course.



Photograph

(L. E. Day)

Common Toad (*Bufo bufo*) newly awakened from hibernation.

Diseases of Fishes

Parasitic Infections of the Internal Organs

By C. van Duijn, Jnr., A.M.Tech.I. (Gt. Britain), F.R.M.S.

DISTOMUMS that belong to the *Trematoda* (Sucking Worms) are often to be found in fish. They have more or less flattened bodies, are not membered, and are equipped with suckers or hooks for fastening themselves to their hosts. In a rare Sucking Worm that is parasitic on the internal organs of fish have one or two sucking discs. The anterior end of the creature has no anal opening and are generally linked. Reproductive organs have a complicated structure. These Sucking Worms are hermaphrodites, i.e., each contains both male and female reproductive organs. Some Sucking Worms produce eggs, whilst others are ovoviviparous. Larvae which hatch from the eggs often show a characteristic metamorphosis.

Water Tapeworms Found in Fish

Most species of *Trematoda* that have been found in the intestines of fish belong to the Genus *Distomum*; these are tapeworms. Larvae hatch from the ova and they swim freely through the water by means of cilia which cover the body. This stage is called miracidium. The miracidium attacks its first host which is a snail or mussel and develops into a band-like shape, called sporocyst, which produces a large number of new sporocysts by asexual division. Finally, the sporocysts change into a new stage, consisting of an oval or ellipsoidal body with a tail, called cercaria (from Latin "tail stage"). The cercaria leaves their host and swim freely through the water until they find a second host, which may also be a mollusc, or fish or other animal living in the water. Then the parasite metamorphoses and rests until its host is eaten by the definite host of the Sucking Worm. When this happens the cyst is laid and the young cercaria ripens to an adult Sucking Worm which produces eggs and starts the complicated life cycle again.

From the description it can be seen that the introduction of these parasites into the aquarium may occur when infected snails or mussels are brought into the tank. Theoretically it would be possible to introduce them with other materials from these waters but that risk is very small. To avoid infection, it is advisable to introduce to your tanks only snails from waters in which no fish are present, if this is possible. If not, the snails can be kept in quarantine for some weeks in a small container where no fish are present before putting them in the tank. Then the parasites will leave the host and die.

A few specimens of Sucking Worms in the intestine of a fish will not do much harm. If there are a number, or if the fish is small, the victim may become thin, but these parasites will not cause death.

Tape Worms (Cestoda)

Tape Worms do much more harm to fishes than the Sucking Worms, but they are seldom found in

aquarium fish. A Tape Worm has a so-called "head", or scolex, bearing sucking discs, hooks, or both, for fastening it to the organs of the victim. The body consists of a number of members, called proglottides, in each of which all the important organs are present, including those for reproduction. The scolex of the Tape Worm produces the proglottides which in turn produce eggs. From these the larvae hatch out and they must be taken up by a suitable host. If this host is eaten by the definite host the larva develops into the adult Tape Worm. Some Tape Worms of fish differ from this general scheme by having a simpler structure, e.g., *Ligula simplicissima*, which is not membered.

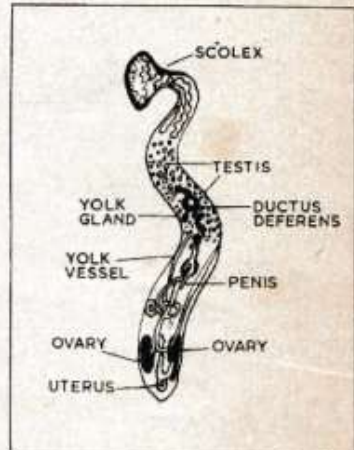
The Tape Worms to be found in fish may be classified into three groups. The first which will be discussed are those living in the intestine. To these parasites the fish is the final host in which the worm reaches the adult stage. One of the commonest members of this group is the Clove Worm, *Caryophyllæus laticeps* or other species of the same Genus. This species may reach a length of 3 cm. The larvae live in *Tubifex* and fishes may thus be infected with this parasite by eating infected *Tubifex* worms. This risk does not arise if *Tubifex* which have been obtained from waters where no fish are present or which have been cultured, are offered.

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Structure of *Ichthyotaenia*

Another worm of this group is *Ichthyotaenia*. This organism has a membered body and a scolex with four sucking discs without hooks. The larvae live in *Cyclops* and *Diaptomus*. This species will not do much harm.

The second group of Tape Worms lives in the belly of their victim and to these the fish is not the final host. Two species must be described here, namely *Ligula simplicissima* and *Schistocephalus dimorphus*. *Ligula* is not membered and lives free in the water during its first larval stage (coracidium) until it is eaten by a Cyclopid (*Diaptomus*) where it develops into its second stage (proceroid). If this organism is eaten by a fish the parasite penetrates from the intestine into the belly and reaches its third stage (plerocercoid). Development into the adult worm takes place in the intestines of water birds after the fish has been eaten by the bird. When in the bird the creature produces eggs which leave with the excrements and fall into the water, where they hatch and start the cycle anew. Thus infection



A specimen of the Tape Worm species *Caryophyllæus mutabilis* (after M. Schultze) indicating position of the reproductive organs and scolex.



Ligula simplicissima (after Hofer), one of the unsegmented Tape Worms.

of fishes can only occur if they are fed with Cycloids that have been obtained from waters where there are fish-eating water birds or where fishes live. Consequently it is not difficult to avoid introducing these parasites into a pond or an aquarium.

Symptom of this type of Tape Worm is a swelling of the belly of the fish due to the space which is occupied by the parasite. The extent of this swelling depends on the size and the number of worms present. The swelling may be distinguished from enlargements due to Dropsy, constipation, or diseases of the ovaries, by the fact that the belly is caved in near the heart. The reproductive organs of the fish will be destroyed completely by these parasites so that they become infertile and finally the victims die. If examined in section, the diagnosis will be certain, for the large worms may be easily recognised. Curing a fish which has been attacked by Tape Worms is impossible.

Ligula may reach a considerable length (a worm of about 7 ft. was once found), however, the average size is about 20-30 cm., which is large enough to do considerable damage to the fish in which it is living. In cases where very strong fishes are infected, the victim may live until the pressure of the worms in its belly has become so great that it bursts.

Adult Stage in Water Birds

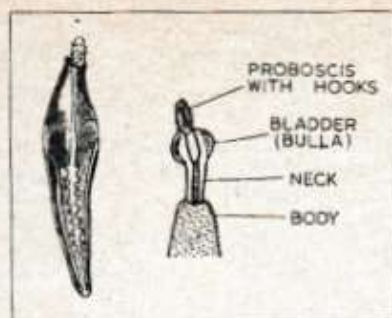
Then the worms escape into the water, where they may live for ten days. If they are eaten by a water bird, they develop into adult worms in the intestines of the bird. As an interesting fact it may be mentioned that *Ligula* are eaten by fishermen in some parts of Italy and France. They call them "maccaroni piatti" or "vers blancs" (white worms).

Schistocephalus has, until now, only been found in Sticklebacks (*Gasterosteus*), where it appears very often. This worm is smaller than *Ligula* and is membered. Symptoms are the same as in *Ligula* infections of fishes in the Carp family. In female Sticklebacks the fishes appear to be full of ripe eggs, but in reality such fishes are full of worms and are completely infertile since their reproductive organs have been destroyed by the parasites.

The third group of Tape Worms are those which live as larvae in the bellies of some fishes, and as adults in the intestines of others. The most common member of this group is *Trienophorus nodulosus*. The larvae, which hatch from the eggs eight days after they have been produced, are eaten by *Cyclops*. If the *Cyclops* is eaten by a fish, the larva penetrates from the intestine into the liver, where it encysts. The cysts have a size of some millimetres and can be easily distinguished in section. A few cysts are sufficient to produce serious illnesses, even in big fishes. If the fish is eaten by another, the cysts open and produce the adult *Trienophorus* worms. In Nature, the adult worm is found mostly in Pike.

Nematoda

Some species of this group of worms live in fish during their larval stage, whilst the adult form is produced when the fish is eaten by the definite host. The larvae have a size of a few millimetres and live for a short period in the skin or in the internal organs and then they encyst. Generally the cysts are the size of a pin's head, although larger ones may



Two members of the Acanthocephalidae, left, *Echinorhynchus globulosus* (after Bremser) and, right, "head" region of *Echinorhynchus proteus* (after Roth).

occur. They are formed on the outside of the intestine, or on the peritoneum, pancreas, liver or other internal organs. If there are many cysts, serious inflammation of the internal organs of a fish may occur.

Other species of *Nematoda* live in fishes in the adult stage. Most of these are found in the intestines, the muscles and the reproductive organs, and do not do much harm to the fish. *Ancyracanthus* is a worm of about 3 cm. in length and it lives in the swim-bladder; *Ichthyonema* is characterised by its red colour and it lives in the belly; *Cucullanus elegans* lives in the intestines and in the eye. *Cucullanus elegans* may be found very often in Perch (*Perca fluviatilis*). Females have a size of about 12-18 mm., while the

males are only 5-8 mm. The organism is livebearing and produces larvae of about 0.4 mm. in length. These swim freely through the water till they are eaten by a *Cyclops*. In the belly of this little animal they grow and develop further, but reproductive organs are not formed. These only develop when the *Cyclops* is eaten by a fish.

Another species of *Nematoda* which may be mentioned here is *Paramermis crassa*. The larvae of this worm have a length of 5-9 mm. and width of 0.15-0.25 mm. They live in the body of red mosquito larvae ("Bloodworms," larva of *Chironomus*). If the "Bloodworms" are eaten by a fish the larva develops into the adult worm which reaches a length of 3-5 mm. and width of 1 mm. When it is full grown, it may leave the fish by boring through the internal organs, the muscles and the skin. In most of these cases a tumour is formed on the dorsal surface of the body which bursts open and the worm emerges. The fish die afterwards as a result of the damage.

The risk of introducing this parasite into tanks will be eliminated if only mosquito larvae from waters containing no fishes, or that have been cultured, are used for feeding.

Acanthocephalidae

This is still another group of worms that may attack the internal organs of fishes and they are typical parasites of the intestine. They are characterised by the possession of a proboscis, bearing a large number of hooks, by means of which the creatures fasten themselves to the intestinal wall of their victims. The body is not membered. The larvae live in the so-called Freshwater Shrimp (*Gammarus pulex*), the Water Louse (*Asellus aquaticus*) or in insect larvae. If the organism is eaten by a fish, the parasite bore into the wall of the intestine with its proboscis, and grow and develops into sexual ripeness. After mating, eggs are produced. In the members of one Genus, namely, *Pomphorhynchus*, a fish is not the definite host, but the secondary host only, and the adult stage of the parasite is reached when the fish is eaten by a water bird or by another species of fish.

Preventing Introduction to the Tank

Introduction of these parasites into the aquarium may occur with livefood but if this is sieved, so that the organism in which the larvae of *Acanthocephalidae* may be present are separated, there will be no risk whatsoever. *Gammarus* and *Asellus* are, however, excellent food for large fishes such as Acaras and other Cichlids but it is often possible to recognise the presence of worm larvae in these livefood as they appear as dark or coloured (sometimes orange) spots in the grey body of the little animal. Consequently it is possible to feed these organisms without risk, if only they are examined prior to feeding.

The *Acanthocephalidae*, of which the most important



A species of Nematode worm *Cucullanus elegans* (after Hofer).

parasites are *Echinorhynchus* and also *Pomphorhynchus*, *Leishmanophthalma*, *Corynosoma* and *Rhadinorhynchus*, are very dangerous parasites and will cause death of their victims, due to the perforation of the intestine.

Ichthyophthiriasis Disease

This disease is due to *Ichthyophonus hoferi* or a related species, a parasite belonging to the group *Chytridiaceae*. In living fish diagnosis is difficult since no distinctive symptoms appear. Diseased fishes swim with sluggish movements as if they were numbed. Then they lose their equilibrium and finally die, without showing signs of disease, because when the parasites have penetrated into the brain, they make tumbling movements.

Recently, cases of this infection have been investigated in Trout and Fish (*Macropodus*), which showed ulcerous lesions in the skin, about the size of a pea. These lesions were contained many cysts of *Ichthyophonus*.

Generally, however, the parasites are to be found in the internal organs, i.e., the heart, liver, kidneys, spleen, reproductive organs, stomach and intestines and also in the muscles. In section the cysts may be recognised easily, especially when with the naked eye or at least with the aid of a low-power magnifying glass. The cysts appear as whitish-grey granules lying between the tissues of the organs. When examined under the microscope they seem to be surrounded by a thick membrane. They contain a plasmodium which grows out periodically and penetrates through the whole organ.

Organs which contain many cysts feel hard, like stones, and when they are held with forceps. The disease takes a very long course. It may be months, or even years, before the victims die as a result of the gradual destruction of the internal organs. During this period they will slowly become pale and dark-coloured.

Infection may take place if a fish eats an infected fish which has died or if it eats the cysts, which have entered the water from the gills or the skin of an infected specimen. In the stomach the cysts open and produce a number of zoospores, which have a size of 10-20 microns. After a day, these penetrate into the mucous coat of the stomach, then into the blood, and finally they are transported by the blood stream to all internal organs.

Method of Infection

The day after the infection occurs, the cysts may be found in the heart, liver and other internal organs. They may reach a size of 150 microns, or even more. The parasites reproduce themselves in the organs of their host, if the temperature is sufficiently high (thus in coldwater fishes during the summer and in tropicals the whole year through). In some cases reproduction may be so rapid that in a fortnight an organ can be totally filled with cysts so that, if it is removed from the creature, death may occur in a very short time.

In aquariums, *Ichthyophonus* has been found in Paradise fish (*Parachanna*), a species of *Aequidens*, *Hemigrammus*

unilineatus, *Pterophyllum eimekei* and Veiltails. The parasites have also been found in several species of fish in seawater tanks. It is impossible to heal fishes infected with this parasite.

Sleeping Sickness

In fish, a Sleeping Sickness may occur which is related to the Sleeping Sickness of men and cattle. Fishes may lie on their side for weeks, slowly breathing and showing very little movement. If they are placed in an upright position they will swim for a while, but then they fall on their sides again. Gradually they grow thin, since no food is taken, and finally die from weakness and exhaustion.

Microscopical examination of the blood of such diseased fishes will show the presence of small unicellular parasites, belonging to the *Mastigophora*. Although in Sleeping Sickness of men and cattle, species of the Genus *Trypanosoma* (characterised by the possession of one flagellum only) are found most cases of this disease in fish are due to members of the Genus *Trypanoplasma* which have two flagellae.



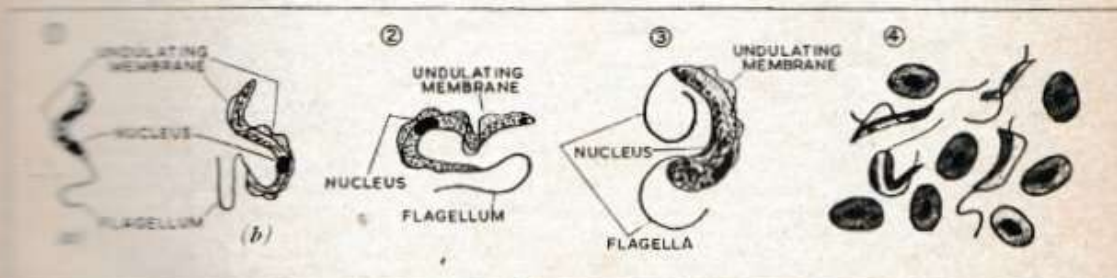
A cyst of *Ichthyophonus*. This parasite belongs to the Chytridiaceae.

Infection takes place if a fish is attacked by a leech which has sucked blood from another infected fish. Direct infection from fish to fish cannot occur and therefore the disease will not often be met with in aquariums, since leeches are not introduced into a tank intentionally.

When such organisms are present on plants or other materials they may be seen easily and removed.

So far the following species of this group of organisms, which are found in the blood of fish, have been found:—

Trypanosoma Remaki, forma parva—length 15-20 microns, breadth 1.4 microns, length of flagellum 14 microns; *Trypanosoma Remaki, forma magna*—length 26-28 microns, breadth 2-2.5 microns, length of flagellum 17-19 microns. Both varieties live in the blood of Pike (*Esox lucius*). *Trypanosoma granulorum*—length up to 55 microns, breadth 2.5-3 microns, length of flagellum 25 microns. This parasite has been found in the blood of Eels (*Anguilla vulgaris*); *Trypanoplasma Borelli*—length to 20 microns, breadth 3-4 microns, length of flagellae 15 microns. It has been found in the blood of *Leuciscus erythrophthalmus*; *Trypanoplasma cyprini*—length 10-30 microns. The flagellae are not of the same length, one being only half as long as the other. This parasite has been found in the blood of Carps (*Cyprinus carpio*) which become anæmic if large numbers of parasites are present. The gills will become pale and the blood becomes watery. Thus normal respiration is impeded until finally the victims die from anæmia.



Organisms responsible for Sleeping Sickness in fish. Fig. 1, *Trypanosoma Remaki*, (a) *forma parva* and (b) *forma magna*. Fig. 2, *Trypanosoma granulorum*. Fig. 3, *Trypanoplasma Borelli*. All after Laveran and Mesnil. Fig. 4, *Trypanoplasma cyprini* between the red blood corpuscles of an infected Carp (after Marianne Plehn).

Bristol's Challenge Taken Up

By Capt. L. C. Betts

THE proposals by the Bristol Society for the further revision of Goldfish standards, as outlined by Mr. R. V. Coombs in the August issue of *WATER LIFE*, will be received by all lovers of the Goldfish with interest. The appearance of new standards or, rather, revision of old ones, helps to show the increasing interest that is being manifested in this most attractive of all aquarium fishes. Mr. Coombs presents the case smoothly and with the minimum of feeling. Perhaps he presents the case too smoothly and, in so doing, glosses over weaknesses which should not be dismissed so glibly. He deplores the existence of three sets of standards, i.e. B.A.A., F.B.A.S. and G.S.G.B., and then proceeds to announce a fourth which, he says, is an improvement on the first. Posterity alone will judge which set is right and the verdict may well be that all four are wide of the mark.

The August issue also includes an article by Mr. W. H. Hildemann of the University of S. California which criticises the present British standards for Guppies and all readers are urged to read this again since it challenges the British method of fixing standards. Mr. Hildemann asserts, in effect, that standards for domesticated fishes must be based on scientific and genetical factors rather than aesthetic ones. Briefly, they must reflect the truth that science reveals rather than artistic feelings of the uninformed enthusiast.

However much members of the Bristol Society yearn for a Veiltail with the body like a 5/- piece, the fact remains that this is physiologically impossible at present. They must be prepared to wait thousands of years for the processes of evolution to work out. A spherical head and body implies an imaginary angle of 120 deg. for the head (the mouth forming the angle of the apex to the triangle produced by the head). Of the thousands of Veiltail heads that I have examined, I have yet to see one with an angle greater than 90 deg. In every case the head has appeared as a protuberance, failing to melt into the spherical outline of the body. I go further and say that I have yet to see an adult Veiltail even approaching a 5/- piece, although I can agree that I have seen dorsal fins the depth of the body and caudal fins twice the body length.

Querying the Basis of B.A.A. Standards

If standards are to be based on scientific fact, those of the B.A.A. fail for several reasons. To start with they have two main tables of points, one for "scaled" and one for "scaleless". This is fundamentally wrong since all Goldfish are scaled. If the terms are intended to describe the different scale groups then they are wrong again since there are three groups and not two, as proved by Shisan C. Chen and R. J. Affleck. Again, of all the recessive characteristics of the Goldfish, the all-black colouring and the protruding eye are the most persistent. It is common to find the protruding eye with harlequin colouring to the body but I have yet to see the all-over jet black colouring without the protruding eye. The two factors appear to go together and thereby automatically produce a distinct variety. The B.A.A. failed to appreciate this and referred to a "Telescopic eyed Veiltail" and the "Telescopic eyed Fantail". The Moor is true breeding (i.e., if you produce a black form of Goldfish it will always have telescopic eyes) but a "Telescopic eyed Veiltail" is a mixed form (since you have a combination of a normal Veiltail plus the eye development). I should explain that whereas black only appears with

telescopic eye development, telescopic eye forms exist without the black coloration. I suggest that it is desirable, when setting standards, to concentrate on true varieties, such as Moors and normal Veiltails, rather than variations between such varieties.

B.A.A. standards were made for the Nymph which, after all, is only a single-tailed Veiltail and should be regarded as a partial reversion to the wild type. This pandering to a popular demand for easily-bred fishes is to be deplored and is found again in the case of a scale of points for the Ribbon-tail Veiltail which is nothing, more nor less, than an over-developed Fantail. It must be recognised that it is possible to produce over one hundred varieties of Goldfish. To make standards for each is absurd. The Goldfish Society claims that all these varieties spring from four basic forms or, rather, the hundred variations can be produced from the four basic types which they have recognised.

Perhaps the greatest weakness of all, in the B.A.A. standards, is their inconsistency over points. We find, for example, that 30 points are given for the tail of the Scaled Fantail but only 20 points for that of the Scaleless form. Everyone realises that it is no more difficult to produce a good tail in the Scaled Fantail than in the Scaleless, so why the difference? The reason, of course, is that there are 35 points for colour for the Scaleless but only 5 points for the Scaled form and the points have to be adjusted to meet the difference elsewhere. A better solution would have been to define a colour pattern for the Scaled, as difficult to achieve as that for the Scaleless. This is how the Goldfish Society have got over the problem.

Bristol's Apparent Change of Attitude

It is curious to note that the Bristol Society, in professing their regard for the B.A.A. standards, were the first of the societies to break away when they submitted a new standard for the Shubunkin. Mr. Coombs, in deploring the lack of true appreciation of the Bristol Shubunkin by judges past and present, says that the quality of the present day Bristol Shubunkin has never been better. Are we to assume from this that the improvement is in spite of the judging?

He says that it has a blue ground colour and four others. I have yet to read any literature which specifies the order of preference of these colours nor yet how the 55 points (later reduced to 35) shall be awarded. What for instance is the difference between a 25 point fish and a 30 point fish in this respect? How, for example, would he adjudicate between a three-coloured fish intensely pigmented and a five-coloured fish of poor intensity? Which is the more desirable?

The ideal Bristol Shubunkin should have blue ground splashed with black, interspersed with violet, brown, yellow and red. I am informed on the highest authority that a Goldfish with red colouring has yet to be seen. The nearest approach so far seen has been orange. There are many other anomalies. For example, "Tail to be very broad and tips rounded". How broad is "very broad"? "Tail to be carried straight" my dictionary defines this as "... not crooked ... direct ... upright ... undiluted". "Pectoral fins to be paired and of even length in proportion to the other fins". How long should the pectoral fins be? "Anal fins to be single, long and broadening". How long should they be and how broad? "Eyes to be normal, bright and clear". What is a normal Shubunkin eye, and what is meant by bright and clear? I venture to suggest that, bearing in mind the vagueness and ambiguity of the specification, the judges over the last fifteen years have not done so badly.

The Federation of British Aquatic Societies are at present reviewing their Goldfish standards but it is premature to say what their future intention will be. The Goldfish Society standards have been criticised mildly but so far no fundamental objection has been sustained. It will be interesting to see whether the Bristol Society have anything new to offer or whether their revisions will be just a changing of point values on a system that was wrongly conceived in the first place.

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telescopic eye development, telescopic eye forms exist without the black coloration. I suggest that it is desirable, when setting standards, to concentrate on true varieties, such as Moors and normal Veiltails, rather than variations between such varieties.

B.A.A. standards were made for the Nymph which, after all, is only a single-tailed Veiltail and should be regarded as a partial reversion to the wild type. This pandering to a popular demand for easily-bred fishes is to be deplored and is found again in the case of a scale of points for the Ribbon-tail Veiltail which is nothing, more nor less, than an over-developed Fantail. It must be recognised that it is possible to produce over one hundred varieties of Goldfish. To make standards for each is absurd. The Goldfish Society claims that all these varieties spring from four basic forms or, rather, the hundred variations can be produced from the four basic types which they have recognised.

Perhaps the greatest weakness of all, in the B.A.A. standards, is their inconsistency over points. We find, for example, that 30 points are given for the tail of the Scaled Fantail but only 20 points for that of the Scaleless form. Everyone realises that it is no more difficult to produce a good tail in the Scaled Fantail than in the Scaleless, so why the difference? The reason, of course, is that there are 35 points for colour for the Scaleless but only 5 points for the Scaled form and the points have to be adjusted to meet the difference elsewhere. A better solution would have been to define a colour pattern for the Scaled, as difficult to achieve as that for the Scaleless. This is how the Goldfish Society have got over the problem.

Bristol's Apparent Change of Attitude

It is curious to note that the Bristol Society, in professing their regard for the B.A.A. standards, were the first of the societies to break away when they submitted a new standard for the Shubunkin. Mr. Coombs, in deploring the lack of true appreciation of the Bristol Shubunkin by judges past and present, says that the quality of the present day Bristol Shubunkin has never been better. Are we to assume from this that the improvement is in spite of the judging?

He says that it has a blue ground colour and four others. I have yet to read any literature which specifies the order of preference of these colours nor yet how the 55 points (later reduced to 35) shall be awarded. What for instance is the difference between a 25 point fish and a 30 point fish in this respect? How, for example, would he adjudicate between a three-coloured fish intensely pigmented and a five-coloured fish of poor intensity? Which is the more desirable?

The ideal Bristol Shubunkin should have blue ground splashed with black, interspersed with violet, brown, yellow and red. I am informed on the highest authority that a Goldfish with red colouring has yet to be seen. The nearest approach so far seen has been orange. There are many other anomalies. For example, "Tail to be very broad and tips rounded". How broad is "very broad"? "Tail to be carried straight" my dictionary defines this as "... not crooked ... direct ... upright ... undiluted". "Pectoral fins to be paired and of even length in proportion to the other fins". How long should the pectoral fins be? "Anal fins to be single, long and broadening". How long should they be and how broad? "Eyes to be normal, bright and clear". What is a normal Shubunkin eye, and what is meant by bright and clear? I venture to suggest that, bearing in mind the vagueness and ambiguity of the specification, the judges over the last fifteen years have not done so badly.

The Federation of British Aquatic Societies are at present reviewing their Goldfish standards but it is premature to say what their future intention will be. The Goldfish Society standards have been criticised mildly but so far no fundamental objection has been sustained. It will be interesting to see whether the Bristol Society have anything new to offer or whether their revisions will be just a changing of point values on a system that was wrongly conceived in the first place.



SCORPIO

Current Notes

Seasonal Tasks for the Enthusiastic Pondkeeper and Water Garden Owner



SAGITTARIUS

THERE is no doubt that this autumn will see additions to the ranks of Britain's pondkeepers, for it is the season when rain and heavy dew have softened the ground so that digging becomes a fairly easy proposition. Even the war pond-making presented few difficulties, for materials were cheap and in plentiful supply and, for the matter of a few shillings, it was possible to get all the timber necessary for the shuttering that would hold the setting concrete in position. Nowadays, of course, timber is out of the question and cement and shingle are expensive items, so that we have to look around for substitutes and think of new and means of keeping the cost as low as possible.

Perhaps the following experience will be of interest, for about the time last year it was decided to build a pond in a new garden in the country—something really ambitious was required as there was plenty of available space. It was to be a rectangular pond, approximately 24 ft. by 12 ft. and about 2 ft. deep. Three estimates of cost from contractors ranged from about £85 but, whilst it was appreciated that there was a good deal of labour and material involved, the prices named were more than could be afforded. The householder therefore decided to build the pond himself. Luckily he managed to enlist the services of a gardening friend who would help him dig the hole.

As mentioned previously shuttering was out of the question so it was decided to use 18 x 9 x 3 in. coke breeze blocks which ran eight to the square yard. The advantages of using these blocks is that they are not only cheap but a wall can be readily and easily built by a novice. In addition, owing to the blocks being 3 in. in thickness, less concrete is needed in setting the sides.

Strong Foundations Laid

The actual construction of the pond was as follows. Having marked out the area to be dug 4 in. wider all round than the actual measurements of the finished pond, it was excavated to a depth of 2½ ft. Then, having rammed in a foundation of large stones and broken brick, a 4 in. floor of concrete (three parts shingle to one part cement) was laid and this was covered from time to time with small wooden pegs and a spirit level. At the same time some old panels of wire mesh were incorporated as reinforcement.

When the floor had thoroughly set the blocks were laid, leaving 4 in. of the floor projecting beyond the base of the wall. So the wall was built higher a cavity between the outside of the wall and the earth was left and into this a fairly thick concrete was poured and rammed well down with a piece of wood to ensure a good bind. As the sides of the pond were three blocks high, the top of the wall was brought to 10 in. above ground level. This was done for three reasons. Firstly, it meant less excavating. Secondly it raised the level of the water so that Water-lily blooms could be easily seen and, thirdly, it would discourage newts and frogs.

Having built the floor and walls, the whole of the interior was rendered with an inch layer of cement (two parts, sharp sand to one part, cement), taking care to see that all junctions were properly knit. Finally this finer coating of cement was

carried over the top of the wall, giving a slight camber as a finish.

To provide levels for the growing of different varying types of lilies, and at the same time give added strength to the structure, the pond was divided into three sections with two transverse walls which were two courses of blocks high. Into the middle section was put a foot of soil which gave a water depth of about 20 in., whilst the two outer sections were filled to the top of the walls with soil, thus giving a depth of approximately 12 in.

Fortunately there was no need to make a drain-away for emptying the pond as the ground sloped away from the pond to a ditch on the garden boundary, so that if, at any time, it is wished to empty the pool this can be effected by siphoning the water away through a garden hose.

The pond which has been described was completed about eight months ago and so far there has been no sign of any leak. When winter comes, however, the water level will be lowered from its present elevated position to just below ground level as a precaution against freezing and cracking. The cost may be of interest, actually this amounted to a little over £20 for the materials, but of the work involved, the less said the better!

(Continued on next page.)

Readers' Hints and Tips

(23) Cover Glass Device

BY fitting the type of clips which I shall describe, to the upper angle-iron of a tank all the water condensing on the cover glass runs down to the back and drips back into the tank, so preventing any rust forming. Furthermore it will be found that when feeding the fish it is easy to lift the cover from the front as there is a slight space under the front edge of the cover glass. The cover glass hinges in the aluminium clips and this prevents water running down the back of the tank.

To make the clips cut two ½ in. wide strips (three in the case of tanks over two feet in length) from thin aluminium sheeting of a sufficient length to bend round the top angle at the back of the tank as shown in the sketch. Starting with the flat strip bend one end to form a hook to fit under the outer edge of the top angle-iron. Then hold this strip flat against the vertical part of the top angle-iron and bend the strip at right-angles along the horizontal surface. Holding it firm bend at right-angles in a downward direction and then outwards to form a platform for the cover glass. The length of the cover glass should be about ¼ in. less than the length inside the top angles and of a width equal to the overall width less the depth of the back angle, plus ½ in. After cutting, the edges of the glass should be rubbed with a wet carborundum stone to round off and render them smooth.—D.C. Crisp, Stockton-on-Tees.



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

MOST dyed-in-the-wool aquarists are also pond-keepers as well. Some start in the garden and spread to the drawing-room whilst others commence with a 2-gallon aquarium and finish up with a 2,000-gallon pond. There is much to commend the acquisition of a pond, particularly for those interested in breeding fish. There is one drawback to a pond, however, which has broken many a heart and that is the easy access it provides for the hunting propensities of neighbours' cats. There is a simple and most effective solution. It consists of using lengths of ordinary chicken wire-netting cut to a width of nine inches and placed around the perimeter of the pond so that about six inches of the width overhangs the water. The lengths are loosely held in position (i.e. held down) by flower boxes, the trailing leaves from which hang in the water and camouflage their purpose. The very insecurity of the wire provides just that "give" to deter the boldest cat and, whilst it can be seen, it does not detract unduly from the picturesque appearance of the pool and its surroundings.

Many fishlovers up and down the country are viewing their pets with apprehension now that the evenings are drawing in. The annual question crops up "Shall I take my fishes indoors for the winter?" Subject to certain conditions the answer is undoubtedly "No". In Nature fishes usually prepare themselves for the rigours ahead. Their appetite becomes more acute and the extra food consumed is stored away in the form of fat ready to be drawn upon when the occasion demands. All native fishes, and most Goldfishes, will survive outdoors as, being cold-blooded animals, their blood temperature is the same as the water in which they are living. Around 40 deg. F. their life processes are at a minimum and they go into a "winter sleep". Nevertheless they still breathe and it is very important to see that there is sufficient oxygen available for them.

From a Coldwater Fishkeeper's Notebook of Experiences

A dirty pond, or one with an excess of humus and rotting vegetation under an inch of ice, can become not only deficient of oxygen, but heavily charged with poisonous gases. A large number of fishes found floating dead on the top of the water in the spring die from absorbing these gases.

If this contingency is to be guarded against the most obvious thing to do is to tidy and clean up the pond before winter sets in. Remove all dead or dying leaves, particularly those of the Water-lily. Take a handful of the mud and smell it. This will tell you whether it is sweet or whether it should be removed. Very few fish will be lost from a pond that has been cleaned out in the autumn, although they should be housed in ponds with a depth of 2 ft. or more. The depth of water is important as the fish find it impossible to hibernate in shallow water because of the temperature variation. Fish remaining active during the winter use up their fat reserves, become debilitated and are unable to resist the disease germs which infest all waters. The milder conditions in the house are not necessarily better than the more severe ones in the pond. Fishes accustomed to the larger area of a pond do not take kindly to the confinement of the aquarium since it is not often possible to give them the room they need. On balance the risks are less in the pond except for fish under two inches in length.

Fanciers intending to exhibit at the late shows this year are reminded that now is the time to start to condition the fish. Fish that have been earmarked should be segregated and given a tank to themselves. Food should be predominantly Earthworm as this produces the best condition. From time to time the fish should be placed in a show tank filled with tapwater and illuminated with electric light. Only in this way will they appear at their best before the judges. How often have we heard an exhibitor remark, "It is not the same fish. You should see it at home".

AS the first autumn days are with us again and we look around the fishhouse or fishroom it seems that we have much more work

to do before the cold weather sets in than we realised. Aquarists always hope for a mild winter but we must not neglect preparations for a cold spell. The main consideration at present is to save fuel and the only way to do this is by reducing the number of tanks in use, as well as sealing up all cracks which may be sources of draughts. All this means a considerable amount of work but we think it well worth doing.

First of all we should consider how to dispose of the older fish which are no longer required. Although we have had all the spawnings from them which we require it is possible to make children happy if they are given to one of the hospitals which have tanks in their wards. Then there are the half-grown fish. It is usual to pick the next season's breeding stock from these and sell the rest to help defray expenses. By the time these fish have been disposed of only half the tanks will be in use no doubt and whether electricity, gas or oil is used, this reduces the cost for fuel besides conserving supplies.

Conditions for the Plants

There are still the plants to consider so the glass on the roof of the fishhouse should be cleaned to ensure that as much light as possible penetrates to the tanks. Although plants must have light we have observed that they grow stronger and greener at lower temperatures, the twists of *Vallisneria spiralis* var. *torta* are tighter but the plant grows more slowly, yet we find this method

Topical Suggestions for the Keeper and Breeder of Tropical Varieties

of growth more satisfactory.

The fish are best kept at a lower temperature, around 72 deg. F., and fed sparingly.

It is the resting period that

is particularly helpful and they will not only be better for next year's breeding but will also enjoy a longer span of life.

Do not forget to overhaul heaters and thermostats now, and make sure they are in good working order. It is particularly unfortunate when we find that a heater or thermostat has failed during a very cold night and even more unfortunate when we are unable to revive the fish. Fish can often be saved after a drop in temperature if netted into a jar, containing the same water, which is then lowered into another tank so that the temperature is brought up slowly.

Tidying the Fishhouse

Autumn can also be the time when we clear up our fish establishments and it is surprising the number of articles which are tucked away underneath the stands. A curtain hides up a lot of rubbish but unfortunately it also hides a lot of dust, mildewed rags and nests of woodlice; in fact, many things which should be removed. There are also, the jars for drip-feeding. These are bound to accumulate, but it is not wise to get rid of them so they should be well washed and stacked upside down ready for next year's breeding season. The Infusoria pans should also be cleaned, and put away for future use. Nets can be mended and hung up so that they are handy when required. It is always satisfying when the last of these odd jobs has been finished although they are worth-while and the benefit will be realised later on.

Judges and Their Responsibilities

Final Selection of Opinions on a Controversial Subject

Mr. J. Brunning Invited to Sum Up the Pros and Cons of a Judge's Right to Withhold First Prizes

IN the December, 1950 issue of WATER LIFE, Mr. J. Brunning contributed an article under the above heading, stating that "It is high time to draw attention to a growing habit of judges at aquaria shows who indulge in the practice whereby, instead of automatically awarding the first prize to the best fish in the class, they decide, on their own, that there is no fish worthy of that award—a practice, which, he said, unfairly penalises exhibitors."

This article aroused considerable interest and numerous letters have been received putting forward points for or against the contention. Space has been given as evenly as possible to those taking

one side or the other and a final selection of comments that have been made are published below.

Mr. Brunning has been sent a copy of each letter as it has come in and has accepted an invitation to sum up the situation in light of the observations made. His views will appear in our next issue and it will be interesting to see whether our contributor has been persuaded to change his outlook or not. To those readers whose letters have not appeared, we express regret but they have been held out through lack of space. In all cases, however, the points they emphasised have been adequately covered in letters which have appeared.

From Mr. C. W. G. Creed

In my experience, and I think you will agree it is fairly widespread, all the prize cards have been awarded at the shows at which I have had the honour to officiate, but they have been given only after consultation with the show organisers. The sort of question I ask is "How many points do you want me to award?" "Can't you give a 1st, etc., to give encouragement?" (this question in large classes) "What award do you want given in small classes such as two or three exhibits?"

After putting such questions, and being given a directive by the show secretary, I, as judge, have got on with my job of selecting the best fish in front of me. I have usually found that the answer to the last of the above questions is that it is up to the judge. If he does not think the fish is worth an award, he is allowed to give what he thinks. I believe that to be fair and reasonable. Surely the judge, and he is usually a judge as the result of long experience, sees many fishes in his travels and is in the best possible position to be able to assess whether a fish is worth a first prize?

Clubs should cover themselves in classes of only one or two exhibits, either by an "amalgamation clause" or a "withholding prizes" reservation in the schedule. Otherwise, how could shows pay? Quoting Mr. Brunning, three entries in a class at 2/- each equals 6/-. If the prize money is guaranteed at 1st £1, 2nd 10/6, 3rd 5/-, totalling £1 15s. 6d., there is a loss on that one class alone of £1 9s. 6d.

I have been approached by exhibitors at shows with such questions as "Why has not my fish gained an award?" or "Why only a low card for my fish which gained a first at award-so show?" After a few questions, it soon comes out that it was a first won in a small class. Is it not better for the exhibitor to know that his fish was not so good? He will not then expect a high award when he comes up against better competition in a larger class. He may also be prevented from wasting money on entry fees and travel through showing poor quality fish.

Shows-placing is adopted in some of the other fancies such as dogs, poultry and rabbits. I, as an exhibitor, have

been satisfied because the judge has taught me a lot.

When the judge has been asked to use his knowledge in placing fishes—knowledge gained by experience—he should be capable of saying whether a fish is worth an award. This assessment may have some use in subsequent selection for the breeding tank. The judge is a servant of the committee and only gives awards after consultation with the show organisers. In other words, the judges award all the cards they are asked to award and do not take responsibility for withholding any.

From Mr. W. C. Cleveland

IHAVE read the numerous letters on this subject and with regard to the contribution to the discussion by the secretary of Croydon A.S., I agree with his views in the main. There are, however, one or two points which I feel I must dispute.

When exhibitors sign their entry forms, they are automatically bound by the rules and the promoting society should be the same, unless it inserts a clause in the said rules which states that first prizes will be withheld if the fish are not up to standard.

So far as "local or self-styled judges" are concerned, the secretary of the society engaging such people must surely have some idea of their ability or they would not ask them to officiate. I fail to understand what Mr. Saunders means when he refers to "their own interest in the hobby." Surely a judge must have a genuine interest or he would not take on engagements? If the financial aspect is implied, I have yet to hear of a judge who has retired on his fees. I would suggest that if an individual is solely interested in getting cash, he would not put himself up as a judge but would remain an exhibitor and would try to get all the leading prizes, not only for prestige but also for any intrinsic value.

Again, the expression "or from self-esteem" could be taken to mean that he would concentrate on showing for the purpose of winning prizes, especially those carrying cash with them, instead of judging, often in draughty halls and then hanging about late at night on stations waiting for the last train home.

Judges and Their Responsibilities

(Continued from previous page.)

So far as the richer members of the fraternity are concerned, with very few exceptions the folk with the longer pockets are no better off than their poorer brothers for the latter can buy young fish cheaply and let them mature before they exhibit them or they can pair them up in such a way as to produce as good a fish as any that costs a lot to purchase from a shop. Fish do not carry a price tag on them when they are in a tank and the judge points the fish on its qualities. By this method a cheaper-to-buy cousin of the Tetras would stand as much chance as the more expensive Neon.

Mr. Saunders says that no "loose points" should be allowed but I disagree. A few such points should be permitted so that in the event of a dead heat on the pointing of two fish the few points which the judge could use at his discretion would be given to, say, the species which was the most difficult to keep in show condition.

If I may be allowed to argue against Mr. Saunders once more, the suggestion that judging at local shows should not be so rigid as at open events seems to me to be wrong. If a standard is set, it should be adhered to always. Any easing up in the judging at a small show might well put the judge in an awkward position if he had to judge the same fish in a bigger show that week or the next and he awarded a different number of points.

From Mr. H. A. Locke

AS a tropical fish enthusiast of only eighteen months' standing, I have followed the discussion, concerning the right of judges to withhold first prizes, with great interest. Much has been said on both sides of the question and undoubtedly there is good justification for each view submitted. Indeed, it would appear to be so open a question that procedure in future should be at the discretion of the organisers according to their own views and by their expressed request to the judge to act accordingly.

The letter from the secretary of Croydon A.S. in the April, 1951 issue, however, mentions in one paragraph a competitor and, in another, an exhibitor and prompts me to refer to the subject. Although I have little doubt that the distinction was made unintentionally, it does in my view pinpoint the answer to the discussion.

In a competition, a fish is entered to compete with other entries, and not against standards, and the best of the entries is entitled to be placed first. It would not matter if all the entries in one class were runts; the entry which was, in the opinion of the judge, the least bad would be entitled to be placed first in relation to its competitors.

In an exhibition, however, the position is, in my submission, quite different. There may be several reasons for exhibiting a fish, but probably the most usual would be to show the onlookers a rarity, a fish of approved standard, or a fish remarkable in some particular attributes. If the exhibits are inspected and adjudicated upon under the accepted standards, then a fish which falls far short of those standards cannot merit a "red ticket" even though there is no better fish in its class at the exhibition.

I submit, therefore, that if the organisers of a show decide initially whether they intend to promote a competition or an exhibition, the judge will be able to decide his course of action.

Also, in your April, 1951 issue, the secretary of the Scottish A.S. refers at some length to what he calls "prize-

consciousness" but great care must be exercised in dealing with this subject, and generalities may do injustice to the large number of competitors at shows who have little or no chance of winning a prize. In every kind of competition there must be a greater number of losers than winners, and it is the number of losers who make or break the competition, not only as a spectacle, but also financially. Show secretaries of clubs are constantly exhorting members to enter fish in table shows, and indeed often have difficulty in arousing enthusiasm. Their difficulties in obtaining full support for table shows will be so much the greater if the reluctant members feel there is a possibility of this "prize-consciousness" label being attached to them.

The real value of table shows lies in the very illuminating remarks made by the judge after adjudication is completed. Comparison of one's fish with published standards is instructive but is not a good substitute for the experienced eye of an expert. I like entering fish in shows for that reason. Some fish which I thought measured

up fairly well to standard were found by the judge to have defects not obvious to my unpractised eye until they were remarked upon. Conversely, one or two fish which appeared to me to be only average were favourably regarded by the judge. These remarks are very helpful in deciding from which fish to breed, and, when taken seriously to heart, likely to result in better stock generally.

It would be futile to deny the feeling of pleasure engendered by favourable remarks made by an expert regarding one's entry, particularly if one has bred the fish; and surely there is nothing wrong in such simple pleasure?

Might I add a plea to some judges to deal gently with entries which do not compare well with standards and bear in mind the difficulties of some show secretaries in gaining sufficient numerical support? Some scathing remarks I have heard made, although no doubt justly merited, were quite sufficient to have deterred me from competing again, had they been made about one of my entries. It is not always possible to obtain an expert opinion on one's fish except by competing in a club show, and a newcomer to the hobby can so easily enter a poor fish through ignorance.

From Mr. W. G. Phillips

WHAT kind of people are they who engage others and then allow them to call the tune! Organizers of any show, who know their job and responsibilities, inform the judges what they require of them regarding the numbers of awards. These may vary and range from "First" to "Seventh", or even more according to the numbers of entries.

Sometimes it is not possible for the judge to find a worthy third let alone a worthy first. In such cases, the judge reports his findings to the show secretary or organizers who then may reconsider their previous instructions, if they are in a position to do so by virtue of the printed conditions under which the entries were accepted.

As a judge, I have no objection whatever to awarding a first prize to what might be the best of a bad lot if that is what is required, whether it involves a 20 guineas cup or just a red ticket, that is the responsibility of the organizers. What I would never be a party to, however, is awarding a "Commended" card to an exhibit which I as the judge would not recommend as "worthy." Some organizers appreciating the meaning of these seemingly unimportant awards (dependent upon the quality and numbers of exhibits involved) relieve the judge of any embarrassment by giving numbers to all awards instead of those words of esteem—very highly commended, highly commended etc

WATER LIFE Glossary of Terms

METABOLISM.—This describes all the chemical processes which occur within a living organism. All these reactions are closely inter-related but may be roughly divided into building-up processes (anabolism) and breaking-down processes (catabolism or katabolism).

NEMATODA.—The Roundworms. A Phylum of animals some of which are parasitic but others are free-living. They are spindle-shaped, pale and unsegmented and have a resistant cuticle but no cilia. Nematodes are found in almost all environments yet their structure is very uniform. Micro-worms (useful livefood for young fish) belong to this Phylum.

Second Series (Continued)

From Mr. N. Matthews

It would, that if a standard prize card was designed to show (a) both the standard of the fish, and its position in its class at a particular show, the problem would be solved.

I suggest that the card should have the four corners and the word ("1st," "2nd" or "3rd," etc.) printed in a range of universally accepted colours which would indicate the points gained. For instance, quite apart from the position in the class, a red ticket would indicate 90-100 per cent, orange 80-89 per cent, yellow 70-79 per cent, green 60-69 per cent, blue 40-59 per cent and black under 40 per cent.

In addition to the appropriate colours, the four corners could be used to show (a) No. of entries in the class, (b) Class No. and Description, (c) Date and name of the presenting society and (d) the standard by which the exhibit was judged.

In this way, if one of my fish gained a first with over 80 per cent, it would get a red-coloured "1st" card, another getting a second prize with say, only 65 per cent, would receive a green-coloured "2nd" card whilst a third fish awarded, for instance, 74 per cent would be given a yellow-coloured

"3rd" card. It would not take long for exhibitors to become accustomed to the recognised colours and the cards would grow in value, when comparisons could be made between say a black or blue "1st" and a red or orange "3rd."

From Mr. B. J. Nield, Blackburn A.S. Secretary

THE committee of my society feels that a show committee should always indicate its wishes to the judge. Whilst it is true that very poor quality fish may not deserve a first prize, if prizes have been offered, then they should be awarded, the fish competing being judged according to their respective merits.

It should be remembered that the desire of all fishkeepers is to better the quality of their stock and it is not the fault of the exhibitors that their fish turn out to be the best of a mediocre selection simply because other aquarists keep their better fish at home. The best fish in the class still qualifies for the prize offered.

If the fish in the class are considered to be of exceptionally poor quality, the judge could refuse to judge them but he would have to state his reason. The committee believes that, if there are sufficient entries, 1st, 2nd and 3rd prizes should be given by the judge, his decision being final.

New Types of Guppy

Veiltail and Scarftail—Two American Forms Rapidly Becoming Popular in this Country

By W. G. Phillips (*Official Judge of the Guppy Breeders' Society*)

MANY aquarists, when visiting shows held recently, may have noticed two types of Guppy with which they were unfamiliar; these are the Veiltail and the Scarftail. Although these long-tailed Guppies are new to most British aquarists they have been known in the United States for some time and we have been informed that they were developed by Charles E. Vesil of Brooklyn and that he was awarded a gold medal by the Ridgwood (Brooklyn) Aquarium Society for one particular specimen which he exhibited. It was described as having an extraordinarily long tail similar to that of a veil-tailed *Betta*.

When born the babies of these fish appear exactly the same as those of any other Guppy and it is not until they are 1-4 months old that their tails start to develop and they are not fully formed until they are twice that age. Anyone possessing a pair of either of these types must therefore take patience whilst awaiting their full development. The greatest care should be exercised when catching them and only the finest and softest nets should be used if damage to the flowing tail is to be avoided. Sometimes, through fighting, a male will develop a split tail but, if the cause is removed to another tank free from any distraction, the split will eventually heal, sometimes within a few days.

Specimens are Grey Specimens

All the long-tailed Guppies exhibited so far (with one exception) have been Greys but it is not colour which is their chief attraction but their wonderful tails. In the Veiltail Guppy it is long and broad, similar to that of the veiltailed Fighter, whilst that of the Scarftail is long and narrow and of equal width throughout its length, similar to a scarf, hence its name. The tails of both types may be multi-coloured or self-coloured of any one shade, including black (blue-black); the latter is the most highly prized by many aquarists. I would point out that the name "Veiltail" is American whereas "Scarftail," an appropriate description of the second form, is a name originated by British Guppy breeders.

There are three different strains of these Guppies in the hands of some members of the Guppy Breeders' Society, two of them came direct from U.S.A. and one via Australia. The females of one strain (from U.S.A.) have a certain amount of colour in the tail and dorsal fin whilst those of the other two strains have plain fins. Since the importation of these American Guppies much crossing and inbreeding has taken place with a view to improving, in certain directions, on the original imported stock.

Provisional Standards Prepared

At first breeders had differing views on what to breed for and judges in what to look for and with that in mind the Guppy Breeders' Society Judges and Standards Committee, after full consideration of the biological possibilities, drew up a provisional standard for each type. This was to be reconsidered after six months with a view to making any addition or minor alteration that might then seem necessary before presenting them to the members for ratification, and finally to the F.B.A.S. for official recognition.

In conclusion might I add that I am of the opinion that, judging by the demand for specimens, this type of Guppy will bring back to the ranks of Guppy breeders many aquarists who deserted us for some of the other species of tropical fish.

Water Life Handbooks

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Should Championship Shows be Organised?

Proposal by Mr. J. P. Keene that Regional and National Events be Held to Find the Leading Exhibits of the Year

ON several occasions lately I have heard the following words being used by aquarists from all over the country, "It is a pity the show is so far away, otherwise I would have entered my fish."

Now unfortunately for the promoters of most of the major shows in our hobby this is quite true; there are always too many keen aquarists, situated far from the venue, who are discouraged from entering by reason of the expense in sending a properly insulated container or because they consider the journey too hazardous to risk their fish. The result is that the show has that many fewer entries and the competition is thus less keen.

Comments at Shows

Then, of course, we have that type of person who, upon seeing a fish placed first in its class, will say, if he has not entered his own fish, "Well, I've got much better fish than this at home but I did not feel like chancing them to the journey." Whilst we all know these sort of people and treat them in the way they deserve, perhaps an occasional one is telling the truth. We then have the situation arise where the man with the fish at the top of its class has the uncomfortable feeling that there is a better fish which had not been competing. This applies not only to fish entries but also to those of plants, furnished aquariums and vivariums, etc.

What then is the answer to the problem, if such it can be called? After giving it consideration and talking to other aquarists I have come to the conclusion that by far the best solution would be to institute major regional shows climaxing in a national show at which successful entries in the major regional shows would again be judged to find the national champions and runners-up.

Various Considerations

With this idea in mind, let us consider the following points:

1. By redistribution of the big shows, or by a concerted move of the clubs to institute regional shows, a larger number of aquarists would be able to compete and the standard of entries would go up accordingly.
2. By regionalising the shows there would be no aquarists chancing their fish to a journey unnecessarily.
3. The regional centres (the number is not relative at this stage) should be the road and rail centres of that particular region, thereby facilitating transportation and also, in the majority of cases, ensuring a fairly large "gate."
4. According to the number of regional shows a condition of entry into them, in any section, could be that the 1st, 2nd, and perhaps 3rd, prizewinners should be entered for the national finals. In this way, barring fatalities, support for the national finals would be guaranteed.
5. The national finals would be held at a previously agreed centre each year and a schedule of regional shows, together with the date of the finals, would be drawn up and published in the first month of each year.

6. Each competitor qualifying and showing at the finals should be given a runner-up card if unsuccessful and in the regional shows successful entries should be given cards inscribed 1st, 2nd or 3rd in the particular region of the national finals.

Receiving the Exhibits

7. Entries coming by road, rail and, perhaps, air, would be met by competent stewards at the destination.

8. Apart from the obvious advantages an organisation of this nature would have in allowing the real champions of any section of the hobby to be judged, it would also have great possibilities in the way of exhibiting, to a greater section of the public, a really big, well-organised and supported show of first-class entries. I think this latter point would be of great assistance in increasing interest in the hobby as only the very best fish would be on display.

9. Of course, there is no suggestion that the rights of individual clubs to put on a show should be restricted.

The above points touch upon some of the advantages of regionalising and finalising the shows but it does not touch on the problems connected with an enterprise of this nature. A few of the obvious ones are, for instance: The age of fish, which perhaps would be in their prime at the regional

show, but too old to show at their best at the national finals if they were held too late in the year; the vast amount of inter-club organising which would have to be undertaken to put on the regional shows; persuading successful entrants in individual club shows to support the regional shows and also, if again successful, to support the national finals; the difficulty an entrant would find in having "time off" from his employment to stage a furnished aquarium in the finals which might be far away. Nevertheless I do not think any of the problems insurmountable. They are bound to arise and they can be overcome by enthusiasm. The growing number of societies and shows devoted to our hobby indicates increasing vitality, so surely, if there are any improvements to be made, now is the time to make them.

Reactions of Show Secretaries

No doubt these views and suggestions will raise quite a lot of criticism from show secretaries who maybe feel that they are already worked to the limit of their capacity. Others will consider the suggestions unnecessary when our shows are already very good and efficient but, whatever happens, it will be interesting to know what other aquarists think of this idea.

Readers should refer to the Editorial in our last issue where the idea of organising shows on championship lines was discussed at some length, together with the relationship of the fish fancy to other livestock hobbies in this direction, and the type of body which might be in a position to stage such an event.

What is Your Opinion?

It will be recalled that a letter on regional and championship shows from the author of this article was published in the August-September issue and Mr. Keene was then invited to enlarge on his suggestions. Whether the proposals in their present form are workable or whether considerable modification is necessary are considerations which must be taken into account but the opinions of individual exhibitors, show promoters and judges on both the broad outline and the details would be welcomed.

Modern Technique for Tropical Fish Culture

An Adaptation of the Circulating System First Developed Under Coldwater Conditions

By C. D. Hughes

In the issue of WATER LIFE for last October I completed a series of articles under the title of "Educational Use of the Aquarium" in which I described a technique of fish-keeping which involved the circulation of water round a range of tanks. For the past eighteen months I have been experimenting with the application of this technique, originally developed under coldwater conditions and generally for educational purposes, to the problems of tropical fishkeeping, particularly to breeding problems which I hoped it might simplify.

Maintaining the New System

This is the first of a series of articles in which it is intended to give an account of these experiments, explaining also the biological factors which are involved, and in which it will be shown that the principle of the circulating range can with advantage be applied to tropical conditions.

I propose first to outline some of the basic problems which are involved in the maintaining and breeding of fish in tanks instead of under natural conditions and which, to a greater or lesser extent can be overcome by the system which I use.

Initially it must be emphasised that the fish we keep have moved into their various forms under the stresses which their particular environment imposes. They have become adapted to that environment and it is therefore obvious that we can expect to be most successful when we reproduce their natural surroundings and conditions as nearly as possible. By this I do not mean that we must reproduce the exact local conditions where the particular species is indigenous; though that might be desirable it is a rather formidable task and not necessary for our purpose. What I do consider to be essential is that we should reproduce those conditions that are common to all fish-producing areas, but even this, simple though it may appear, is something that is never achieved in the ordinary static aquarium.

The most important single factor to be considered here derives from the fact that fish depend upon the water in which they live for their food supply. This means that the water in which we keep fish will always have special properties. In the first place it will have a high degree of fertility for without this the necessary food organisms will not be present in sufficient quantity, normally, and arising out of this, the water will also be the medium in which the biochemical processes of a complicated food cycle are continuously taking place. It must be remembered, too, that the fish is in much closer contact, chemically,

with its environment than are creatures living in the air, and that chemically it is also a more active environment than the air where chemical activity is largely restricted to moist or wet areas.

The biochemical changes taking place in the water of a pond are caused by the growth and development of a wide range of organisms, many of which are absent from our ordinary fish tanks. However, as they naturally form part of the fish's natural environment, and in fact its natural food, it is hardly likely that their presence does not influence its development both directly and indirectly. They obviously exert a direct influence by entering into the fish's diet. Indirectly they affect the chemical content of the water, quantitatively and qualitatively, and its pH value. They may also be responsible for the secretion and absorption of biotic substances.

Aiming to Produce Natural Conditions

The scientific investigation and isolation of all the possible factors would be an extremely complicated undertaking involving years of work and large quantities of equipment. It seems to me that the soundest and most practicable immediate policy for the aquarist is to provide as nearly natural conditions as possible. This is the purpose of the circulatory system I shall be describing. As we shall want to maintain a greater density of fish than occurs naturally we shall not of course be able to rely entirely on the naturally generated food supplies, but this does not seriously affect the general principle of providing natural conditions for, as far as nutritional and biotic factors are concerned, the more vital substances will need to be present only in very small amounts, so that the quantitative aspect is not of over-riding importance.

At this stage perhaps the best way to bring the problem into practical and concrete perspective is to examine in more detail what actually happens in a pond and compare this with the conditions obtaining in the ordinary static fish-tank. The first diagram represents a convenient simplification of the process in the pond. Dead organic matter collects, some by way of land drainage, some windblown, some falling from nearby trees, some dropped by animals and some deriving from the plant and animal organisms of the pond itself. These decay; that is they are consumed, in different stages, by bacteria of various kinds which multiply rapidly in the process and release inorganic salts into the water.

From this point the nutrients, of which the waste matter was composed and

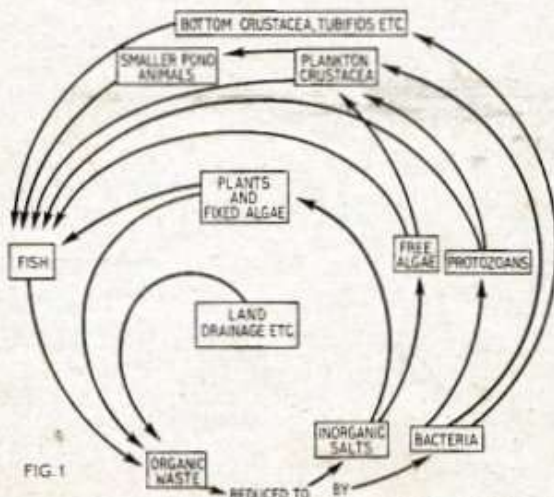


FIG. 1 Simplified diagrammatic representation of the food cycle of the pond. Note elaborate structure deriving from bacteria population which is an important link in the chain.

which is now transformed into these inorganic salts and the cell material of the bacteria, undergo a series of transformations, as they become incorporated into the tissues of a series of organisms of increasing size and higher organisation ending up with fishes themselves.

The inorganic salts released by the bacteria are absorbed by the ordinary aquatic plants of the pond in the process of growth but, together with the bacteria themselves, they also form the food of a large population of single-celled animals (protozoans) and plants (free algæ). Together these are often known as plankton, the former being called zooplankton and the latter, phytoplankton. They constitute the food of very young fishes and also enter quite considerably into the diet of mature fishes of many species. Usually included in the term plankton are the minute free-swimming *Crustacea* of which the commoner species are *Daphnia* and *Cyclops* which also form an important part of the food of many fishes. In the chain of the food cycle they form a separate link as, to a large extent, they feed on the lower plankton organisms though certain of them, notably *Daphnia*, feed directly upon bacteria which, as will be seen later, gives these a special importance. They also provide food for a number of smaller pond animals, especially insect larvæ, which are themselves eaten by fish. Bacteria are also consumed by some of the creatures living at the bottom of the pond, such as Tubifids and the bottom *Crustacea*, and this provides another route whereby the nutrients of pond waste can be made available to fishes, serving especially the needs of those which are bottom-feeders.

Having brought the chain of events in this food cycle of the pond round to the fish population it only remains to point out that by excretion and their eventual death the fish help to continue the cycle by returning to the pond potential nutrients. It will be seen from the diagram that these nutrients, which are contained in organic refuse, once they have been made available as food by the actions of bacteria can follow a large number of different courses of varying length and complexity before they become assimilated by fishes. The shortest route is: organic waste—bacteria

—inorganic salts—algæ—fish. A more complicated cycle would be: organic waste—bacteria—inorganic salts—plankton—plankton crustacea—insect larvæ—fish. Both these processes, and intermediate ones of varying complexity, are going on all the time.

As there is normally a continual supply of fresh nutrients to a pond from land drainage and the other external sources, the obvious assumption is that the number or size of the fish will continually increase and, up to a certain point the density of the fish population, and its rate of growth, will depend upon the fertility of the water, which determines its capacity to support the necessary food organisms. But this is not the whole story. If the water is sufficiently fertile to provide a good food supply, the fish will grow rapidly, but there will come a stage when their collective appetite begins to match the food supply. At this stage the food starts to diminish because, as the fish begin to search out the organisms on which they feed more vigorously, there remain fewer individuals for reproduction. In fact the security of the food supply will now depend upon the amount of cover there is for its constituents in the particular pond. Our fish tanks are the extreme example of this state of affairs, where livefood organisms, no matter how well established, are not merely depleted but quickly exterminated

as soon as any fish are introduced. In a pond what happens at this stage is that a state of equilibrium is reached in which the fish population has only sufficient food to keep itself alive and little growth is made. Such a pond can be called unproductive although it may have a high degree of fertility. Such a condition can be remedied by disturbing the equilibrium through the removal of some of the fish thus giving an advantage to the food organisms whose increase will result in the fish that are left having a better chance of development and growth. This is sometimes achieved naturally by the fishing activities of birds or the presence of Pike. Alternatively artificial feeding, such as we use for maintaining aquarium fish, can be adopted.

Let us now compare this situation with that prevailing in fish tanks. The most obvious difference is that we usually keep a greater density of fish than is to be found in ponds and there is never enough cover for the intermediary food organisms to maintain themselves. This produces the extreme case, already noted, of predators (in this case the fish) reducing their food supply to the point of extermination and, consequently, exterminating themselves. They are, of course, saved from this fate by artificial feeding, but this only solves one problem to create another.

This artificial feeding (which includes the use of livefoods)

will produce a large quantity of waste matter—much larger than in the pond owing to the greater density of fish—and this will give rise to a bacterial population. In the pond the size of this bacterial population would be limited by these organisms which feed either directly or indirectly on bacteria. As we have seen, these are also the organisms on which our fish feed and it is therefore impossible to maintain them in an ordinary aquarium. In such an aquarium there is consequently no control of bacterial development and this in itself can be detrimental to fish. However, another important factor is involved. As the process of organic decomposition is brought about by bacteria, the limitation of the bacterial population results also in the limitation of the rate

at which organic waste is decomposed. If this is excessively rapid, as it will be where there is no factor to limit the rate of bacterial growth, the products of decomposition will occur in such concentration, and will be of such a nature, that they will cause pollution. Even when this stage is avoided the water conditions will be seriously abnormal. This problem is greatly exaggerated when we are breeding, for to get satisfactory growth heavy feeding of the fry is essential.

A comparison of the second diagram with the first will show how the ordinary aquarium lacks the important control of bacterial development which is present under natural conditions. The large question mark represents our problem. It is a slight oversimplification as our tanks usually contain a protozoan population which does help to keep down the population of bacteria. They have not been shown in the diagram, however, because on their own they are quite inadequate to deal with the problem, and in tanks containing young fry they will almost disappear.

Strangely enough, in spite of these limitations we have been keeping fish in ordinary aquariums for a long time with varying degrees of success. This has been made possible because of a number of methods that have been adopted

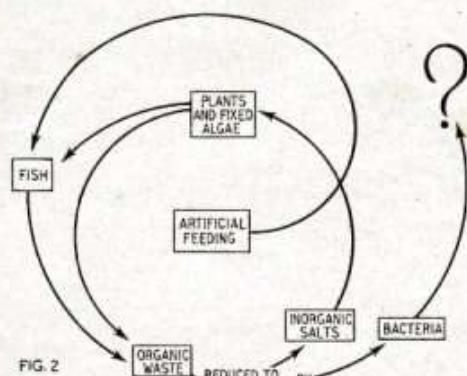


FIG. 2

The restricted food cycle of a static fish tank showing the lack of bacterial control. Compare with Fig. 1 which includes predators on bacteria.

to overcome the problem of water fouling, none of which, however, is entirely satisfactory.

Firstly, there is the by no means discarded technique of completely or partially changing the water at fairly frequent intervals. If a tank is sufficiently crowded to make this necessary the effect is only very temporary. In fact the original condition often returns even more quickly as the organisms which do help a little to check bacterial growth are discarded with the old water and often killed by the new. In any case changes of water are harmful to the fish.

Secondly there is the practice of syphoning away sediment. This removes only the heavier solid particles leaving behind the equally, if not more dangerous dissolved solids and it is a waste of nutrients.

Next we have aeration which removes only obnoxious gases but for this purpose it is extremely useful. Whether it increases or depletes the oxygen supply is, I think, uncertain. One of its most useful functions is to prevent thermal stratification of the water.

Use of Filtering Apparatus

The use of filters is usually regarded as an improvement on simple aeration. They provide a certain amount of aeration and remove unwanted gases as well as suspended solids, but not dissolved solids. They also remove many useful micro-organisms and do not prevent thermal stratification. Lastly there are the most reliable methods of restricting the fish density and feeding so sparingly that there is no danger of uneaten food being left to decay. In cold-water tanks the well-known rule of one inch (now changed to one ounce) per gallon of water, or twenty-four inches of surface area, has been found satisfactory. Under tropical conditions the densities cannot be laid down so precisely as much depends upon the species of fish with which we are dealing, but these figures can be regarded as generous and, with small tropicals, they can usually be doubled without causing trouble. The strict application of these limitations will restrict the bacterial concentration to safe limits by cutting down their food supply, but the limitations on feeding and fish density which the method entails make it both uneconomical and unproductive. Few of us have sufficient tank space to stick to the rules, particularly when our fish are breeding, and in any case the cost of heating and illumination is not entirely negligible.

In practice most aquarists use a combination of all or some of the methods listed above. The vital criticism that can be made in every case is that none of them produces the normal water conditions which result from the full operation of the natural biochemical cycle and this may result in nutritional deficiencies and other failings of a more subtle nature, which have not been determined, but which may well be the cause of some of our fish diseases.

Honourable Results After Trial

Under the system which I have been using all these defects are eliminated. During the eighteen months since the beginning of the experiment there has been no change of water. Heavy feeding has been maintained throughout the period and no sediment has been removed from any of the tanks. All waste matter has been broken down and utilized as food by living organisms which in turn have been used to feed the fish. There has been no interruption in the supply of livefood organisms at any time of the year. Fish densities of up to twenty inches per gallon have been maintained without any check on the rate of growth or sacrifice of colour. Despite the apparent crowding there has been no sign of disease of any kind. The fish are hardy, have withstood wide ranges of temperature, have bred readily, and the fry have been raised to maturity without any losses.

In the next article I shall describe a simple form of the arrangement which is used. The technique is extremely flexible and later I shall be describing more extensive and elaborate systems.

— Know Your Fishes —

No. 17. Spotted Goby (*Dormitator maculatus*)



Photograph]

[G. J. M. Timmerman

Although in common parlance the Spotted Goby or Sleeper (*Dormitator maculatus*) is referred to as a Goby this is not strictly correct. It certainly belongs to the Sub-order Gobioidae but its Family is Eleotridae whilst the true Gobies belong to the Family Gobiidae. Species of the Sub-order have a wide distribution in fresh, brackish and salt water. The habitat of the Spotted Goby ranges from Carolina south to Brazil, embracing Mexico, Panama and the West Indies. It is found in both fresh and brackish water. Two local names for it are the Guavina or Mapo.

The body of a *Dormitator maculatus* is lengthy (in Nature it will grow to nearly a foot but in aquariums it rarely exceeds 6 inches) and is slightly compressed. The head is quite large and flattened. Two dorsal fins are present and the ventral fins are not connected to each other, this latter being a distinctive feature of the Eleotridae Family compared with the true Gobies whose ventral fins are modified and connected to form a sucking disc. Fins of the Spotted Goby are rounded.

The colour is attractive in young specimens, the sides being blue and yellow whilst the back is a brownish-green. There is a particularly conspicuous blue spot behind the operculum. Further variable dark markings may be present on the body. The fins are clear, except for blue spots, but the anal and sometimes the dorsals, have some orange-brown colouring. Adult specimens have not the colouring brilliance of the younger fish. Males are distinguished by their having larger fins but brighter colouring and closer proximity of the dorsals have also been suggested as indications of the male sex.

In the aquarium Spotted Gobies are accommodating and seem to prefer fresh water. Adult fishes should be kept isolated from other species as they are predatory. Although the young fish eat large quantities of plant life, mature specimens will take shredded meat, shell fishes and smaller fish, apart from aquatic plants, which they will tear up. The fish adopts peculiar postures for long periods and will sometimes feign death when freshly introduced to an aquarium. It requires a temperature of from 68-83 deg. F. although 68-72 deg. is preferable.

Little is known of its breeding habits and it is not believed to have been bred in this country. The eggs are laid on previously cleaned stones but the young, which are very small, are reputed to be difficult to rear. Class: Pisces. Order: Percomorphi. Sub-order: Gobioidae. Family: Eleotridae. Genus: *Dormitator*. Species: *D. maculatus*.

Sound Reception in Fishes

Description of the Human Ear and Comparison
With the "Hearing" Apparatus Found in Fish

By Prof. A. N. Worden,
M.A., B.Sc., M.R.C.V.S.

FOR many years various species of fish have been used as experimental animals by physiologists and other laboratory workers and, as a result, much valuable information on the normal functioning of fish and their organs has been obtained. It is surprising how little of this knowledge has filtered through to those who keep fish as a hobby or livelihood.

On the subject of "hearing", and sound reception generally, quite extensive studies have been made and, while doubtless there is a great deal to learn, certain broad principles may be stated. It will be as well to begin by giving a description of the ear of man and other mammals, and then pass on to a consideration of the more primitive apparatus of fish. In this way the studies of sound reaction in fishes will be better understood. The structures are complicated, but the accompanying diagrammatic sketches will clarify the main points.

In land mammals there is usually a well developed EXTERNAL EAR (or pinna) which leads, via the auditory canal, to the outer ear drum or tympanic membrane. This guards the MIDDLE EAR, through which pass three bones, the malleus (hammer), incus (anvil) and stapes (stirrup), and these form a connecting link between the tympanic membrane and the inner ear drum.

Maintaining Pressure in the Middle Ear

The middle ear is filled with air (pressure being maintained at the proper equilibrium by the Eustachian tube, connecting it with the mouth) and it forms an efficient organ for conducting sound waves from air to liquid. On the inner side of the middle ear there is a bony surface in which there are two small holes covered with membranes. The higher of these holes is known as the "oval window", and the stapes bone connects with the membrane, or inner ear drum covering it. There is therefore a bony conducting system, and during sound reception the bones actually move and press on the inner ear drum. The lower hole in the bony surface of the inner side of the middle ear is known as the "round window". Its main function is to relieve pressure in the inner ear—when the membrane over the oval window is pushed in, that over the round window is pushed out.

The INNER EAR is filled with fluid. It is a highly developed structure, and is concerned not only with sound reception but also with the perception of movement.

Housing the inner ear is a complicated series of bony cavities and tunnels which form the osseous (bony) laby-

rinths. One of these, the cochlea, is connected with sound detection. It is called the cochlea because in many species it bears some resemblance to a snail shell. In man the number of "turns" in it is about 2½, whereas in some mammals there are fewer, whilst in others there are 4 or 5.

Another bony labyrinth is formed of the three "semicircular canals", set almost at right angles to each other, and broadly speaking connected with movements in the three planes. The cochlea and the semicircular canals have membranous linings, and both of them open into that part of the inner ear termed the vestibule. The vestibule lies on the other side of the bony plate, in which are the oval and round windows, from that of the middle ear.

The vestibule contains two membranous sacs, the sacculus and the utricle, which open into each other and which connect with the membranous linings of the cochlea and semicircular canals. Inside all of these sacs and linings of the inner ear is a fluid, the endolymph, and outside all of them (i.e. between membrane and bone) is another fluid, the perilymph.

The inner structure of the cochlea is complex. Vibrations pass from the middle ear through the oval window to the perilymph, and hence by suitable means to the endolymph. Movements of this fluid cause vibrations in a delicate structure passing across the cochlea. This delicate structure, the basilar membrane, has attached to it various types of cells forming collectively the organ of Corti. Some of these cells have fine hair-like processes which are stimulated by contact with another membrane, the tectorial membrane, floating in the endolymph. The cells have connections with fine extensions of nerve cells that make up the beginnings of the auditory nerve. Hence "messages" go from the organ of Corti to the brain.

It has been demonstrated that when the little hair-like processes move against the tectorial membrane there is a "voltage change" across the sense cells of the organ of Corti. This "voltage change" is known as the *microphonic effect*, and it is believed to be the same sort of action that takes place when, e.g., a gramophone "pick-up" causes distortion of a piezo-electric crystal to produce voltage changes. Mechanical energy is converted into electrical energy.

As a result of much experimental



Fig. 1. A diagrammatic relation of the complex structure will enable the similar organs which

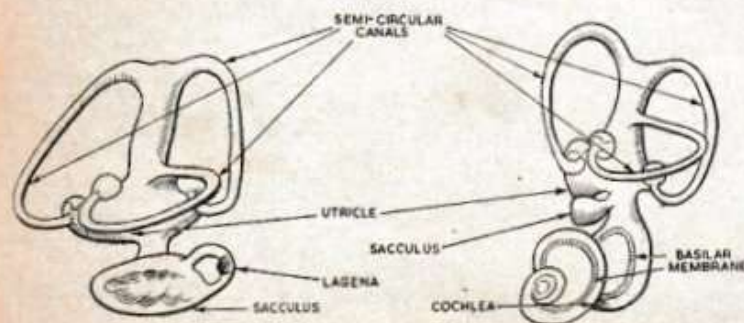


Fig. 2. Labyrinths of the inner ears found in (left) a typical fish (note absence of cochlea) and (right) a mammal.

work, including selective destruction of parts of the organ of Corti, it has been shown, fairly conclusively, that responses to sounds of different frequencies take place at definite places along the cochlea. The cochlea of various mammals has been mapped out.

The auditory apparatus and related structures show considerable variation in different categories of fish. The lowly hagfishes have but one semicircular canal, and the Lamprey, two. The higher fishes have three semicircular canals but these, with the vestibule, are the only parts of the inner ear—the cochlea being absent. The sacculus, however, is quite large in some fishes, whilst it normally has two small extensions, the utricle and the lagena. The lagena may be regarded as a primitive cochlea, for in higher vertebrates it is replaced by the cochlear duct.

The inner ear of most fishes contain particles known as statoliths. Statoliths are especially well developed in species such as Drumfishes which produce sounds.

There is no middle ear in fish nor, of course, any external ear. There is, however, a remarkable development in

Ostariophysine fishes (Carp, Catfish, Characins, etc.) which couples the air-bladder to the inner ear. A chain of bones, again called the malleus, stapes and incus, runs from the air bladder to the sacculus. This chain of bones, discovered by Weber and often called after him, is embedded in tissue. It enables the air bladder to act as a hydrophone, "picking up" pressure waves over a wide area of the body wall and transmitting them to the inner ear.

The actual development of the communicating system varies considerably from species to species. In the bottom-feeding Loach, the air bladder is very modified and is enclosed in a bony case formed of prolongations of parts of two cervical vertebrae. This is, of course, small and it appears that its main function has become that of receiving and transmitting sound waves.

There is, therefore, excellent anatomical evidence that fishes can hear. Proof of hearing, however, depends upon experimental evidence, and fortunately this is not lacking. Most of it is based upon behaviour in defined conditions, but in addition there have been some direct demonstrations of a "microphone effect".

As indicated above, the microphone effect was demonstrated in the cochlea of mammals, and it was thought that it was probably limited to those species possessing a cochlea. In 1938 some physiologists at Cambridge showed that the sacculus of the Pike and of the Burbot (as well as of certain reptiles and amphibians) could produce the effect. Even fairly weak stimuli set up potentials of such a magnitude that "they could hardly leave the nerve fibres within the macula unaffected".

These studies were confirmed by a Swedish worker, who stimulated the ear with the tone produced by a 60 cycle tuning fork, and recorded a "macula effect" similar in all essentials to the microphone effect of the mammalian cochlea. He found also that there were nerve impulses when

the ear was rotated in one direction in the plane of a semicircular canal. When the ear was rotated in the reverse direction nerve impulses were recorded only when movement ceased.

Behaviour studies on hearing in fish have been extensive. In a review published some fifteen years ago it was stated that reactions to sound stimuli had by then been reliably demonstrated in 32 species of fish from 14 different Families.

Use of Conditioned Reflexes

It is, of course, necessary to adopt a definite criterion of response to a sound stimulus in order to be satisfied that a fish does hear. Fish can hardly be expected to show spontaneous reactions to musical tones that have not any biological significance for them. Most workers have overcome the difficulty by use of conditioned reflexes, i.e. "conditioning" the fish to certain stimuli so that it always reacts to them in a definite observable way.

By means of conditioned reflexes it has been shown that some fish are sensitive to submerged tuning forks and electric buzzers. Minnows, Goldfish, Golden Orfe, Barbels, Miller's Thumbs and Catfish have been found to respond to high notes. In the case of Minnows responses have been obtained to frequencies of as high as 4,000 cycles, and in the case of Catfish as high as 13,000 cycles.

In both Minnows and Catfish it has been shown that there is a capacity to discriminate between sounds of different frequencies. Two different frequencies about an octave apart can be remembered and recognised. Some specimens have been found able to discriminate a minor third. Up to five tones may be remembered at the same time.

In fact there does not appear to be any marked difference between the sensitiveness of hearing in these species and that of the human ear. There is, however, no basilar membrane in the fish ear, and probably not the refinement of tone discrimination possessed by land vertebrates.

Response to sounds occurs even after the nerves to the skin and to the lateral line have been cut. It is, however, lost when the auditory nerve (leading from the inner ear to the brain) is sectioned. In the case of Minnows, it has been shown by operative procedures, that the seat of response to sound stimuli is in the sacculus and lagena, which are sensitive to frequencies of from 32 cycles to up to 5,000 cycles or more. The utricle and the semicircular canals are concerned with the sense of equilibrium and not with hearing.

Reception of Low Frequency Sounds

Sounds of low frequency are received by the lateral line, and those of very low frequency by "touch reception" in the skin. When the nerves to the lateral lines are cut, Catfish do not respond to sound vibrations of low frequency. In experiments with Minnows it has been found that frequencies of only 16 cycles are "picked up" by the touch sense only.

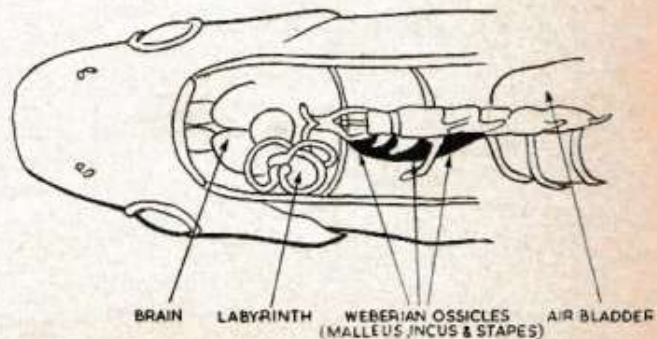
There is, of course, much more to be learned concerning sound reception in fish. Nevertheless there is little doubt

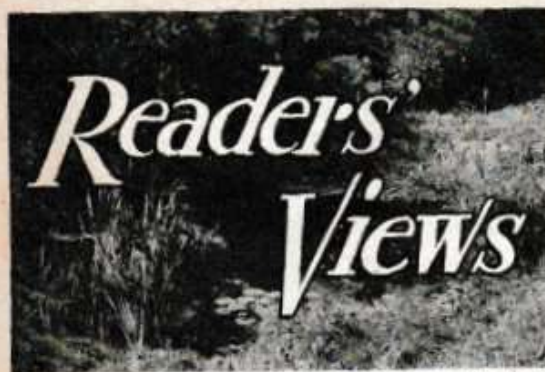
(Continued on page 254.)



Diagram of the human ear showing the details of its construction to be made with bones in various species of fish.

Fig. 3. Arrangement coupling the air-bladder to the labyrinth as is found in species of Carp, Catfish and Characins and other Ostariophysine fish.





The Editor is not responsible for opinions expressed by correspondents.

PARAFFIN OIL TREATMENT

SIR.—In April I had nine young Tiger Barbs (*Barbus tetrazona*) showing an advanced stage of Tail-rot. Having previously tried salt treatment without result, I decided to work upon the lines of Mr. C. H. W. Edmonds and use the paraffin oil treatment which he had successfully employed to cure White Spot. Within one month of giving the treatment all the young fishes were sporting new and unblemished tails. Up to the time of writing, the treatment has not retarded the rate of growth, as feared by an earlier correspondent when he experimented on Veiltails with the same treatment to effect a cure for Gill Flukes (Mr. J. L. Allen, Feb.-March issue, WATER LIFE).

I believe that, if reasonable care is taken, this treatment will provide a definite cure for Tail-rot and I shall not hesitate to use it again should the need arise.

Dalston,
London, E.8.

A. J. WRIGHT,
Secretary, Dalston A.S.

BLADDERWORT AND FRY

SIR.—In view of doubts expressed as to the wisdom of using Bladderwort as a spawning plant, the following may be of interest to your readers. On July 16, 1950, I was removing fry of White Cloud Mountain Minnows (*Tanichthys albonubes*) from a spawning tank. For a long time this tank has had a luxuriant growth of the Lesser Bladderwort floating on the surface as I regard it as most suitable for the reception of ova, whilst the thick mat of plant gives adequate protection for fry, besides encouraging a plentiful supply of tiny life for their food.

Whilst seeking the fish, which were just free-swimming, I noticed one in a queer position, partly on its side and not swimming. It proved to be well and truly caught by the plant, for its caudal peduncle was completely inside one of the little bladders. The fish could not have been there long as it was alive and vibrated in an effort to swim but release was impossible and, as I could do nothing for it, I put the piece of plant, together with its victim, into a tube of formalin for preservation and as proof of my observation. This has been seen by fellow members of the Croydon Tropical Breeders' Circle.

Whilst it seems that the chance of this mishap recurring is very slight, there can now be no doubt that it can happen. I do not believe it possible or likely that fry would enter a bladder headfirst, and the explanation of this occurrence would seem to be that my moving of the plant may have forced the bladder over the tail of the fish. Although the larger species is undoubtedly dangerous to fry, there does not seem to be a sufficient case here for the avoidance of Lesser Bladderwort in the spawning tank.

Norbury,
London, S.W.16.

K. M. MILLER.

TROPICAL DISPLAY IN WINNIPEG

SIR.—I send all fishkeepers greetings from Winnipeg, Manitoba, which city has just been treated to one of the finest exhibitions of tropical fish ever seen by the public in Canada.

The exhibition, the "brain child" of Mr. B. Kynman and sponsored by the Winnipeg Exotic Fish Club, was held in the annexe of the T. Eaton Co. Ltd. store for a period of two weeks. The firm provided the space free, set up the tank panels and advertised the show extensively.

Winnipeg is situated "on the prairies" in the middle of Canada and all stock fish must be imported from "outside", principally the U.S.A. In the circumstances, I think the enthusiasm shown was remarkable. No charge was made for admission. An average of 12,000 persons per day were checked into the exhibition over the two weeks.

The layout comprised three tanks (two small and one large) to each panel, accounting for 99 tanks, 66 of which were 18 in. x 6½ in. x 6½ in. and 31, 24 in. x 12 in. x 12 in. Two tanks, 26 in. x 8 in. x 8 in., were each divided into 6 compartments for the display of male Fighting Fish. There were also seven large community tanks placed down the centre of the annexe. Nearly 140 species were on view.

The exhibition was put on to give the people of Winnipeg an insight into the beauty of tropical fish. Mother Nature took a hand in the proceedings and during the show spawning and hatching took place amongst the following species:—Golden Medaka, Red Paradise, Blue Gourami, African Tetra, Egyptian Mouthbreeder and the Severum Cichlid as well as a number of livebearers including Red Swordtails, Black Mollies and Guppies. An added attraction was the daily performance of a number of Climbing Perch.

I send this letter as an admirer of the man who, I think, will put the hobby on the map in Winnipeg. When told "it could not be done," he set to at his own expense to make all the tanks except those used for the large community displays and imported all the fish, apart from the comparatively few varieties put in by club members.

Incidentally, I am not a member of the local club and write as a subscriber to WATER LIFE. I wish your journal continued success. I consider it the best magazine published for fishkeepers.

East Kildonan,
Manitoba,
Canada.

FREDK. HARVEY

FISHKEEPING IN MONTREAL

SIR.—It was a pleasant surprise to receive an airmail letter referring to my somewhat casual note written on the back of my subscription form.

Montreal has grown so that it now has a population of one-and-a-half millions and at the moment there are a dozen or so pet shops and dealers. It also has three or four aquarium societies, the oldest being the Montreal A.S. formed in 1933, of which I am a past president. Another group is predominantly French-speaking. There are two smaller groups formed in districts on the outskirts of the city.

The pet shops depend primarily on American supplies for fish, plants and gadgets. Very few items are made in Canada. A departure from the above has been made by our largest pet shop who have started to bring in British-made pumps, foods and equipment. This merchandise seems to be taking hold very well. You will understand, however, that it is rather confusing to see an air pump with three wires that have to be connected, one of the wires being marked "Earth." Over here that means a "ground" wire. We do not have them on household equipment!

I hope that my endeavour to get some exhibition standard Guppies sent out to me from England will be successful. I see many names of fish listed in WATER LIFE that I would like to get. For instance, we have not seen *Copeina guttata* here for some years, yet it was a popular fish in the 30's.

I also see you have *Neolebias* species for sale in London. I do not believe that a *Neolebias* has ever set fin in Montreal.

I have been in the hobby since childhood, and that is more than twenty-five years. At present I have eleven aquariums and a mixed collection including batches of *Badis badis*, *Barbus tetrazona*, *Panchax lineatus* and *Tanichthys albonubes*. I would welcome letters from fanciers who would like to have information on the hobby in Canada, and especially about native Canadian fish.

6255 Sherbrooke Street, W. L. W. HAYTER.
Apartment 3, Montreal, P.Q.

POND BUILDING FOR THE AMATEUR

SIR.—I have read Mr. T. Brown's series of articles on pond building with interest and am building a pond along the lines suggested. May I, however, ask him to explain further why he recommends using sand only for the first year on the bottom of the concrete pond?

I layered the ledges and part of the bottom of my first pond with loam and I have always been troubled, except in early spring, with dull-coloured water, apparently full of suspended material. This material (I am not sure whether it is floating algae or just mud) adheres to the plants, which lose their fresh appearance and partly rot away.

There is a considerable growth of algae on the concrete sides and on stands below the surface. The algae at the lower levels appears to be dirty, apparently because of the suspended mud. There are, however, two curious exceptions here. A red closely-grained and smooth stone is never affected by the algae, which I find very difficult to remove from other large stones below water. The other exception is the north wall of the pond, where there is no ledge. Here the algae is negligible.

The pond is 3 ft. 6 in. deep at one end (north) and the water is clear enough for 12 in. down. Goldfish, Rudd, Orfe, a big Carp and a few large Minnows are healthy and happy in this pond and appear to find plenty of food. Can Mr. Brown suggest a way of reducing the suspended mud or the excess of floating algae.

Aberdeen. J. BEATTIE.

(The above letter was shown to Mr. Brown, who writes:—"The trouble seems to be algae in suspension and it may be that the large Carp are stirring up the loam in their search for food. There is nothing you can do to rectify this, except wait until the pond matures and rectifies itself. It takes about three years for it to become fully matured, when the stationary algae overcomes the suspended matter, and the water becomes perfectly clear. Do not be tempted to use any chemicals or take any drastic action as this phase will right itself.

I advocate sand as a bedding medium for the first season because the pond has not matured and the new loam will give off gases with which the pond, being new, is unable to cope. This condition often upsets the fish, causing outbreaks of Fungus and Tailrot. As I remarked in my article, Water-lilies and other subjects which need loam can be planted in pots and introduced into the pond during the second or third season."—Ed.)

OBSERVATIONS ON AXOLOTLS

SIR.—In the October-November, 1950 issue of WATER LIFE I described the complete and simultaneous metamorphosis of a pair of Axolotls, and could give no reason for this action, since they had not been fed on thyroid gland nor had the level of the water been gradually lowered.

The water in their tank was always 9 in. in depth. This water was changed only when it became too cloudy. The tank was lined with an inch and a half of fine sand and there were a few rocks. It was noticed that the Axolotls were in the habit of coming frequently to the surface to "pop" air after the manner of newts. Their food chiefly consisted of Earthworms with an occasional fragment of meat.

When the tank was cleared out after the metamorphosis had taken place, the sand was found to be in an exceedingly dirty condition—due probably to the excreta of the Axolotls having been augmented by the soil normally found in the intestines of the Earthworms they had eaten.

The six Axolotls (8½-9½ in. in length), which I have at present, show no inclination to metamorphose. They live in a tank bare of sand, rocks and plants, and the water is



Photograph]

[J. Topham

The Matron of the War Memorial Hospital, Shooters Hill, Woolwich, accepts a set-up tropical fish tank for the Children's Ward from the chairman of the Shooters Hill A.S., Mr. W. Key.

changed every two or three days, when all excreta is removed. They never come to the surface to "pop" air. A slight restlessness on their part is an indication that the water requires changing. They each eat three or four Earthworms a day, and no meat. On very warm days several blocks of ice are floated on top of the water.

I have come to the conclusion that my former pair of Axolotls metamorphosed because, owing to the saturation of their water with waste gases and the scarcity of oxygen, they were forced to come to the surface very frequently for mouthfuls of air, and so developed their rudimentary lungs at the expense of their external gills.

There is one very great difference between an Axolotl and a Salamander. Whereas an Axolotl can suck in with one action a four-inch worm from a distance of an inch from its mouth, a Salamander has no suction power at all. Having grasped a worm a Salamander shakes it down its throat by violent side-to-side movements of the head—preferably under water.

Only one of my Salamanders is living. The other one died from the effects of heat after being left in a south window during the whole of a very sunny day. The remaining Salamander has grown, eats two earthworms a day, and makes a faint croaking sound at times.

Mr. Higginson refers to the regrowth of lost limbs in Axolotls (WATER LIFE, June-July, 1951 issue). This is a very common occurrence in all reptiles. Sometime ago I was given two Axolotls without any feet at all. Very soon the limbs grew to normal length and then feet developed. One of them made the mistake of growing five fingers on a front foot! Usually they have five fingers on the rear feet and four on the front feet.

Fovant,
Wilts.

DR. R. C. C. CLAY.

SIR.—The letter from Mr. H. W. Higginson on the "Adaptability of Axolotls" in the June issue of WATER LIFE was of great interest to me. I have a pair of white Axolotls which were sent to me by rail from a dealer in Sussex. I was disappointed to see on their arrival that one of them had, as I thought, a deformed front leg. The leg was very short and appeared to be shrivelled. They arrived on February 21 and now the leg is almost normal though not yet as long as the normal one.

This has all happened so slowly that I never really realized the change until I read Mr. Higginson's letter, as I had no idea that such a thing could happen. I shall now write to the dealer and ask him what had happened before he sent the Axolotl to me.

Deal,
Kent.

M. D. BROWN (Miss).

BREEDING FROM WAGTAIL PLATIES

SIR.—I was puzzled by the statement made by your correspondent, Mr. S. H. Butler, who stated that on interbreeding Golden Comets, which were the offspring of Wagtails, he expected a further type reversion. To what? And what is type reversion?

We know from the paper by Dr. Myron Gordon (*Zoologica*, 1946, 31, pp. 77-78, and quoted in *WATER LIFE*, 1950, 5, p. 240) that the original cross was between a "golden domesticated Platy and a wild type (greenish-grey) specimen with the comet marking." The first generation were all grey Wagtails.

In his paper, Dr. Gordon also states that the "modified effect of the comet marking" to the wagtail is due to a specific factor E which has no visible effect of its own. E is autosomal (i.e. not linked with sex in any way) "and independent of" the factors which produce the various Platy caudal markings and of the factor for body colour.

We are, therefore, dealing with three separate factors: body colour, caudal marking, and the factor E (from the Swordtail). From the fact that the second generation (F₂) consisted of six different colour varieties, we can deduce the following:—

- (1) That each factor has two expressions, dominant or recessive (or alternatively presence or absence).
- (2) From (1) it follows that the original parents were true breeding. (We could not otherwise have had six colour varieties in F₂.)

To move another step forward, we can work out the theoretical ratio of the six F₂ colour varieties as follows:—

27 Grey Wagtails	9 Grey Comets
12 Plain grey	4 Plain gold
9 Golden Wagtails	3 Gold Comets

Total 64 offspring.

Of the nine golden wagtails only one will be true breeding. The other eight will be capable of producing plain golds, Golden Comets or Golden Wagtails.

In other words, to be a Golden Wagtail, a Platy must possess the factor for gold in double dose, the factor for Comet either singly or doubly and E either singly or doubly. That a pair of Wagtails produces a few Comets seems to indicate that the factor E, through some accident, has been lost completely in these individuals.

As the only aberrant strain produced is comet, and not plain gold, it would seem that at least one parent (Wagtail) was true-breeding for comet. It is therefore unlikely that anything other than comets would appear among a small number of offspring. In larger numbers, if one parent were not true-breeding, plain golds might appear. This would be due to the sorting out of factors and not to type reversion.

Grey body-colour can not re-appear as it is obviously absent, for when present, even in single dose only, it makes its presence known.

Hendon, N.W.9.

B. DEREK GREEN.

ONEROUS TASK

SIR.—With regard to the controversy over the editorial in your June issue, I should like to give my views on the subject, first as a judge on the panel of the F.B.A.S., secondly as a club show secretary and thirdly as an exhibitor.

As a judge, I feel that Mr. Carnell and his colleagues are taking the matter rather too much to heart in that they appear to think all the comments refer to them. This is an unfortunate point of view, since, if they are satisfied that their standard of judging is sufficiently good, then the remarks must surely refer to some other judges. For myself, I can only say that when I am called upon to judge at a show I do so to the best of my ability, which, in the case of fish for which there is no standard, must be limited to my knowledge of those species. This points to the fact that if the F.B.A.S. Standards Committee would only buck up their ideas and supply more standards for tropical fish, a great deal of the dissatisfaction which exists would disappear.

My view as a show secretary on this matter is that if

clubs would only appoint judges trained by the F.B.A.S. there would be no complaints from competitors. I have never had any complaints made to me at any show run by my club and I think the above is the reason.

The only criticisms I have ever had to make as an exhibitor have been solely due to incompetent judging and on each occasion I have discovered that the judges concerned were not on the Federation panel. Although I feel sure that they knew their fish from years of experience, they lacked the knowledge of the finer points of judging which the Federation's judging classes explain.

London.
N.W.11.

D. B. CANNON
Show Secretary,
Hendon A.S.

SIR.—The suggestion in the June issue that the overnight scrapping of the F.B.A.S. standards, and their replacement by a universal standard which would be the panacea of all ills, is both naive and amusing. I cannot find anywhere in the editorial any comments on the need for care and thorough examination of the pros and cons or details of the suggested all-embracing scheme.

Has it not occurred to you that the hurried introduction of a fundamental change, without due consideration of the advantages and disadvantages, might prove to be a cure worse than the complaint?

The view that judging is rife with inconsistencies and personal preferences is unfair to a conscientious and hard-working body of people; further, the proof that such a suggestion is untenable lies in the fact that show-promoters continue to insist on F.B.A.S. judges and that the exhibiting public continue to support such shows in ever-increasing numbers. I feel that the editorial overstates any dissatisfaction that may exist.

Welwyn Garden City.

J. H. GLOYN

(Mr. Gloyn has recently been appointed secretary to the Judges and Standards Committees of the F.B.A.S. The above letter was written before the appointment was made public. It is a personal expression of opinion and not an official view of the Standards Committee.)

Sound Reception in Fishes

(Continued from page 251.)

that fish have in many instances at least a well-developed hearing capacity, and in the *Ostariophysina* the upper and lower limits of hearing are approximately of the same order as in man. Other fish so far investigated have proved less sensitive to sound, but on anatomical grounds there is reason to believe that they do, in fact, "hear".

That fish can hear, and in some cases apparently hear with discrimination, is possibly not surprising. After all, sound production is by no means uncommon in fish, and it presumably has some biological significance. As mentioned earlier, some of the Drumfishes have very large statoliths. One species (*Sciæna*) has been reported as being audible six feet above water when "drumming" sixty feet below the surface. In Drumfish the sounds are produced by movements of the air bladder, usually by males in the breeding season. It would seem highly probable that these sounds have significance for other fish of the same species.

No originality is claimed for the observations noted in this article, which is based upon the excellent material cited in the list of references. Those interested are recommended to read some of these references, not the least valuable of which is the classic compilation of Richard Owen, published nearly a century ago, but still a mine of information.

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PROBLEMS ANSWERED

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

Water Hyacinths

I have bought two Water Hyacinths (*Eichhornia crassipes*) which I have put into my garden pond. May I leave them in the pond during the winter or should I bring them into an unheated greenhouse?—(C.T., New Barnet).

Water Hyacinths are essentially subtropical plants. They will certainly not survive the winter outdoors and if you bring them indoors it will be necessary to keep the water at a temperature not lower than 55 deg. F. Whilst the plant grows a prolific grower under natural conditions, it resents overcrowding under aquarium conditions. Unless you have large heated tanks you will not be very successful.

Belonesox belizanus

Can you give any information regarding the *Belonesox belizanus* species?—(J. C., S. Wigston).

For breeding *Belonesox belizanus* the aquarium should be well planted to provide cover for the fry. The species' temperature range is 72-80 deg. F. These fishes are livebearing tooth eels. The depth of water should be about 4 in. They have been found difficult to feed as they require live fish. The young number about 30 per brood. These broods do not appear so frequently as those of most other live-

bearers but too frequently to feed well as the young have enormous appetites! The young are large when born and will take very large *Daphnia*, but in order to rear to adult size live fishes must be fed. You could try feeding worms but being pike-like in disposition live fish are really required.

Container for Terrapins

What should be the size of a glass bowl in which three young Terrapins are to be kept?—(I.G.S., Farnham).

Three young terrapins would live quite well in a glass bowl or dish about 9 in.-1 ft. across. It should contain a layer of sand in about 3 in. of water, with a small rock island in the centre. Whenever possible place the container in the sunshine or, in dull weather, make use of a low wattage bulb suspended over the rock. Arrange the stones into a cave under which the babies can hide or retire.

Hatching Brine Shrimps

Although I have followed the instructions given in the booklet "Livefoods for Aquarium Fishes" for the hatching of Brine Shrimps, only one or two shrimps have hatched from the eggs.—(R.C.K., Birmingham).

You should have little trouble in hatching Brine Shrimps provided the

eggs are in good condition. The eggs should be placed in a shallow dish (the larger the surface area the better) which receives plenty of light. Add four to six level tablespoonfuls of common table salt or sea salt to each gallon of water. The temperature of the water should be maintained at between 75-90 deg. F. Normally the shrimps will hatch out in 48 hours. If possible, slightly aerate the water. Should your store of eggs have become damp at some stage before being put into the salt solution very few are likely to hatch out.

Weathering Glazing Material

After glazing an aquarium how long, once the putty has set, should one allow for "weathering" of the tank before the introduction of plants and fish? Does the red lead in the glazing compound have any harmful effect on the fish if they are introduced fairly soon after setting-up?—(F.C., Maidstone).

Provided the glazing has been good, i.e., the glass fits snugly and there is not too much putty exposed, you can put the fish in immediately after a good wash round. A safeguard is to paint gold size sparingly around the inside joints with a water-colour brush. This hardens quickly and seals off the putty.

WATER ANALYSIS

Samples for analysis should be sent in a clean pint bottle to Water Life Analyst, 12, Featherbed Lane, Addington, Surrey, together with a fee of 5s. per sample. The name and address of the sender and details of prevailing conditions should accompany each sample which is submitted.

Sample received from G.P.B., Luton.

—Taken from a pond in a sunny position which had been in existence for just over a year. It contained Goldfish (including Shubunkins) and floating aquatics, also other aquatic plants which were planted in shallow troughs. The water was far from clear and it was wondered whether this was due to loam which covered the bottom of the pond.

Test for impurities:—Appearance: greyish, very unsatisfactory. Odour: offensive, due to sulphuretted hydrogen gas. Total mineral content: 0.0278 per cent. Organic matter: 0.0120 per cent, very high. Nitrogen compounds: 0.00022 per cent, very high. Ammonium compounds: 0.00015 per cent, very high. Poisonous metals: none detected. pH: 6.8. Chlorine, as salt: 0.0052 per cent.

Suggested corrections:—The chemical analysis of this sample of water revealed pollution with organic matter, probably from vegetable and animal sources. Secondary decomposition of this organic matter is responsible for the production of the foul-smelling sulphuretted hydrogen gas, which is toxic to fish life. Entirely cleanse the pond and well wash the plants. Discard the loam. Refill with tap water and install a pump or fountain which will prevent these conditions recurring in the future.

Eliminating Hydra from Tropical Tanks



[E. E. Dennis] Hydra attached to aquatic plants.

Can you tell me how to rid my tropical aquarium of Hydra without emptying the tank?—(N. A., Ashford).

Most of the Gouramies, including the Blue (*Trichogaster trichopterus*)

and the Leeri (*T. leeri*), when introduced into a tank, will eat Hydra and the addition of two or three of these fish is often the simplest way of keeping the pests in check or eliminating them altogether.

If you take out the fish you can add to the water in the aquarium one tablespoonful of household ammonia to every five gallons of water and gradually increase the strength of the solution until the Hydra visibly diminish in size in a matter of minutes and then die. You must siphon out this solution, flush out the tank with a refill of clean water, and then put in further fresh water before reintroducing the fish.



[W. S. Pitt & G. J. M. Timmerman] Left: Blue Gourami.



right: T. trichopterus of which the Blue Gourami is a variety.

That American View of British Guppy Standards

Mr. W. G. Phillips Replies and Describes the Standards Drawn Up for Varieties in this Country, Where Concentration is on Shape Rather than Colour

IN the August issue of WATER LIFE, Mr. Wm. H. Hildemann of Los Angeles gives an American view of British Guppy Standards. As Chairman of the Standards Committee of the Guppy Breeders' Society, I feel it incumbent on me to reply in order to remove any misconception your readers may have gained.

The membership of the G.B.S. consists entirely of amateurs, not scientists. Whilst the great majority have made no attempt, so far, to work on the lines followed in the laboratory but, rather, have based their activities on practical day-to-day experiences gained in their fishrooms, there are some who have kept themselves informed of the scientific data available to them. They have, in fact, tried to put into practice the knowledge gained from such sources but their progress in this direction has, of necessity, been limited by their individual capacity and the important considerations of time and space available.

Practical Possibilities

Standards issued by the G.B.S. are not an artist's conception of an idealistic dream. I submit that the outlines used in the standards embody characteristics which it is biologically possible to produce. Each and everyone of the characteristics that go to make up a standard were already in existence when that particular standard was evolved. True, in some specimens a characteristic was more developed than in others, but it had been proved beforehand that such a feature could be attained before it was incorporated in the drawing of an ideal type.

Providing the Incentives

In drawing up each standard we endeavoured to get an outline that was appropriate and knew that it would be ridiculous to incorporate "characteristics" that did not exist. All we did, in order to create an incentive for breeders to try to produce fish conforming to an ideal, was to examine as many fish as possible possessing one or other, or more, of the normal characteristics. We then permitted slight modifications or intensifications so as to present a standard which would be accepted by experienced breeders as an ideal for which to aim.

The 1948 standards were drawn up for the Society by people competent to do so, including two well-known ichthyologists, two qualified judges and three of the society's most successful breeders. The standards were not decided upon in

one sitting. I had the privilege of putting forward rough sketches in the first instance and numerous meetings and discussions took place before we reached agreement. By that time the drawings had been modified to meet the several points of view put forward; but at no time did we overlook the fact that we had to be guided by what it had been proved possible to breed from the several existing types and strains of *Lebistes reticulatus*.

Easily Recognizable Types

It was due to the combined knowledge of the members of the committee that the standards we have are not only practicable but that they can be recognised by their respective names. These names (the Robson excepted) correspond with the form of the caudal fin of the males, e.g., Speartail, Pintail, Cofertail, Topsword, Bottomsword, Doublesword, etc. Such recognition is not possible in the U.S.A. where they have a number of varieties or forms which we would never recognise by the names applied to them, e.g., peacock-fish, chain variety, Swedish, Blue, Red and Aqua, to mention but a few.

Further, the committee knew when discussing its standards that the factors responsible for the dorsal and caudal fins were inherited independently. They took advantage of that knowledge to combine the differing fin forms when preparing the various standards.

Mr. Hildemann suggests that whether a given tail form should be accompanied by a short, intermediate or long dorsal fin, is a matter of individual taste. This view is wrong in the eyes of breeders in this country where there are so many fish exhibited in keenly competitive displays. The judges must know what the standard is so that they can assess the respective merits of the exhibits and similarly the breeders must have a clear guide when selecting fish to mate up. It seems here that we have reached a stage well in advance of our American friends in respect of shows. Both our judges and exhibitors know what is a good fish and they have found in practice that it is possible to maintain true strains conforming to our recognised varieties.

Idea Now Discarded

To say that the wild-type should be the fundamental standard to which domesticated strains are compared indicates an outlook we discarded years ago. Our recognised types are so well established that we do not judge them by the original forms but solely on their

relation to the standards drawn up for each type.

I think Mr. Hildemann's underlying attitude is revealed when he says that any definition of tail type should indicate which rays are prolonged. Surely the attitude of the scientist should be just the reverse? Here in Britain we have prepared standards based very largely on tail types and, what is more, are getting very near to breeding specimens conforming in all respects to our standards. It seems to me that the scientist can now enter the field and examine such specimens to see what ray development has occurred to give us these types.

It is worthy of mention that, in the hands of our more experienced breeders, line-bred specimens are mated in such a way as to produce a high percentage of progeny conforming more or less to the desired type aimed for by breeders who enter their fish in competitive exhibitions.

I note that Mr. Hildemann suggests that our Cofertail, Speartail and a "more striking variation" (presumably our Pintail) are probably variable manifestations of the same character. He may be right. Having bred Cofertails over a number of years it is interesting to record that during that time no semblance of a Speartail has appeared amongst our fish.

I am grateful to Mr. Hildemann for setting out so explicitly the American view. I believe, however, that he and his colleagues are placing more importance than we do on producing strains with known colour patterns. We in the G.B.S. have realised only too well how complex that side is and have concentrated for the present on shape, particularly that of the fins.

Technicolor Film for Hire

THE Harrow A.C. has prepared a technicolor film covering its activities and this has already been shown at the meetings of a number of clubs in the London area. It may now be hired and full particulars will be given by the chairman Mr. N. Allies, if he is contacted at 32, Weldon Crescent, Harrow, Middx. (Phone Harrow 3094).

A reader in the U.S.A., who is also an associate member of the Goldfish Society of Great Britain, wishes to obtain a copy of the February-March 1950 issue of WATER LIFE, which is now entirely out of print. If any fancier can assist would they contact Mr. Barth Maina direct at 10623, Church Street, Chicago 43, Illinois.

In and Around the Aquaria World

— By W. J. Page —

WEST GREENWICH aquarists have at last drawn the line. To avoid confusion with other clubs they have changed the name of their society from "West Greenwich and District Aquarist and Pondkeepers' Association" to "Meridean Aquarists" (should it not be Meridian Aquarists?). The latter is more correct if, as we presume, the new name has been chosen since Greenwich is the home of the Royal Observatory (now in process of being transferred to Hurstmoor) and is on the Meridian of Greenwich (longitude 0°). On the other hand, if the members are all doyens of the hobby, perhaps the new name is a diminutive indicating a band of merry deans of the fish world. I must wend my way to West Greenwich to find out whether the society is an enterprising organisation with a distinctive name or one which lives on a plane of jollity and facetiousness in carrying out its aquatic studies.

A sign of the times is a letter just received from the author of the article "An American View of British Guppy Standards" to whom Mr. W. C. Phillips replies on page 256. No longer is it MR. Wm. H. Hildemann of Los Angeles but 2nd Lt. He writes from Quantico, Virginia:—"I have been separated from the University Laboratory since our last communication and am back in the U.S. Marine Corps. I would much prefer the piscatorial environment but all of the reserves have been called into service". We must be careful now not to tell any "fishy" story to the (U.S.) marines for at least one member of that illustrious corps will in all probability know the answer.

OCASIONS arise when we want to buy gifts for friends. These days we often scratch our heads, wondering what to choose. A new departure which may solve the problem for aquarists is the introduction of a line in toilet soap. Sets of three tablets, each bearing a different picture, in black, of popular tropicals (Tiger Barb, Siamese Fighter and Angel Fish) are being sold in a gift box, complete with greetings card.

So far, I have not exhausted the tablet I am using; but the picture has not worn off and looks like lasting to the end. The illustrations, which are accurate and pleasing, are from line drawings by Mr. Reginald Harrison.

VERY so often I manage to tear myself away from the editorial chair to visit shows. This permits me to renew acquaintance with aquarists in different parts of the country and to keep up-to-date with the trend of things in the exhibition world. Recently three of them from the office took the road out of

London on to the Watford By-Pass and so on to the Oxfordshire town of Banbury. Here Mr. L. W. Ashdown stopped for the afternoon to go to the local society's exhibition in the ancient town hall situated near to the famous Cross.

Pressing on, but not regardless of the rules of the road, Mr. L. Mason and I reached Bingley Hall, Birmingham, some little time later, where we made a surprise call on the Midland A. & P.S. event. The new venue is much more capacious than the one used in previous years and displays twice the size can be accommodated another time.

This year, the society which, hitherto, has had a predominantly coldwater bias

heads) might have been its proper home. The exhibitor, the well-known Mr. C. F. Whitehead, of Portsmouth, maintained that his fish was eligible to be exhibited and judged in company with normal plainhead Veiltails.

Several folk said it was one of the best scaled Orandas ever seen. The F.B.A.S. standard for Orandas states that the "general body form is as for the Veiltail". The same exhibitor won the class for Calico Veiltails with another outstanding specimen, again a Veiltail in body shape and finnage but with a "narial bouquet" as the Goldfish Society might describe it. The F.B.A.S. Veiltail standard says nothing about such head development and certainly none is indicated in the pictorial outline of an ideal Veil.

Turning to the tropical classes, I noted that for some classes true pairs were specified and for others "two fish". Guppy enthusiasts accustomed to seeing separate classes for single males and females found that they had to enter two males together and the judge had a difficult task to sort them out. All these points, however, can easily be handled by the society which is hoping from now onwards to stage some of the leading exhibitions in the Midlands if not in the country. With one or two improvements to the classification they should be able to present a schedule which will attract entries from exhibitors over a large area.

BECAUSE we were so outspoken in these columns on the question of standards, I believe that in order to see the matter in its right perspective it is an apt moment to mention something of what has been going on behind the scenes.

As far back as 1947 the F.B.A.S. issued its book of Standards covering Hi-go! Carp; Golden Orfe, Rudd and Tench; recognised forms of Goldfish; the more popular livebearers (Guppies, Mollies, Platies and Swordtails) and one egg-layer, the Fighting Fish (one of the Anabantids).

The standards were warmly welcomed by many but the Guppy Breeders' Society soon made its voice heard and in course of time the F.B.A.S. recognised the more comprehensive G.B.S. standards, but not until a degree of opposition had been outvoted. They have not given similar recognition to the new ideals issued by the Goldfish Society. This may be due to the fact that the G.S. has proved too revolutionary or because the G.S. has not formally sought recognition by the Federation or for both reasons.

In July, 1950 the Federation published one further standard, not for an additional species but for another



Photograph by P. M. Gosschild. This novel lantern aquarium was on view at a display by Kings Lynn A.S. which was visited by H.M. The Queen.

put on a large section for tropicals. It was well-supported, with a variety of species, while the coldwater section was as good if not better than those of previous events.

I was intrigued by the schedule. No class was provided for Fantails, yet Comets shared a class with Common Goldfish. Considerable comment was heard over the coldwater judges' decision to give the special awards of Best Fish in Show and Best Veiltail to the winning entry in the class for Scaled Veiltails. In my opinion, the fish selected was by far the best fish in the show, for body shape, colour, finnage development and size. It had full Oranda head development, however. Should it have been "wrong classed" by the judge? Class 11 (Orandas and Lion-

variety of Platy, namely the Wagtail. Since then, the G.B.S. has prepared a standard for the Pintail and has put forward promised standards for Scarftail and Veiltail Guppies. The assumption is that these three, having the blessing of the specialist society, will be accepted by the Federation.

No more new fish standards have been drawn up by the Federation during the four years or so since their original Standards Handbook was published. A new edition has just been issued. Mainly a reprint, it incorporates details of the Wagtail Platy and of the eight Guppy types, including the Pintail. Unfortunately, the approved drawings of standard Guppies, issued in an official G.B.S. pamphlet in 1948, have not been included. The omission will be regretted by all who exhibit *Lebistes reticulatus*.

Instead of devoting time to issuing new fish standards, the responsible Committee concentrated on the recently produced plant list. It took a long time to do this since the task was by no means straightforward. Its reception was good but there have been criticisms which may result in some revision. Maybe, that is the reason why it has not been added to the new edition of the handbook but I think that, as a provisional list, it would have been useful to incorporate it.

It is said that the original intention was not to make standards for all fishes but rather to confine them to "man made" varieties. If that is so, the Federation has achieved this object but recently there have been signs that exhibitors want the standards to be extended. The fact that no specific motion to that effect has been put on

an Assembly agenda does not necessarily indicate lack of support for that view. Rather, it points to the fact that individual members of societies have not taken advantage of their rights. They are entitled to put up suggestions to their society and if that society agrees it can then give definite instructions to its delegates. I sometimes get the feeling that societies send their delegates to hear what "the Federation" has to tell them whereas they could more often go primed with views and propositions. There is a possibility of the policy being framed on the suggestions of the same few who get up and say their say at each meeting rather than on the ideas of each delegate who should know clearly his own society's feelings beforehand and not be diffident about expressing them.

Perhaps one contributory cause of the non-appearance of further standards has been the need to spend time on deciding the status of accepted judges who have been nicely segregated into "A" and "B" categories for the different sections. This having been done, they are faced with the task of considering the claims of some "B" judges (no offence meant, ladies and gentlemen) to be upgraded to "A" status.

It will be seen that the committee has had much to do but the point at issue is whether they were expected to produce more standards and if so has their energy been devoted too much to other matters? The situation remains that until there are standards for all fishes, judging of so many species will be left to the personal opinions of judges as to what is a good or a bad specimen. Will that continue to satisfy exhibitors for long?

CONTEMPORARY PRESS COMMENTS

Reviewed by L. W. Ashdown

KEEPING or culturing worms is a very necessary ingredient of good fishkeeping yet it is the one feature of the aquarium hobby which evokes nausea in the uninitiated person. In reality, of course, the maintaining of worm cultures is not the messy and smelly business which the fertile imaginations of non-aquarists tend to suggest.

Worm culture is indeed becoming more of a science as each month passes; immediately after the war Earthworms, *Tubifex*, and White Worms (*Enchytrae*) were the sole representatives of this type of livefood but since then (thanks to Mrs. Morten Grindal of Sweden) Mikro-worms and a new Dwarf White Worm, midway in size between a Mikro and an *Enchytrae*, have appeared. This has resulted in worms being available for feeding to fish even when they are only at the fry stage. The generally accepted order of feeding is Mikro-worms (or mashed Earthworms) initially, followed by Dwarf White

Worms and then White Worms, chopped *Tubifex* or chopped Earthworm.

The approximate lengths of the cultured types are:—Mikro, $\frac{1}{16}$ to $\frac{1}{8}$ in.; Dwarf White Worms, $\frac{1}{8}$ to $\frac{1}{4}$ in. and White Worms, approximately $\frac{1}{2}$ in. From this it will be seen that there is a gap in size between the Dwarf White Worm and the ordinary White Worm. This makes an article in *The Aquarium* (U.S.A.) especially interesting for in

THE uncomplaining Goldfish—all too often the victim of fate in the shape of a Goldfish bowl—is now receiving publicity which suggests that he has some mystical association with Dame Fortune. Listen to this letter which appeared in the *Sunday Express*. "Are Goldfish unlucky? A woman in a pet shop told me that soon after she bought one her husband disappeared. Last week my son brought one home. Since then our cat, which we have had for several years, has vanished."

WATER LIFE DISPLAY

December, 6-7-8, 1951
NATIONAL HALL, OLYMPIA
LONDON, W.14

(Incorporating Annual Shows of the Goldfish Society of Great Britain and Guppy Breeders' Society).

Classes for Furnished Aquaria, Tropical Fish, Coldwater Fish, Reptiles and Amphibians will be staged at this year's WATER LIFE Display which is being held in conjunction with the National Exhibition of Cage Birds. Cash prizes and other awards, as well as special prizes, are offered to competitors.

Experienced show officials have been invited to serve on the organising committee and the committee of the Federation of British Aquatic Societies has agreed to give their valued co-operation and to provide the stewards and judges.

The hobby's two specialist clubs, the Guppy Breeders' Society and the Goldfish Society of Great Britain have been given facilities to stage their annual shows at this event.

THIS YEAR'S VENUE IS LARGER THAN THE 1950 HALL, PERMITTING A BETTER LAY OUT AND SPECIAL ATTENTION IS BEING PAID TO THE REQUIREMENTS OF EXHIBITORS IN THE AQUARIA SECTION.

ENTRIES CLOSE 13th NOVEMBER. Entry fees:—Club Classes 5/-. Other classes:—2/- per entry. Schedules will be sent to all regular exhibitors and club secretaries shortly. If you have not received yours by 1st November, please send a P.C. requesting a copy to the Section Organiser, WATER LIFE Display, Dueset House, Stamford Street, London, S.E.1.

it a White Worm of length between $\frac{1}{8}$ and $\frac{1}{4}$ in. is mentioned. It is a member of the *Oligocheta* Order which means it is more closely related to Earthworms. *Tubifex* and White Worms than to Mikro-worms. It has been cultured in a similar manner to *Enchytrae*. The man responsible for introducing the livefood to American aquarists is Mr. H. L. Geis of Texas and the Houston A.S. is making cultures available at a nominal sum.

Our compassion is aroused and we come forward in support of inoffensive and mute *Carassius*. We have studied every Lionhead and Oranda at the fish shows we have visited this year but whilst the fish have frequently boasted well-developed head-pieces, we could find not even a suggestion of horns which are normally indications of Satanic connections. We therefore feel it our duty to deny these accusations made against our eternal and respected companion, the Goldfish.

High Quality at Well-attended Ulster A.S. Show

ULSTER A.S. staged their Annual Show in Belfast from August 6-11 and they can be truly proud of their efforts. Once again judges were invited from "over the water" to co-operate with Mr. Morris Harding, O.B.E., R.H.A., President of the Royal Ulster Academy of Arts. The two London judges were Messrs. C. W. G. Creed, F.Z.S. and C. J. Saunders, B.Sc.

During the period of the show over 10,000 paid for admission. The Y.M.C.A. Hall is spacious and the layout was well thought out with, as the centrepiece, a 9 ft. high waterfall and pond, surrounded by a flower garden set up by Messrs. Samuel McGrady and Son. This was flanked by the 64 tropical, coldwater and marine furnished aquariums, a remarkable number for a club show. It was encouraging to see that the standard had improved considerably since last year. Amongst the furnished aquariums were tanks containing all varieties of aquarium plants.

There were 16 coldwater aquariums. The five best tropical exhibits were of a very good standard and showed originality but Dublin managed to take the premier award (Lily Shane Memorial Shield) from the Ulster and Scottish clubs.

Around the outside of the furnished aquariums were the individual exhibits, which again were of a high quality. One class alone (for Guppies) contained 52 entries.

A new award this year, a very fine shield (Thomas McGarry Shield and gold medal) was given for the best fish judged to F.B.A.S. and U.G.A. standards. This went to a junior (S. Sneddon) from Scotland, for his Fighter. The fish was purchased out of his own pocket money when it was young. Ulster hope that by putting an idea like this whereby for competition it will urge the F.B.A.S. to bring out more standards to make competition keener.

The show was well divided into sections and large banners, which obscured the fixtures, marked each section.

The officials had worked well under their able show manager, Mr. W. Ryan, F.Z.S., and Secretary "Jimmy" Lutton. As at most shows there were initial setbacks and on this occasion it was when the society took possession on the Thursday and found that the roof was being repaired and was open to the sky and rain! This was overcome and the show was opened to time by the Lord Mayor of Belfast. The first day's takings were given to the Northern Ireland War Memorial Fund.

PRIZEWINNERS

COMMON GOLDF. (9): 1, R. Pearce; 2, J. T. Bonfield; 3, F. W. Shane; best junior, S. Moffett; lady's exhibit, Mrs. E. Ryan.

Senior and Junior Societies Combine for Essex Show

THE Southend, Leigh and District A.S. held their most successful annual show from August 4-8 at the Clarence Hall, Southend-on-Sea. The accommodation was much larger than that for last year's event and this enabled the organisers to stage a larger and more pleasing show. Over 1000 fish were exhibited and over 2000 visitors were attracted during the four days.

In the main hall, in addition to the tiers of the tanks and furnished aquariums, the S.E. Essex Junior A.S. displayed several excellent fish distribution maps, while a number of local firms had trade shows. Miniature gardens were being made by eager customers. The Leigh Horticultural Society staged a colourful floral arrangement of multi-coloured flowers for the show cups and trophies which were up for competition.

The smaller room was devoted to aquatic insects and fish biology, while another housed coldwater fish and some fine specimens of reptiles and amphibians. These included an exceptionally large Toad, Marsh Frogs, Grass Snakes and Slowworms with young.

Amongst the numerous awards special mention should be made of Mr. C. J. Saunders, B.Sc., who won the Abbott Cup for the third year in succession.

GUPPIES, ETC.: 1, S. Halfhead; 2, P. Soffietti; 3, A. DuBoisson. GOLDEN GUPPIES: 1,

SHUBUNKIN (19): 1 & 2, E. D. Taylor; 3, S. Kerr; best junior, R. Smith. VEILTAIL (12): 1 & 3, W. McDowell; 2, W. Ryan. A.O.V. GOLDF. (2): No award. A.O.S. COLDW. (6): 1 & best junior, J. Smith, Jr. (Catfish); 2, W. McDowell (Bitterling); 3, R. Smith (Rudd).

BREEDERS' COLDW. (1): 1, E. D. Taylor (Shubunkin). GUPPIES (52): 1 & 2, H. S. Pate; 3 & lady's exhibit, Mrs. W. McDowell; best junior, A. Chestnutt. PLATIES (5): No award. MOLLIES (8): 1, F. W. Shane; 2 and lady's exhibit, Mrs. E. Godden; 3, G. E. Crisp. SWORDTAILS (16): 1 & best junior, A. Gilpin; 2 & lady's exhibit, Mrs. Robb; 3, D. S. McComb. A.O.S. LIVEBEARER (3): 1, G. E. Crisp (Merry Widow); 2, G. E. Crisp. GOURAMIES (12): 1, J. Cochrane (Blue); 2, T. J. McKnight (Blue). FIGHTERS (5): 1 & best junior, A. Sneddon; 2, F. W. Latimer; 3, J. Adgey; lady's exhibit, Mrs. W. Ferguson. ROSY BARBS (4): 1, J. T. Bonfield; 2, J. H. Crawford; 3, J. Lutton. NIGGER BARBS (4): 1, H. S. Pate; 2, F. W. Shane; 3, V. Kilpatrick. TIGER BARBS (1): 1 and lady's exhibit, Mrs. E. Godden. A.O.S. BARB (5): 1, W. Ryan (*B.schuberti*); 2, H. S. Pate (*Chequer*); 3 & best junior, A. Robbins (Cherry); lady's exhibit, Mrs. W. Ferguson. DANIOS AND RASBORAS (10): 1, J. Cochrane (Pearl); 2, J. T. Ruiterford (Giant); 3, J. T. Bonfield (Zebra); best junior, W. Adams (Pearl). WHITE CLOUDS (7): 1 & best junior, E. Moffett; 2, H. S. Pate; 3, I. Coburn. BLACK WIDOWS (9): 1, Leman; 2, T. J. McKnight; 3, D. S. McComb; best junior, A. Chestnutt. BEACONS (1): No award. A.O.S. CHARACIN (20): 1, G. E. Crisp (*H.seppa*); 2, F. Latimer (*N.anomulus*); 3, G. E. Crisp; best junior, A. Sneddon (Black-line); lady's exhibit, Mrs. W. Ferguson (*H.pulcher*). ANGEL FISH (4):

1 & 3, G. E. Crisp; 2, J. H. Crawford. A.O.S. CICHLID (1): 1, G. E. Crisp (*Aequidens curviceptus*). A.O.S. TROPICAL (15): 1, G. E. Crisp (Upside-down Catfish); 2, J. T. Bonfield (*Aplochelus lineatus*); 3, A. Forte (*Epiplatys chaperti*); best junior, A. Robbins (*Rivulus*). BREEDERS' TROP. (28): 1, A. Robbins (Flame Fish); 2, A. Forte (*Epiplatys chaperti*); 3, G. E. Crisp (Black Widows).

FURNISHED AQUARIA AND PLANTS

COLDW. JNR. (6): 1, C. Morrison; 2, R. Smith; 3, L. Peoples. COLDW. ADULT (7): 1, E. D. Taylor; 2, M. Magee; 3, W. McDowell. COLDW. LADIES (1): no award. CLUB COLDW. (2): 1, Ulster A.S. CLUB TROP. (5): 1, Dublin Soc. of Aquarists; 2, Ulster A.S.; 3, Scottish A.S. TROP. JNR. (7): 1, J. Coburn; 2, A. Robbins; 3, A. Gilpin. TROP. ADULT (30): 1 & 3, W. F. Shane; 2, J. Morrow. TROP. LADIES (6): 1, Mrs. B. Collier; 2, Mrs. W. Ryan; 3, Mrs. Robb.

TROP. PLANTS (21): 1, Crawford (Amazon Sword); 2, V. Collier (*Aponogon ulacrum*); 3, V. Collier (*Bacopa caroliniana*). COLDW. (3): No award.

SPECIALS

Thomas McGarry Challenge Shield and Gold Medal, A. Sneddon (Cambodia Fighter). Warnock Cup (best trop. furn. aquarium), F. Shane. Harper Cup (best coldw. furn. aquarium), E. D. Taylor. Ulster A.S. Cup (best junior trop. furn. aquarium), I. Coburn. Romayne Cup (best junior coldw. furn. aquarium), C. Morrison. Lily Shane Memorial Shield (best club furnished aquarium), Dublin Society of Aquarists. Ulster Aquatics Cup (best exhibit bred by exhibitor), A. Robbin (Flames). Sawyers Cup (best coldw. fish), E. D. Taylor. Pate Cup (best trop. fish), G. E. Crisp (Upside-down Catfish). Ulster Aquatics Rose Bowl (best lady's furnished aquarium), Mrs. V. Collier (marine).

VIEW OF THE ULSTER SOCIETY'S SHOW

Part of the show hall showing an attractive rock garden and a number of the sections for competitive exhibits, each clearly marked with large banners which hid the electrical installations.



Photograph [C. W. G. Creed

G. Cooke; 2, Mrs. Gibbs; 3, G. Willis. SWORDTAILS: 1, C. J. Saunders; 2, G. Willis; 3, S. Halfhead. PLATIES: 1, S. Halfhead; 2, P. Soffietti; 3, Mrs. Smith. MOLLIES: 1, E. Smith; 2, W. Hoare; 3, S. Halfhead. A.O.S. LIVEBEARER: 1, R. Sullivan; 2, K. S. Scott. FIGHTERS: 1, Mrs. Smith; 2, G. Pryor; 3, B. Harris. A.O.S. LABYRINTH: 1, C. Villion; 2, S. Halsey; 3, Mrs. Gibbs. ZEBRA FISH: 1 & 2, C. J. Saunders; 3, Mrs. Gibbs. A.O.S. DANIO: 1, G. Willis; 2, F. Walker; 3, A. Kelly. WHITE CLOUDS: 1, R. DuBoisson; 2, C. J. Saunders; 3, E. Smith. ROSY BARBS: 1, G. Willis; 2, M. Rayner; 3, E. Baker. NIGGER BARBS: 1, G. Willis; 2, G. Cooke. A.O.S. BARB: 1, P. Soffietti; 2 & 3, G. Willis. BLACK WIDOWS: 1, A. DuBoisson; 2, W. Donges; 3, Miss Gibbs. A.O.S. CHARACIN: 1 & 3, A. DuBoisson; 2, M. Mash. ANGELS: 1, W. Donges; 2, A. Scragg. A.O.S. EGGGLAYER: 1, G. Willis; 2, P. Blomfield. BRISTOL SHUS: 1 & 3, C. J. Saunders; 2, W. Hoare. A.O.V. FANCY GOLDF.: 1 & 2, C. J. Saunders; 3, J. Cowan. A.O.S. COLDW. FISH: 1, 2 & 3, M. Mash. FURN. AQUARIA: 1, P. Blomfield; 2 & 3, G. Cooke.

SPECIALS

Abbott Cup (Highest Points), C. J. Saunders; Giles Cup (Best Home Furnished Aquaria), P. Blomfield; Anon. Cup (Second Best Home Aquarium), G. Cooke; Anon. Cup (Third Best Home Aquarium), Mrs. I. Gibbs; Brooks Shield (Best Show Furnished Aquarium),

P. Blomfield; Du Boisson Cup (Best Black Widow), A. DuBoisson; Flamboyant Cup (Best Tropical Fish), W. Donges; Barnes-Oake Cup (Best Breeders' Entry), E. Smith; Runner-up, Abbott Cup, G. Willis; Best Fish in Show, W. Donges; Best Egglayer, W. Donges; Best Livebearer, E. Smith; Best Characin, A. DuBoisson; Best Labyrinth, E. Smith; Runner-up Breeders' Class, P. Blomfield; Runner-up Furnished Aquaria, G. Cooke; Best Barb, P. Soffietti; Best Guppy, S. Halfhead; Best Goldf., C. J. Saunders; Best Angel, W. Donges; Best Ladies' entry, Mrs. Smith.

Doncaster's Public Show

FIRST major show promoted by Doncaster A.S. was staged during the summer and it proved a success with 62 tanks on display. There were classes for decorative aquaria, livebearers, tropical egglayers and coldwater exhibits. They were judged by Mr. E. Chapman of Sheffield.

Illness prevented Mr. E. Bunting staging the scheduled display of reptiles and amphibia himself, but he sent along some specimens which created considerable interest.

Reports of the shows staged by Banbury A.S., Midland A. & P.S. and Nottingham A.S. have been held over until the next issue owing to extreme pressure on space. Reference to the Midland A. & P.S. event is made in the In and Around the Aquaria World on page 257.

High Quality at Friern Barnet Show

Entry Slightly Down on Last Year

ONCE again Mrs. W. M. Meadows, show secretary of Enterprise A.S., can feel very satisfied with the standard achieved at her society's annual show. This year it was a Festival event and, as on previous occasions, it was held in conjunction with the Friern Barnet Summer Show in Friary Park. Staged in a marquee the layout was similar to that which had proved eminently satisfactory other years. The show was of two days duration (August 24-25) and, this year, an added attraction was the Pengilly Memorial Trophy up for competition in the breeders' tropical egg-layers' class for the best team of Danios or Brachydanios. This certainly drew the entries—in fact there were 24 teams of species belonging to these Genera, mainly Zebra and Giant Danios.—yet none was of a sufficiently high standard to get into the prize cards. It was fitting that the Trophy went to Mr. W. J. Holdstock, a friend of the late Mr. George Pengilly.

Although the number of entries over the entire show was not quite as large as last year the quality was extremely high. Particular mention should be made of the Veiltail class described by the judge, Mr. A. Boarder, as the best class of Veiltails he had seen since before the war (the leader here was the best coldwater fish in show). Other notable exhibits were the first prizewinning albino Scaevola of very good size and quite exceptional colour, a superb pair of *Mollentia velina*, a Firemouth with very well developed finnage and sparkling colour (took best tropical fish in show award), and the furnished coldwater aquarium of E. London A. & P.A.

The judges were Messrs. W. G. Phillips, C. W. Creed and A. Boarder. Among the non-competitive displays was one of reptiles and amphibians by Mr. B. M. Smith and two trade exhibits by Mr. P. E. Child and Finchley Aquarium. The show secretary wishes to thank all supporters of this show.

PRIZEWINNERS

TROP. FURN. AQUARIA (CLUB): 1, Hendon A.S., well designed, good plants, excellent fish. **COMP. ARRANGEMENT** little incongruous. 2, Tottenham A.S., attractive layout, but rockwork too heavy and plants too closely grouped. 3, Weimbley A.S., worn marble and new compost did not blend, slightly atragally plants but good Angel Fish. 4, E. London A. & P.A. **COLD FURN. AQUARIA (CLUB):** 1, E. London A. & P.A., very fine layout, excellent plants and interesting design. 2, Hendon A.S., one-sided arrangement with plants of variable quality. 3, Hornsey A.S., attractive tank spoiled by over-use of *Fossilin* and haphazard arrangement of stone chips. **INDIVID. FURN. AQUARIA:** 1, H. A. Hallet, natural layout, plants not too starchy and White Clouds offered little contrast. 2, R. Oakes, apart from the round stones a good effort with excellent use of *Riccia*. 3, W. T. Loader, too much emphasis on straight-leaved plants and mixing of fish was not too satisfactory. 4, A. Eley, SHUS: 1, Mrs. M. A. Friend, Bristol type, lovely finnage, colour a trifle pale. 2, J. Fish, larger caudal, slightly narrow forked, not colour. 3, Mrs. B. Putterill, a London of good colour. **A.O.V. FANCY GOLDF:** 1, A. Defelice, lovely Veiltail, fine body, good finnage, not quite the colour. 2, H. C. Nutt, Veiltail, slightly rounder body but not the finnage. 3, Woolford, Scaled Fantail, with not quite the finnage development. 4, H. C. Nutt. **A.O.S. COLDW. FISH:** 1, Mrs. M. A. Friend, large Sun Bass, good colour and condition. 2, R. J. Kesteridge, Golden Orfe, caudal slightly ragged. 3, Mrs. D. Hughes. 4, F. G. Sanders.

LIVEBEARERS

GUPPIES (ROUNDTAIL AND SPEAR-TAIL): 1, E. S. Lloyd (Spear). 2, H. H. Caines (Round). 3, H. S. White (Spear). **DOUBLE-SWORD & LYRETAIL:** 1, E. S. Lloyd (Lyre). 2, 1 & 4, H. S. White (Lyre and Double-sword). **BOTTOMSWORDS:** 1 & 2, F. A. Hazell. 3, E. S. Lloyd. 4, H. S. White. **COFFERTAIL & ROBSON:** 1 & 3, F. A. Hazell. 2, D. Cannon. 4, E. Russell. All Coffertails. **SWORDS:** 1, W. T. Loader, Albinos, exceptionally fine colour

and good caudal. 2, T. A. Leighton, Reds, good body, reasonable caudal and fair colour. 3, A. W. Friend, Reds, failed colour and matching. **MOLLIES:** 1 & 2, F. Frampton. 1st, superb Saffins, good colour and dorsal. 2nd, black Sphenops, excellent colour and body. 3, J. G. Phillips, speckled Mollies, better finnage. 4, E. G. H. Westcott. **PLATIES:** 1, R. F. Fletcher, Blue, good colour but did not extend over entire body. 2, T. Oakes, reasonable Blacks but not the body shape. 3, T. G. F. Oakes, Reds of good colour but poor depth of body. 4, W. T. Loader.

EGGLAYERS

WHITE CLOUDS, A.S. DANIOS & RASBORAS: 1, G. S. Rutt, Pearl Danios, lovely colour and matching. 2, C. W. Hughes, Harlequins, good body and black colouring. 3, G. S. Rutt, well matched Zebras, male had better lines. 4, D. Cannon. **BARBS:** 1, W. H. Page, Rosy, fine size, colour and condition. 2, E. W. Kite, good colour, not quite body shape. 3, J. Bassett, fine female Schuberti, good colour but not quite the size. 4, Mrs. J. M. Montell. **MALE FIGHTERS:** 1, C. Francis, Blue with wonderful finnage (Red ventrals) and darkish body led a strong class. 2, W. J. Holdstock, Cambodia fine finnage and size, failed body shape. 3, Hall, Red of superb colour. 4, C. Francis. **A.O.S. LABYRINTH:** 1 & 2, W. J. Holdstock. 1st, Kissing Gourami, good size, colour and condition. 2nd, Leeri nice finnage and body, not quite the sparkling colour. 3, T. Oakes, Three-Spot, excelled in finnage and colouring. 4, W. H. Page. **CHARACINS:** 1, C. W. Hughes, A *Metryn* in good colour and condition. 2, W. H. Page, *Hespera*, good colour, body a little narrow. 3, Mrs. J. M. Montell, large *H. pulcher*, good colour, failed on body shape. 4, J. Torr. **CICHLIDS:** 1, Mrs. D. Eley, Firemouth, exceptionally fine colour and very well-developed finnage. 2, J. G. Phillips, Texas Cichlid, good colour and condition. 3, J. G. Phillips, *Geophagus brasiliensis* of unusually good colour. 4, C. W. Hughes, A.O.S. TROP.: 1, R. Seaman, *Epiplatys chaperi*, good fish, nice colour but pale. 2, T. W. Neal, Spiny Eel, very fine colour and good condition. 3, C. W. Hughes, *C. melanostictus*, good colour but not body shape. 4, H. S. White.

BREEDERS' CLASSES

BREEDERS' COLDW.: 1, H. C. Nutt, well-developed Veils, rather poorly matched. 2, A. Defelice, very young Veils but good development. 3, H. C. Nutt, Veils of variable quality. **BREEDERS' TROP. LIVEBEARERS:** 1, E. Russell, Albino Swords, good size and matching. 2, E. Russell, Perma-black Mollies, fine colour and finnage. 3, R. Collyer, Lemon Wagtails, very good colour and reasonable shape. 4, Mrs. N. Russell. **BREEDERS' TROP. EGGLAYERS:** 1, Mrs. B. Robertshaw, *H. verreauxi*, variable body shape but very good colour. 2, Hall, a team of very fine Dwarf Gouramis lovely colour and good matching. 3, Mrs. B. Robertshaw, very fine Glowlights, matching and condition excellent. 4, Mrs. B. Robertshaw.

Large Non-Competitive Display at Bournemouth Show

BOURNEMOUTH A. C. held their first open show from Aug. 30 to Sept. 1 at St. Peter's Hall, Bournemouth. As the object of the exhibition was to attract more people to the hobby and to give a practical demonstration of the correct conditions for keeping fish, all the aquaria, with the exception of those in the competitive classes, were furnished and contained single species of fish, thus showing each species to the best advantage. Cards showing habits, and other general data, were affixed above each tank.

A section of the coldwater display showed the development of the Goldfish from newly-born fry to adult Common Goldfish and prizewinning Shubunkins. Exhibits in the British coldwater section were all caught locally and included Crayfish, Minnows, Dace, Stone Loach, Sticklebacks and Eels. These proved very popular. A marine display was staged by Messrs. Philpott and Weedon.

A total of 108 furnished aquaria were staged, in addition to a further 108 competitive tanks. A most attractive cacti garden was arranged by Mrs. E. H. Payne and Mrs. B. H. Stephenson.

TROP. FURN. AQUARIA: 1, Dr. R. C. C.

Successful Initial Venture of Romford A.S.

THE Romford A.S. staged its first open show on July 28 and over 600 people attended the event. Advanced publicity was supplied by a furnished 3 ft. tank set up in the local Electricity Showrooms by City Aquaria. The judges were Messrs. Barnes-Oake and C. J. Saunders, B.Sc. Tropical classes were well supported but coldwater entries were not numerous. Nine cups and twelve plaques were up for competition in addition to a WATER LIFE Diploma (won by Mr. S. Dumont with a Leeri Gourami, adjudged best fish in the show) and traders' specials.

PRIZEWINNERS

FURN. AQUARIA (INTER-CLUB TROP.): 1, East London A. & P.A.; 2, Dagenham A.S.; 3, Hamault A.S.; 4, Benthurst A.S. **INTER-CLUB COLD:** 1, East London A. & P.A. **INDIV. TROP.:** 1, C. F. Long; 2, B. Newman; 3, A. E. Falkus. **JUNIOR INDIV.:** 1, R. Smith; 2, C. Speller; 3, A. Terry.

GOLDFISH: 1, Johnson; 2, Torbury. **FANT. VEILS,** etc.: 1, 2 and 3, Torbury. **SHUS:** 1 and 3, S. Humberstone; 2, W. F. Saunders. **A.O.V. COLD:** 1, N. Solomons (Rudd); 2, A. J. Brooks (Golden Orfe). **GUPPY:** 1, N. Sherman; 2, A. E. Falkus; 3, B. Newman. **FIGHTERS:** 1, W. E. Saxon; 2, H. Mace; 3, B. Newman. **CICHLIDS,** etc.: 1, J. G. Phillips (Blue Cichlid); 2, J. G. Phillips (*A. ocellatus*); 3, R. E. Cheek (Angel).

PLATIES: 1, Mrs. V. Russell; 2, C. Speller; 3, J. Torr. **MOLLIES:** 1, J. Torr; 2, R. Aldred; 3, Fleming. **SWORDBTAILS:** 1, W. E. Gawler; 2, L. Loader; 3, F. Longman. **BARBS:** 1, C. F. Long; 2, Brown; 3, D. Piesley. **CHARACINS:** 1, J. Torr; 2, J. G. Phillips; 3, L. Loader. **A.O.S. TROPICAL:** 1, S. Dumont (Leeri Gourami); 2, A. E. Falkus (Glass Fish); 3, L. Elliott (Pearl Danio).

LIVEBEARERS: 1, W. E. Gawler (Mollies); 2, E. F. Russell (Albino Swords); 3, A. E. Falkus (Scarfall Guppies). **TROP. EGG-LAYERS:** 1, A. E. Falkus (Penguins); 2, A. E. Falkus (Cherry Barbs); 3, D. Piesley (Black Widows).

SPECIALS

Best Fish: S. Dumont (Leeri Gourami). Best Tropical: S. Dumont. Best Coldwater: S. Humberstone (Shubunkin). Best Plant in Furnished Aquarium: A. Terry (Spatterdock). Best Fish in Furnished Aquarium: B. Newman (Bloodfin). Most Original Junior Furnished Aquarium: R. Smith. Best *Hypophysobrycon*: S. Torr. Best A.O. Characin: L. Loader. Best Livebearer (Male): S. Torr. Best Nigger or Tiger Barb: D. Piesley. Best A.O.S. Barb: C. F. Long. Best Anguillid (Male): S. Dumont. Best Angel: R. E. Cheek. Best Breeders' Class Entry: W. E. Gawler. Best Member's Furnished Tank (Salmon Cup): C. F. Long. Best Junior Member's Furnished Tank (Salmon Junior Cup): R. Smith.

Clay; 2, E. A. Bowler; 3, Dr. N. Crow. **COLDW. FURN. AQUARIA:** 1, Mrs. M. Cuff; 2, E. A. Bowler. **GUPPIES:** 1 & 2, Dr. Clay; 3, E. Howarth. **SWORDS:** 1 & 2, E. Howarth. **MOLLIES:** 1 & 2, S. A. Taylor; 3, Dr. Clay. **PLATIES:** 1, E. D. Poulton; 2, L. A. Gardner; 3, Dr. Clay. **BARBS:** 1, R. J. Squire; 2, E. Stidwell; 3, E. D. Poulton. **CHARACINS:** 1, J. Glass; 2, R. J. Squire; 3, Dr. Clay. **MALE FIGHTERS:** 1, H. W. Philpott; 2, D. F. Upward. **A.O.S. LABYRINTH:** 1, F. G. Kennedy; 2, Dr. Clay; 3, G. Lange. **CICHLIDS:** 1, S. A. Taylor; 2, D. F. Upward; 3, E. A. Bowler. **A.O.S. TROP.:** 1, F. G. Kennedy; 2, E. A. Bowler; 3, Dr. Clay. **COMM. GOLDF:** 1, A. H. Crisp; 2, G. Russell-Smith; 3, Mrs. B. D. Wyatt. **SHUS:** 1 & 2, A. H. Crisp; 3, G. Russell-Smith. **FANCY GOLDF:** 1 & 2, Moorish; 3, A. J. Gumbrell. **A.O.S. COLDW. FISH:** 1, Mrs. B. D. Wyatt; 2, A. H. Crisp. **AQUATIC PLANTS (SUBM.):** 1 & 3, E. A. Bowler; 2, R. Matley. **JUVENILES:** 1, B. P. Prince; 2, A. W. Wright; 3, Miss J. Suttierthwaite. **Best Trop. Fish:** S. A. Taylor (Firemouth). **Best Coldw. Fish:** Moorish (Fantail).

Hendon Show Unimpaired by Adverse Weather

It might not be unreasonable to expect favourable weather for a show held at the beginning of August, especially when the prophets forecast a sunny Bank Holiday, but aquarists in the London area will be aware that this year torrential rain graced the opening day of Hendon Aquatic Society's show in connection with the Borough of Hendon event. The display was under canvas and so the members were kept very busy as the prolonged downpour found even the smallest gap in the marquees. It was only by a united effort that the standard of the staging remained unimpaired. And the standard was certainly high: a bumper entry (reputed to be the largest for a marquee show displayed by an aquatic society) was accommodated in two unconnected marquees. Just inside the entrance was an impressive stocked pool, complete with miniature waterfall, set up by Hendon members. On either side of this the furnished aquariums were staged behind fascia boarding whilst the individual fish and plant entries occupied the remainder of this tent and all of another, erected at right-angles.

The entry was well-distributed over all classes, the Platy class being the largest with 35 fish, closely followed by the Mollie and A.O.V. Characin classes with 30 in each. Two classes, those for Danios and Rasboras and Barbs were divided as support was exceptional. Enterprise A.S. deserve congratulations on winning the marquee furnished tropical aquaria class for the second year in succession.

The show was of six-days' duration, from August 6-11, in the Hendon Park, and the society can commend itself on a difficult task, well managed. Mr. D. Cannon was the show secretary.

PRIZEWINNERS

CLUB FURN. AQUARIA (TROP.) (6): 1, Enterprise A.S. Good design with *Myriophyllum* used as focal point. 2, Tottenham A.S. Tank containing Characins, rock of good colour, but *Ludwigia* badly planted and placed. 3, London A. & P.A. Sparse back planting and less contrast but very effective stone and compost. 4, Colindale A.S. Arch rock effect, a nice overtopping and hardly practicable.

CLUB FURN. AQUARIA (COLDW.) (5): 1, London A. & P.A. Very fine plants but slightly unbalanced design. Greatly improved at Enterprise Show. 2, Harrow A.C. Well designed, but plants and fish offered no contrast. 3, Waltham A.C. Not design of leaders.

INDIV. FURN. AQUARIA (TROP.) (19): 1, T. S. Hoadley. Good effort but too many small-leaved plants and rockwork was artificial. 2, P. O'Connell. Good plants but inferior planting gave jumbled effect. 3, Mrs. Skipper. Orthodox layout and sparse planting. 4, R. Dicker, hc. W. A. Hallett. Nos. 16 and 17 deserved recognition.

INDIV. FURN. AQUARIA (COLDW.) (7): 1, A. Sutton. One-sided arrangement, but well positioned with care. 2, P. R. Chapman. Good use of plants, but rockwork little incon-

gruous. 3, A. R. Prince. Excellent plants and orthodox planting with good quality *Velvetails*.

FURN. AQUARIA, JNR. (COLDW.) (9): 1, M. Hartnup, good plants employed in a commendable effort. 2, M. Hartnup, design good but not the quality of plants, to carry it through. 3, G. King.

TROPICAL CLASSES

GUPPIES, MALE (EXCL. ROUND, ROBSON AND COFER) (19): 1 & 2, S. Martin. Double Swords, leader good specimen with nice caudal and colour. 3, H. S. White. Bottom Sword, hc. R. Dicker. **MALE ROUND, ROBSON AND COFERTAIL (17):** 1 & 2, F. A. Hazel. *Cofertails*. Leader good dorsal and caudal but second smaller dorsal. 3, D. Cannon. *Cofertail*; hc. E. F. Russell. **COFERTAIL GUPPIES, FEMALE (17):** 1, K. E. Day, coloured specimen of good shape. 2, S. Martin, similar fish with smaller caudal. 3, J. Torr, good all-round uncoloured fish. hc. E. F. Russell. **GREEN, RED and ALBINO SWORDS. (11):** 1, G.



Photograph [E. R. Nicholls] Entrance to the Hendon A.S. exhibition showing pool, waterfall and tropical furnished aquariums.

Bennett, Red of pale colour but good caudal development. 2 & 3, E. F. Russell, second an Albino female of good size, third an Albino male. **A.O.V. SWORDTAIL (9):** 1, K. E. Day. Red Wagtail, poor colour, except black. 2, G. Bennett, female London of good colour pattern and condition. 3, A. Whatford, Green Wagtail, good colour but inferior black markings.

MOLLIES (30): 1, A. Whatford, *Velifera* with wonderful colour definition and dorsal development. 2, K. E. Day, *Perma Black*, dense colour and good dorsal. 3, P. Pearson, large *Perma Black* of good colour. hc. E. Barker, c. R. E. Cheek. **PLATIES (35):** 1, S. Martin, Red with fine body colour but less good finnage colouring. 2, H. S. White, Wagtail, large size, fair black colouring. 3, Mrs. M. Green, *Blue Platy*, good finnage and body. hc. J. R. H. Wagland, c. S. Packard. **A.O.S. LIVEBEARER (18):** 1, A. J. Holloway, *Girardinus codonocentrus, reticulatus*. hc. K. E. Day. **DANIOS (28):** 1, R. E. Cheek, Giant Danio, good size and colour but dark in caudal. 2, W. J. Dockree, Zebra, fine size, lines straight but ragged edges. 3, D. Cannon, Pearl, good condition and exceptional colour, failed body shape. hc. S. E. Cook, c. R. Seaman. **RASBORAS (12):** 1, A. Whatford, *Seisortail*, good condition, fine department and colour, well ahead. 2 & 3, D. Cannon, *Epiplatys danicus*, second, better body shape but third, superior colour. hc. E. Riddle. **HYPHESSOBRYCON (24):** 1, W. Page, *Serpae*, good size but pale body colour. 2, R. Dicker, *Glowlight*, with slightly shallow body and pale colour, excellent condition. 3, J. Torr, Lemon Tetra, exceptional colour and condition, failed forward body shape. hc. R. Skipper. **A.O.S. CHARACIN (30):** 1, P.

O'Connell, *M.schreimulleri*, size, condition and colour excellent. 2, R. Dicker, X-Ray, fine colour and department. 3, C. W. Hughes, *M.rossivelli*, good colour but not body shape or carriage. hc. V. A. Adams, c. R. Dicker. **STRIPED BARBS (14):** 1, A. Whatford, Tiger, exceptional size and condition, good colour. 2, Mrs. Robertson, *B.cunningi*, excellent condition and colour, failed body shape. 3, A. Whatford, *B.fasciatus*. hc. R. E. Cheek. **UNSTRIPED BARBS (23):** 1, W. Page, Rosy, good size, condition and body shape, reasonable colour. 2, J. Torr, Chequer, excellent colour but small size. 3, A. Whatford, Schubert, good size but variable colour. hc. R. E. Cheek. **FIGHTERS (19):** 1, C. Cooper, lovely red, fine finnage but body trifle heavy. 2, G. Bennett, blue with little red; not quite finnage of leader. 3, W. J. Dockree, Cambodia with heavy body but good colour. hc. T. Oakes. **A.O.S. LABYRINTH (14):** 1, W. Holford, Dwarf Gourami with sparkling colour but slightly ragged definition; poor department. 2, A. Whatford, Leeri, good size and colour definition but not colour intensity. 3, P. O'Connell, Dwarf Gourami, not colour density. hc. E. F. Russell. **CICHLIDS (81):** 1, J. G. Phillips, Brazilian Cichlid, good size and condition and exceptional colour. 2, I. Willis, Angel of good colour and finnage, failed slightly on dorsal. 3, J. G. Phillips, Blue Cichlid, not fullness of colour. hc. J. G. Phillips. **A.O.S. TROP. (16):** 1, A. R. Prince, Whiptail Catfish, fine size and condition. 2, B. Catrow, well coloured *Punchax lineatus* with slightly faulty caudal. 3, A. R. Prince, Sucker Catfish, large size and good condition. hc. R. Skipper, c. J. G. Phillips. **PLANTS (2):** 1, L. J. Mansel, well-developed *Cryptocoryne*. 2, R. Skipper, *Cubomba*, excellent fronds but wide spacing. 3, S. Packard, *Cryptocoryne*, not as sturdy as first. hc. E. G. Harris.

COLDWATER CLASSES

COMMON GOLDF. (10): 1, P. R. Chapman, medium size, good colour and moderate dorsal. 2, S. G. Wingrove, inferior colour but good tail, slightly larger. 3, M. R. Price, good all-round finnage but less even colour. hc. C. A. Rose. **BRISTOL SHUS (19):** 1, E. G. Harris, good colour pattern, reasonable caudal, failed slightly head and body. 2, S. G. Wingrove, another of good colour but smaller size and rounder body shape. 3, A. Sutton, larger caudal, fair overall colour pattern. hc. A. R. Prince. **FANTAILS AND MOORS (9):** 1, W. E. Smyth, Moor of good body shape and reasonable colour. 2, W. E. Smyth, Fantail, good colour and moderate fins. 3, A. R. Prince, larger fish but not quality. hc. G. King. **A.O.V. FANCY GOLDF. (5):** 1, Mrs. Jackson, Comet, pale colour, black marking on anal. 2, 3 and hc, M. Freeman, all Orandas, leader had good head and nice colour but 3rd prizewinner failed on fins. **BRITISH COLDW. FISH (8):** 1, P. R. Chapman, Green Tench, large size, even yet pale colour. 2, S. G. Wingrove, small Golden Orfe. 3, M. R. Price, very small Green Tench. hc. F. Stanley. **FOREIGN COLDW. FISH (6):** 1, J. H. Bulley, American Sunfish. 2, H. H. Cains, N. American Catfish. 3, F. Stanley, Sunfish.

Accrington's Three-Day Event

MR. Marshall Tomlinson put on an attractive non-competitive display of coldwater fish at the show of Accrington A.S. held from Sept. 6-8 in the Town Hall, Accrington. This special exhibit included Tench, Bream, Gudgeon, Crayfish, Sticklebacks and Orfe. The secretary reports that the show was a great success with quality particularly high in the junior furnished aquaria class.

PRIZEWINNERS

OPEN FURN. AQUARIA (24x12x12in.) (14): 1, J. Grice; 2, D. Baldry; 3, Mrs. Grice. **MEMBERS' FURN. AQUARIA (26):** 1, D. Baldry; 2, J. Pettifer; 3, E. Ward. **FURN. AQUARIA (over 24x12x12 in.) (5):** 1, J. Grice; 2, G. Kirkman; 3, M. Scarfe. **JUNIOR FURN. AQUARIA (7):** 1, J. Sharples; 2, Stockforth; 3, Abbot. **ORNAMENTAL AQUARIUM OR VIVARIUM:** 1 and best in show, V. Stephenson; 2, C. Doberty; 3, Mrs. Pettifer. **COLDW. FURN. AQUARIA (6):** 1 & 3, J. Nolan; 2, G. Hargreaves.

Special Displays at Erith Show

ERITH A.S. staged an aquaria display on August Bank Holiday and in conjunction with it was held the furnished aquaria competition of the S.E. London and N. Kent Association. In the latter section Greenwich A.S. won the Hallow Shield with Welling and Erith runners-up, followed by New Cross.

The show had a number of attractive features which included 40 tanks, an illuminated waterfall, fountain, 10 ft. diameter pond, displays of aquarium gadgets, livefoods, plants and molluscs and a projector by which live Infusoria were shown on a screen.

PRIZEWINNERS

MEMBERS' FURN. AQUARIA (COLDW.): 1, Jessop; 2 & 4, Waymont; 3, Hallett. **TROP.:** 1, Dodd; 2, Webb; 3, Clarke; 4, Liffen and Kelly. **S.E.L.A.N.K.A. FURN. AQUARIA (COLDW.):** 1, Erith A.S.; 2, Welling Aquarists; 3, Greenwich A.S. **TROP.:** 1, Greenwich A.S.; 2, New Cross A.S.; 3, Welling Aquarists; 4, Erith A.S.

Club Notes and News

A CLUB table show was organised by **Thames Valley A.S.** on Sept. 28. The future programme includes a lecture by Mr. McInerney on Oct. 4, an outing to McLynn's Aquarium on Oct. 7 and a joint table show with Surrey A.C. on Oct. 18.

MEETINGS of **N. of Scotland A.S.** are held fortnightly in the Y.M.C.A. Rooms, Union Street, Aberdeen. Seven thousand people attended a recent show, organised by this society.

LECTURERS who have spoken at **Banbury A.S.** meetings are Messrs. W. L. Mandeville and T. L. Dodge. Two table shows were held during the summer.

SHORT lectures from members were heard at the Aug. 14 meeting of **Walsall A.S.** and these were followed by an auction. At the September fixture, Mr. J. Richards spoke on "Tropical Fishkeeping for Beginners."

"BREEDING Guppies" was the title of a lecture given by Mr. W. G. Phillips when he visited **Portsmouth A. & F.C.** during September. On Sept. 7 a party travelled by coach to visit the Southampton Society's show. At the October gathering, Portsmouth Water Co. are putting on a cinematograph show entitled "Putrefaction of Public Water Supply."

AT the A.G.M. of **Edinburgh & E. of Scotland A.S.** the following officials were elected:—President, Mr. Kean; vice-president, Mr. Knox; secretary, Mr. H. MacLennan, c/o Bolton, 11, Montague Street, Edinburgh, 8; treasurer, Mr. Thomson and assistant secretary, Mr. A. Robertson. Among recent activities were visits to Mr. Kean's fish hatcheries, the Natural History Department of the Museum and the pools at Aberlady.

TWO recent outings of the **Usbridge A.S.** were to the London Zoo Aquarium and Reptile House and McLynn's Aquarium, Epsworth. There are three sections in the club's breeders' competition and one of these will be judged each month. Those adjudicating are Messrs. Harker, Creed and Boarder, who will be responsible for live-

bearers, tropical egglayers and coldwater fish, respectively. The Harrow A.C. film will be shown on Oct. 11.

RECENT events in the **Sutton & Cheam A.S.** have been an auction, a lecture on "Livebearers" by Mr. Cooper, and a visit to Mr. R. H. I. Read's establishment. A livebearer table show is scheduled for Oct. 2.

AT the end of August the young **Horley A. & P.S.** presented a large tropical furnished aquarium to the Children's Ward of Redhill County Hospital.

THE three October meetings of **Harrow A.C.** will be held on October 1, 15 and 29. The programmes are a social evening, a tropical table show and a film show. The society's fifth annual show was held on Sept. 14-15 in co-operation with the local council's Festival celebrations.

APPROXIMATELY 24 aquaria will be staged by **Middlesbrough A.S.** at the Middlesbrough Chrysanthemum Show in the Town Hall on Nov. 5-7. A quiz between this society and Seaham is being arranged.

RECENT lectures heard by members of **Bulham A.C.** were on "Line-breeding the Guppy" (Mr. Cooper), "Labyrinth Fish" (Mr. P. Hewitt), and "Digestive and Nutritional Systems of Fish" (Mr. Brown). Future activities include a lecture by Capt. L. C. Betts, two table shows, a Twenty Questions session, an auction sale and the A.G.M. on Nov. 12.

MRS. M. K. BULMER, 12, Hartington Road, Chiswick, W.4, has resumed the secretaryship of **South West London A.S.**, in succession to Mr. E. G. Weatherley. Activities in the last few months have included a table show and talks on "White Clouds," "Labyrinths" and "Fancy Goldfish."

A WATER LIFE Diploma will be up for competition at the members' show of **Streatham A.S.** to be held at the beginning of October.

MEMBERS of **Oldham A.S.** recently visited the fishhouses of Mr. J. Grassby. This club held its first annual show from Sept. 17-22.

ADMISSION will be free for the exhibition and club show organised by **Lambeth A.S.** at St. Luke's Hall, West Norwood, on Oct. 13. The doors open at 2.30 p.m.

FIFTY classes are scheduled for the 17th annual exhibition of the **Scottish A.S.**, which will be held in the Kelvin Hall, Glasgow, on Nov. 8-10. These include 10 for furnished aquaria. Mr. J. W. Wilson will speak on Oct. 2, his sub ect being "Jobs Around the Fish-house."

A WATER LIFE Quiz was given at the Sept. 3 meeting of **Sheffield A.S.**

THREE extra trophies will be up for competition at the open show of **Bristol A.S.** which will be held on Nov. 2 and 3. The venue is the Y.M.C.A. Hall, Trenchards Street. Twenty-nine classes are scheduled.

A SUCCESSFUL exhibition was staged by **W. Middlessex A.S.** at the Southall Grammar School over the August Bank Holiday. During September and October the

home aquaria and breeders' competitions are being held. The secretary is Mrs. P. Burton, 14, Creffield Road, Ealing Common, W.5.

FOLLOWING the affiliation of **Sydenham & Penge A.S.** to A.S.L.A.S., the society has taken advantage of this organisation's panel of lecturers. Mr. A. Maybaw and Mr. P. Hewitt have spoken on "Electrical Equipment" and "Diseases of Fishes." Meeting nights are now the third Thursday of each month. The venue is the Works Canteen of Messrs. Wayne's, Newlands Park, S.E.26.

A MEMBERS' show is to be held at the Community Centre, Kingstanding, on October 6. This is organised by **N. Birmingham P. & A.S.**

FIFTH annual show of **Nottingham A.S.** was held in the Regent Hall from Sept. 5-15.

NEW clubroom of **Brighton Equitable Co-op Society (Aquarists' Section)** is in the Golden Cross Hotel, Southover Street, and meetings are held on the first Monday and third Thursday of each month. Mr. Riddle spoke at the beginning of September, and on Sept. 15 a small display was staged at the local horticultural show.

AN auction was on the programme of the Sept. 3 meeting of **West Bromwich A.S.** and the annual social evening was held on Sept. 17. The A.G.M. will be held on Oct. 15 in the Y.M.C.A., St. Michael Street, West Bromwich, commencing at 7.30 p.m.

OVER 600 people visited the annual exhibition of **Eastbourne A.S.** on Aug. 11. Forty tanks were staged and there was a water garden constructed by Messrs. Knights, of Haslemere. Mr. Pepper spoke on "Livefoods and Harmful Infusorians" on Sept. 20. The first talk of a series on "Genetics" by Mr. Wedmore will be given on Oct. 4.

NEW secretary of **Urmston A.S.** is Mr. J. Southern, 14, Riverside Drive, Flixton. The President, Dr. J. Scott-Clark, won the Founders' Club for best furnished aquarium at the society's August Bank Holiday show.

MEETINGS of **N. London A.S.** are now held each Wednesday at "The George," Holmes Road, Kentish Town, N.W.

ON Sept. 5, members of **Coventry P. & A.S.** entertained the Manor Park School Parents' & Teachers' Association to a film show of pond, river and sea life.

THE second table show for egglayers staged by **Wandae A. & P.C.** was held on Aug. 30. An interesting winter programme has been prepared and prospective members should contact the secretary, Mr. E. E. Orchard, 12, Hilliers Lane, Beddington, Croydon.

Guppy B.S. Notes

INTERESTING lectures heard at recent monthly meetings of the Guppy Breeders' Society have included two by Mr. W. G. Phillips, one on the activities of the Dutch Guppy Circle and another in which he gave a résumé of his experiences during fifty years of fishkeeping. Mr. Stacey has also given a talk under the title of "How to Give a Lecture."

Winners at the monthly table shows have been Mr. Myers (the now has his tenth silver pin and qualifies for the Golden Guppy emblem), Mr. H. G. Stanley, Mr. J. Keene (who swept the board in one class), Mr. R. Jeffereys and Mr. G. F. Burfoot.

Members are hoping to put on a first-class show of top-quality fish in the society's section at WATER LIFE Show on December 6, 7 and 8.

Nelson Show Results

WATER LIFE Diploma for best fish in show at the Nelson Aquarists' Exhibition held at the end of July was awarded to Mr. J. W. B. Beaumont. Judges were Mr. and Mrs. A. Anness and Messrs. H. Loder, C. Birtwell, E. Mackerel and P. Rooker.

PRIZEWINNERS

OPEN FURN. AQUARIA: 1, M. W. Hipperston; 2, Mrs. M. Shipley; 3, J. Southworth. MEMBERS' FURN. AQUARIA: 1, M. W. Hipperston; 2, J. Southworth; 3, G. Roe. COLDW. FURN. AQUARIA: 1, D. Butler; 2, W. Iverson; 3, G. Roe. COLDW. FISH: 1, N. Gotti; 2, R. Metcalfe; 3, C. W. Arnold. GUPPIES: 1 & 3, W. Cartwright; 2, A. Padgett. SWORDS: 1, D. Baldry; 2, F. Taylor; 3, J. Southworth. MOLLIES: 1, B. Pengilly; 2, G. Roe; 3, J. Dodsworth. PLATIES: 1, E. S. Maynock; 2, F. Taylor. BARBS: 1, M. W. Hipperston; 2, J. Whittle; 3, J. Dodsworth. CHARACINS: 1 & 2, F. Taylor; 3, D. Miller. LABYRINTHS: 1 & 2, J. W. B. Beaumont. ANGELS: 1, A. Padgett; 2 & 3, D. Miller. A.O.S. CICHLID: 1 & 2, B. Pengilly; 3, D. Baldry; 4, F. Taylor. A.O.S. TROP.: 1, E. Beaumont; 2 & 4, J. Southworth; 3, F. Taylor.

THERE was general discussion at the August meeting of **Preston Scientific Society (Aquaria Section)**. An extra meeting is now held each month. Two local hospitals have received tropical aquaria from a member of this society.

WITH the reorganisation of **Southern Amateur Aquarists** the present officials are: chairman, Mr. C. Waldron; secretary, Mr. J. W. Stephens, 131a, Elm Grove, Brighton, and treasurer, Mr. S. White. Mr. Waldron gave two lectures during August and in September the home aquaria competition for the Nickolls Challenge Cup was held.

HIGHLIGHT among recent activities in **Wimbledon A.S.** was a return inter-club contest with the Streatham society. Wimbledon were the winners. The future programme includes a quiz and a small "readers' show".

FOURTY members of **Swindon A.S.** inspected the Marlborough College aquaria at the beginning of August. The society's first show will be held on Oct. 17 in conjunction with the Swindon C.B.S. event. A silver cup is up for competition.

AT the October meeting of the **Guppy B.S. Eastern Counties Section**, there will be a "readers' show" for both standard and non-standard types. A breeders' trophy and Doublesword trophy will be up for competition. Meetings of this group are held on the first Tuesday of each month at the "Rose and Crown," near Ilford Broadway, and membership is open to anyone resident in E., and N.E. London.

MRS. W. M. MEADOWS lectured to **Medway A.S.** on Aug. 7 and later in the month Mr. Wood gave a talk on "Breeding White Worms." Sept. 24 was the date of the club's second annual general meeting. Fish were to be exhibited at an "Art and Craft" local art show commencing on Oct. 22.

"DRESTS" was the title of a lecture given by Mr. W. H. Macey at the Aug. 7 meeting of **Plymouth A. & P.S.** The society's annual dinner will be held on Dec. 14 and other forthcoming events include the B.I.A.S. on Oct. 2 and a display at the "Shelburne" Exhibition (Plymouth) from Dec. 27-Jan. 3.

AT the A.G.M. of **Clapham A.S.**, the chairman, secretary and treasurer were re-elected. Mr. F. Beasley was nominated to the new position of vice-chairman. Future

events include a visit to the Southsea Aquarium, lectures by Messrs. R. and C. Minnett, Hart and Burcombe, and the club's annual dinner.

THE **New Cross A.S.** meets at 7.30 p.m. each Wednesday in the Childeric Road School, New Cross. Mr. J. Willis has been forced to resign his position as instructor due to illness and the members wish him a speedy return to full health.

BROCKLEY JACK HOTEL, Brockley Road S.E.4, is the new meeting place of **Forest Hill A.S.** As the room available is larger, new members will once again be welcomed. A comprehensive programme for the forthcoming months has been arranged and interested persons should contact Mr. J. Shearing, 2, Garlies Road, S.E.23.

AT the August meeting of **Swinton A.S.** Mr. W. Smith lectured on "Furnishing an Aquarium." The speaker at the September meeting was Mr. C. Bierwell, who also judged a table show for Guppies on the same evening. Two displays have been staged in local cinemas. Mr. Battersby speaks on "Genetics" at the October fixture.

MEMBERS of **Southampton A.S.** held their open show from Sept. 6-8.

AT the Sept. 13 meeting of newly-inaugurated **Loughborough A.S.**, Mr. S. B. Scargill, lectured on "Livefoods." The secretary is Mr. W. Sharp, 159, Forest Road, Loughborough.

WHILST the first open show of **Bournemouth A.C.** was being held, the Mayor of Bournemouth presented a tank to the Matron of the Royal Victoria Hospital on behalf of the society.

MEETINGS of newly-formed **Harrogate A.S.** are held in the Y.M.C.A., Harrogate on the second Tuesday of each month. The secretary is Mr. D. C. Ingham, 77, Station Road.

AT a recent inter-club quiz, between **E. London A. & P.A.** and **Ilford A. & P.S.**, E. London were the winners. On Aug. 3 there was a brains trust session which proved entertaining. The next event is a breeders' show to be held at Ripple Schools on Oct. 6.

MR. E. RIDDLE judged the exhibits at a table show organised by **Beshill A.S.** on Sept. 6. First prizewinners were Messrs.

A natural development of the scope of the Federation has been the suggestion that it stages an aquaria show, but the big problem to overcome is to raise sufficient money. Mr. R. O. B. List, the general secretary spoke at great length at the last Assembly on the numerous factors to be considered in promoting such an event and then appealed for £2,000 to back up the venture. As suggested by the General Assembly, the secretary has sent out a letter to all affiliated societies mentioning 1952 as the possible date of the show and seeking donations or loans to help raise the money required. The stipulation was made that profits from the show, if any, would go to the F.B.A.S. Losses, if any, would have to be borne by the guarantors. Reducing the appeal to a *per capita* basis, it would require either sums of up to £30 from every affiliated club or a levy of 5/- from every member of those clubs to reach the target. Unfortunately, figures shown to Mr. List have convinced him and the committee that £2,000 would be an inadequate sum to back an exhibition at venues such as Olympia or Earls Court. The Federation, if it is to hold an aquaria exhibition will have to consider running the event on less ambitious lines than was first envisaged.

Meetings of the B.H.S.

NEXT general meeting of the British Herpetological Society, due to be held at 3 p.m. on Saturday, October 20, in the British Museum (Natural History), 5, Kensington, London, S.W., will include a talk by Dr. Hugh Cott, expert on camouflage, entitled "Adaptive Coloration".

The London branch of the society, which caters mainly for members interested in vivarium study, is now holding regular meetings at which specimens are shown and problems of care discussed. Many interesting experiences have been reported by members. Their next meeting, on the subject of Crocodiles, will take place in the London Zoo at 7 p.m., October 22. Particulars of the branch may be had from the secretary, Mr. G. A. Izzard, 17, Prospect Road, Long Ditton, Surbiton, Surrey.

C. Leeves, A. Goldup, V. Watts, J. Cowland and A. Harmer. A film will be shown at the Oct. 4 meeting and there will be a discussion on the September show.

MR. A. HASKEY has spoken at a meeting of **Midland A. & P.S.** His subject was "Infusoria."

TWO recent activities enjoyed by members of **Accrington A.S.** were a visit to Chester Zoo and Aquarium and a lecture by Mr. Z. Fic.

A 3 ft. tank was presented to a Children's Ward at the Woolwich War Memorial Hospital on Aug. 25 by members of **Shooters Hill A. & P.S.**

MR. F. W. BRINKLEY, President of the **Suffolk A. & P.A.**, staged 15 tanks at the show of Beccles C.B.S. held on Aug. 24-25. Suffolk Aquarists loaned the equipment.

AN aquarist society has been formed in the **Grangemouth area** and the last meeting was held on Sept. 6. The secretary of this new organisation is Mr. R. Baird, 37, Cromwell Road, Falkirk.

WINNERS of a tank glazing competition, organised by **Hainault A.S.**, were Mr. Wilkins, Mrs. Frankland and a junior member. Lectures will be heard on Oct. 17 and Nov. 14 and 28 and a debate is scheduled for Oct. 31.

MR. H. W. HAMMOND, 14, Valley Drive, Walsingham, Bury, Lancs., is the secretary of recently-formed **Bury A.S.**

ANNUAL show of **Huddersfield A.S.** was held in the Fraternity Hall, Alfred Street, from Sept. 15-22.

NEARLY 20 members now comprise the **Holme Valley A.S.** This society was formed a few months ago and the secretary is Mr. J. Rollitt, 8, Hill Street, Jackson Bridge, New Mill, Huddersfield. The establishment of Mr. Myers (Bradford) has been visited by members.

A STALL, designed to discourage people from keeping fish in glass bowls, was set up at an exhibition of **Dorking A. & P.C.** There were also displays of tropical and coldwater fish and reptiles, and a miniature water garden with a waterfall.

THE **Burton A.S.** held its annual show on Sept. 8 when entrants were able to compete for a WATER LIFE Diploma.

SEVERAL rambles around local ponds and lakes have been organised by **York A.S.** during the summer months, the most recent was one to the Great Lake, Castle Howard.

(Continued on next page.)

F.R.A.S. NEWS

Second Edition of Standards Handbook Ready

IN addition to the news that the draft Constitution is to be voted on at the October 6 Assembly, affiliated societies and others will have with interest that a second edition of the Federation's Show Standards Handbook is now available. Enquiries for copies (price 3/6d. plus postage) should be sent to the secretary, Mr. R. O. B. List, 31, Coronation Court, 11, Willesden Lane, London, N.W.6. This information does not appear in the Handbook.

The Federation's Bulletins are now being sold regularly and good work has been done by Mr. W. H. Hendon A.S., as chairman of the Bulletin Committee, to bring about regular and efficient distribution.

Mr. J. H. Glynn has been appointed secretary to the Judges' committee and invitations have been made to societies and individual aquarists to put forward information and criticisms on show standards, show standards and the conditions governing furnished aquaria.

Club Notes and News

— continued —

A SERIES of table shows for novice and senior exhibitors is being organised by **Gravesend A.S.** Two silver cups, presented by Mrs. H. Manser, will be awarded. This society has recently set up another aquarium in a local hospital, this time in one of the women's wards of St. James's.

LONDON ZOO will be visited by **Daston A.S.** on Oct. 7. This club has recently purchased a printing machine.

INFORMATION on coldwater fish was given by Mr. Tomlinson at the August meeting of **Blackburn A.S.** A film show was given during September. This club's annual show will be held on Oct. 15-17.

THERE was a quiz at the last meeting of **Ch'essa A.S.** Mr. Mayhew visited the society during August and spoke on "Electrical Wiring," whilst on Sept. 16 Chessington Zoo was visited.

PRESIDENT and vice-president of **Dundee A.S.** were re-elected at the society's A.G.M. Pressure of business resulted in the resignation of Mr. Ewing from the combined posts of secretary and treasurer, and Mr. S. Hunter, 11, Union Bank, Tottill, Locher, Dundee, was elected to these positions.

LONDON TRANSPORT employees in the Merton district are invited to attend the meetings of newly-formed **Merton (L.T.) Garage A.C.** The secretary is Mr. L. Russell, 76, Louisville Road, Balham, S.W.17, and the chairman is Mr. S. Freeman.

MESSRS. T. H. ALEXANDER & SONS, 149, Kirkcure, Wakefield, hope to form an aquarist club in their district.

FIRST prizewinners in the recent inter-club show between **Welling Aquarists** and the **New Cross Club** were Messrs. Lunnion, Rawlinson, Lawrence, Hickie and Fookes. **New Cross** beat **Welling** by 39 points to 31. Mr. S. Harker was the judge. The **Welling Society** is holding a breeders' show on Oct. 15.

ON Sept. 29 **Chelmsford A.S.** staged an exhibition in the Jubilee Hall, Chelmsford.

TWENTY-FOUR aquaria will be staged by **Brighton & Hove A.S.** at the combined fish and bird show to be held at Hove Town Hall on October 5-6.

FROM Oct. 18-19 the **Aquarists' Society of East Anglia** is putting on an exhibition at the Corn Exchange, Bury St. Edmunds. This is in co-operation with the show of Bury and W. Suffolk C.B.S. and proceeds go to the British Red Cross Society.

ANNUAL show of **Walthamstow A.S.** will be held at the Conway Hall, High Street, on Oct. 6. Twenty-six classes are scheduled. New secretary is Mr. A. Crowe, 67, Skelton Lane, Leyton, E.10, and two other changes of officials are show secretary, Mr. H. Tibury and publicity representative, Mr. E. F. Gill.

THE **Richmond and Twickenham A.S.** has now been formed with Mr. V. C. Bailey, 6, Bradmore Park Road, Hammer-smith, W., as the secretary. Lectures have been heard from Messrs. P. Hewitt, C. Minnette and J. Langstone. Future activities include a quiz (Oct. 11), lecture (Oct. 25),

general discussion (Nov. 8) and table show (Nov. 22).

TEMPORARY joint secretaries of **Rugby A.S.** are Messrs. K. Cave and K. Ash-down, following the resignation of Mr. C. Cook. Mr. Cave spoke on "Furnished Aquaria" at the Aug. 31 meeting and the society's first show was staged in the Mart, Clifton Road, on Sept. 15.

OUT of the profit made at the first annual show of **St. Yarmouth A.S.**, the society is purchasing a tank to present to the local Orthopaedic Hospital.

THE **Oldbury A.S.** was inaugurated on August 16 and meetings are held at fortnightly intervals. The secretary is Mr. L. H. Ironside, 128, Sandwell Street, Walsall, Staffs.

PRESIDENT of the Slough society, Mr. Gilbert, spoke on "Barbs" at the last meeting of **N. Hants A. & P.C.** A colour film will be shown at the next meeting on Oct. 3, which will be held in the Alexandra Hotel, Aldershot.

IN the inter-club competition between **Leicester A.S.** junior section and the juniors of **Nottingham A.S.**, Leicester retained the shield with 144 points to Nottingham's 107. Mr. Jones won first prize in a table show organised by the junior section on Aug. 30. A film show was also held. Messrs. Hodgson and Coleman spoke at the August meeting of the adult section and Mr. G. A. Atkins addressed the Sept. 6 meeting. The society won a gold medal for their display at the Abbey Park show, at which Mr. Atkins was the judge.

WHITWELL & SMYKALA'S FISH HATCHERIES were visited by **Greenwich A.S.** members on Sept. 2. In an inter-club competition with **Shooters Hill**, on Sept. 3, **Greenwich** won by 38 points to 32.

ON August 31 and Sept. 1, **Southport Aqua-Art Club** displayed tropical and coldwater fish at the show of **Southport Budgerigar Society**. A junior section has now been formed and it already has 12 members. Secretary of the society is Mr. L. Langtree, 6, Denmark Road.

WEST GREENWICH A. & P.A. will in future be known as the **Meridian Aquarists**. A new secretary has been appointed and he is Mr. Kidd, 64a, Hyde Vale, S.E.10.

OFFICIALS of **Keighley A.S.** are:—President, Mr. H. K. Harrison; vice-president, Mr. E. Cook; secretary, Mr. H. W. Ermsley

Progress in the G.S.G.B.

EARLY show successes recorded by members of the Goldfish Society of Great Britain include the winning of the society's Veiltail Cup (at the British Aquarists' Festival) by Mr. Z. Webb and the award of the Best Veiltail in Show Trophy (presented by Mr. Strachan Kerr, president) at the National Aquarists' Society's show to Mr. B. J. Urschurck.

The society now has a new meeting place, this is "The Feathers Hotel", Broadway, London, S.W.1. (opposite St. James Park Station), where a meeting was held on Sept. 22 and another is scheduled for December 15, commencing at 2.30 p.m.

Fish which the society supplied for stocking a pond in the Homes and Gardens Section of the South Bank Festival Exhibition are thriving and, in July, 1 in. fry were seen.

Mr. J. Shaw has been elected to the post of secretary (Hants and Sussex Section) following the resignation of Mr. Speil.

The treasurer of the society, Mr. Sumbler, was complimented by the auditors at a recent committee meeting for his excellent book-keeping during the year ending March 31, 1951. The balance sheet, for the financial year ending on

and treasurer, Mr. G. F. Mitchell. The society staged a display in connection with the Haworth Festival show on Sept. 22. The Mayor and Mayoress will open the society's show on Oct. 12. This is a two-day event, consisting of 10 classes, which will be held in the Drill Hall, Lawkholme Lane, Keighley.

MR. W. G. Phillips spoke of "Guppy Breeding" at the Sept. 3 meeting of **B.T.H., Willesden, Hobbies & Handicrafts Club (Aquarist Group)**. More than 120 aquaria were on view at the Sept. 15 show. Mr. Rowe will lecture on Oct. 1 and a visit to Southsea is planned for Oct. 13.

THE President of **Cambridge A.S.** has presented a cup for competition in the garden ponds contest. The London Zoo was visited in the middle of August. Due to removal, Mr. A. J. Staden (junior section organiser) and Mr. G. D. Watts (publicity officer) have had to resign from their posts.

MR. E. Gough, 16, Burnside Avenue, Shelf, near Halifax, is the secretary of the new **Shell A.S.**

THERE were 24 classes in the third annual show of **Luton A.S.**, held in conjunction with the St. Andrew's District show on Aug. 25.

FURNISHED aquaria were staged by **City of Salford A.S.** at a recent local horticultural show. Junior members' classes are now being arranged and the winter schedule is in the process of preparation. New secretary is Mr. A. McDowell, 6, Pimblets Place, Salford 6, Lancs.

THE **Catford A.R. & P.S.** resumed its activities on Sept. 24 and a full programme has been arranged.

FIRST prizewinners at a recent table show of **Rochdale A.S.** were Miss Holmes, Mrs. Dodsworth and Mr. D. Boswell.

AN aquarists' section has been formed in conjunction with the **Hawker Athletic and Social Club**, Kingston-on-Thames. The first A.G.M. will be held during October.

NEW secretary of **High Wycombe A.C.** is Mr. R. G. Gray, Elsenore, Totteridge Hill, High Wycombe, Bucks. The society staged a display at the High Wycombe Show on Sept. 1. London Zoo Aquarium is to be visited.

THERE has been a change of secretary in the **Lotus A.S.** The person now holding this position is Mr. G. R. Pearce, 3, Tabor Grove, Wimbledon, S.W.19. Meetings are held on alternate Tuesdays, the next one being on Oct. 9 in the A.T.C. H.Q., Kingston Road, Merton Park.

that date, has now been published and a balance of £66 11s. 10d. is shown.

New N.A.S. President

THE National Aquarists' Society holds its annual general meeting on October 15 in the New Horticultural Hall, Westminster, London, S.W.1, at 7.30 p.m. Mr. L. B. Katterns, this year's Vice-President, automatically becomes President for the ensuing two years. Nomination papers have been sent to all paid-up members for the election of a new Vice-President and Council members (four are due to retire, of whom three offer themselves for re-election). It will also be necessary to appoint a new secretary, as Mr. F. Diwell, who has efficiently carried out the duties for the past twelve months, has had to intimate his decision to resign owing to business commitments involving an eventual move away from London. The society will be pleased to see more of its members and associate members at the monthly meetings which are held in the Floral Committee Room at the above hall. Newcomers will be welcome. A bulletin is issued and a library service operates. The treasurer, Mr. F. G. Odams, will report on the financial result of the 1951 Festival Exhibition at the A.G.M.