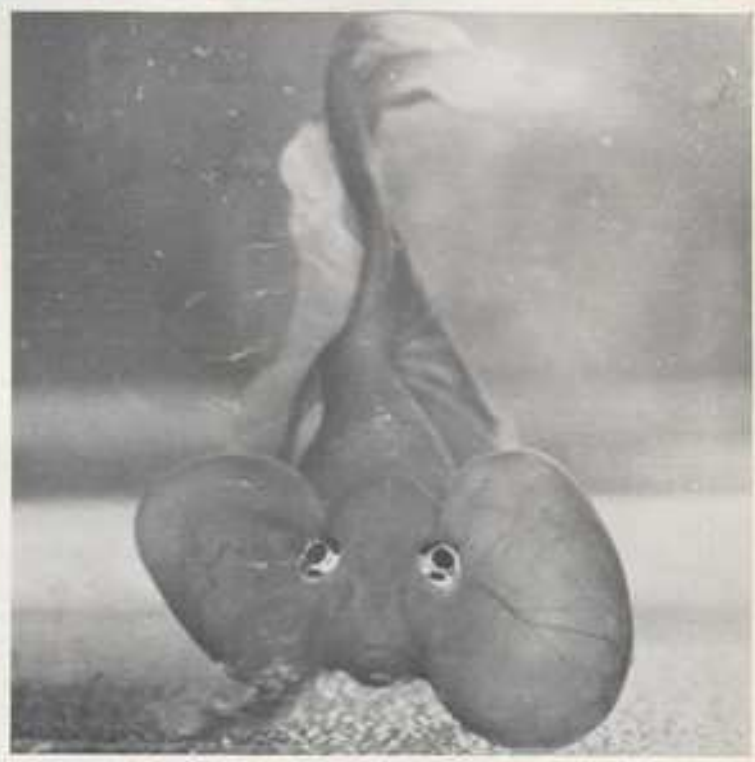


# The Aquarist

and Pondkeeper

JUNE, 1960



MONTHLY  
Vol. XXV No. 3

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| Veil Lace Angelfish   | 18-          |
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## Editorial

**I**NCREASING use of poisonous chemicals for control of pests and diseases in agriculture and horticulture is a trend that is worrying naturalists in this country. Ornithologists have reported numerous deaths of wild birds after chemical spraying of orchards. The strange situation has also developed that with the killing of insects, hives of bees have had to be hired by the fruit-growers to ensure fertilisation of the tree blossoms. At the same time apiarists are alarmed at the effects of the toxic chemicals on their colonies of bees. Aquatic wild life, too, is not immune to the danger from field poisons. The Somerset River Board recently has had to warn farmers that pollution of rivers may arise from land treated with chemicals; this was after 200 dead trout had been found in the River Yeou. Two fields had been treated with gas liquor by a firm of contractors and the compound had found its way into the river. The contractors did not know that river fish could be killed by trace amounts of such substances. Sometimes careless disposal of washings from emptied cans of chemicals has been the cause of water pollution and deaths of animals, and on other occasions the chemicals have reached streams after soaking through the soil of treated land. It is only in recent years that consciousness of the growing loss of amenities of natural waters through pollution from unrestricted entry of industrial effluents into rivers has stimulated stricter enforcement of the river laws, and it will be a sorry setback to the progress that has been made if the new danger from the pesticides is not soon widely recognised.

Even on the home front some potent poisons are now being used by gardeners, and the owner of a fish pond should be careful to see that no spray or other preparation is blown into the pond by wind or washed into it by rain. If spraying must be done in the vicinity of a small pond, the threat to fish is greater because of the small volume, protection can be given by covering the pond with a sheet of polythene or similar material.

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# Some Variations in Domesticated Goldfish

by Dr. R. J. AFFLECK

**A**LTHOUGH there are many varieties of cats, dogs, pigeons and other domesticated animals the variations in these animals are mostly in the relative proportions of the different parts. In domesticated goldfish (*Carassius auratus* L.), however, the variations include structures, or lack of them, which are not found in the wild type. It would appear that the goldfish exhibits the greatest variations found in any species of domesticated animal and also constitutes an outstanding example of evolution under domestication. During the past 60 years a number of papers on goldfish have been published. It was thought that a brief survey of some of these papers, with illustrations of the main varieties, would be a useful basis for future studies.

Modern goldfish are descendants of orange-coloured specimens which first arose as mutants from wild-type fish over a thousand years ago. Unfortunately there are no definite records of when any of them arose and only a few scattered references exist (in poems, official gazettes and other such publications) to enable a somewhat vague account of the evolution of the goldfish to be pieced together. Chen (1925), Koh (1934) and Hervey & Hems (1948) give accounts of the early works.

There are no known illustrations of the early types but in the Imperial Encyclopaedia of China A.D. 1726, three goldfish are depicted. The next important illustrations are in *Histoire Naturelle Des Dorades De La Chine* (Sauvigny, 1780), where over 50 fish, almost all of which seem to be

poor specimens in bad condition, are shown. The illustrations were copied from a scroll, sent from Peking, on which were painted 92 fish (Hervey, 1950). Illustrations in papers by Kishinouye (1898), Matsubara (1908), Chen (1925), Matsui (1934) and Innes (1917) show, between them, the varieties known to goldfish fanciers of to-day.

Most goldfish studied by these authors are types kept by goldfish fanciers, but it is important to realize that with the exception of the common goldfish, which is a colour mutant of the wild type, none of these so-called varieties is a variety in the zoologically accepted sense of the word. None is homozygous (true-breeding) for the mutant characters and the specimens illustrated often represent less than 5 per cent. of the offspring from a mating. Breeders of goldfish state that it is only by careful selection over many generations that they are able to mate fish which will produce even this small percentage.

Although a very large number of varieties of goldfish are known, many of them are merely formed by combining mutant characters in different combinations. It is therefore more convenient to begin by discussing the different characters rather than the varieties.

## Variations in External Features

The wild-type fish has caudal and anal fins which are typical fish fins and median in position (A). In some varieties paired caudal and paired anal fins exist (B). Between the two extreme forms of caudal fin (single and paired) numerous intermediate ones exist but they are discarded by the fanciers. Intermediate types of anal fins also exist but, although they are comparatively uncommon, they too are discarded by fanciers.

The bodies of goldfish exhibit great variation from those of the wild type and common goldfish (A), which are long and slim, through numerous intermediate forms to ones which are extremely short and deep (D). Although fanciers usually select the short deep bodies with care the bodies of varieties such as the shubunkin do not receive such careful consideration, and a much greater range of bodies is tolerated in these fish.

In most varieties the eyes are similar to those of the wild-type fish (A), but two kinds of abnormal ones exist. In one kind the eye is greatly enlarged and projects laterally from the orbit (F) whereas in the other the eye is not only enlarged but rotated forwards and upwards so that the eye projects from the orbit and the pupil is directed dorsally (H).

Wild-type fish and most domesticated varieties have eyes which fit fairly closely into the orbit and there is only a comparatively small space between them. In the form known as bubble-eyes, this space, particularly ventral (under) to the eye, becomes filled with a fluid and the tissues are pushed outwards as a fluid-filled sac (J). The sac may be small and project very little from the general surface of the head but in other cases the bubbles are almost as large as a normal head.

Two kinds of scales are found in domesticated goldfish. The first is the wild type, consisting of thin overlapping plates, and the second a mutant type where each scale is domed (pearl scale) and very much thicker than the wild-



Photo: Tachibana Tetsuzo  
A bubble-eye goldfish with enormous fluid-filled sacs that have displaced the eyes

type ones. These scales bulge conspicuously and push the outer tissues into ridges.

Most goldfish possess a dorsal fin, which may be long or short, but in some fish this fin is absent (C). There are numerous other forms of dorsal fin, from those with only one ray through numerous intermediate types to the normal, wild-type fin. The intermediate types are discarded by fanciers.

The surface of the head is normally smooth but in a few varieties it has a rough appearance (D). This appearance, due to foldings in the skin and underlying tissues, occurs in the cranial, sub-orbital and opercular regions but may be restricted to one, or two, of them.

The olfactory (smell) organ consists of two pits divided by a septum. The normal septum projects slightly above the general surface of the head. In a variety of goldfish known as pompons, each septum is greatly enlarged and folded so that the fish appears to have a pair of pompons on its head (G).

A variation in the operculum (gill cover) occurs in one variety known as puffy gills. Instead of the operculum fitting into the general streamlined shape of the fish, as it does in the wild type, the posterior margin is bent outwards. The branchiostegal membrane does not therefore form a water-tight seal and the opercular opening cannot be closed. The gill filaments are visible through the opening (L).

Reflecting tissue, in the form of minute crystals, is deposited in various regions of the body including two layers in the skin of the trunk and tail. The outer layer is situated beneath the translucent scales and gives them a shiny appearance. The inner layer at the base of the dermis is normally masked by the outer tissues and so cannot



Illustration from *Imperial Encyclopedia of China*. Left, and centre, types of wakin; right, type of wakin without dorsal fin. The eyes are not those of a celestial and their position may be due to an "artistic impression".

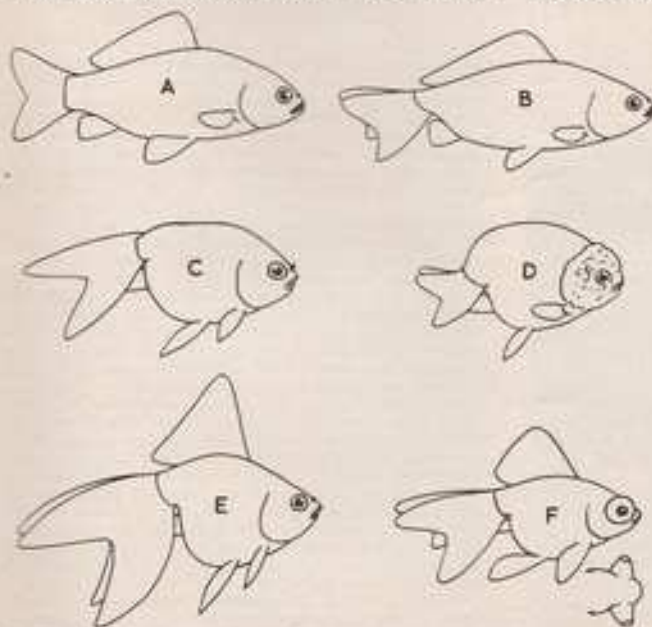
be seen. Fish with the maximum amount of reflecting tissue are known to British fanciers as metallics. Fish with little or no reflecting tissue are described as matt and those with an intermediate amount are said to be nacreous. In mock metallic fish the reflecting tissue is limited to restricted regions beneath a few scales and in net-like transparent fish the reflecting tissue occurs under the scales in a "net-like manner."

The olive-grey colour of the wild-type fish is produced by a combination of blackish-brown, yellow and orange pigments in chromatophores and the reflecting tissue mentioned above. Colours seen in domesticated varieties are produced by different combinations of the factors found in the wild-type fish and also by a greater intensification of the pigments. No red pigment has been found in goldfish, with the exception of haemoglobin in the blood, which, in some nacreous and matt fish, gives the operculum a red appearance (Affleck, 1952).

During the last few years chocolate-coloured goldfish and albinos have been reported, but as far as I know there are no detailed studies of them.

The variations in external characters described above are well known to students of the goldfish but although most have been recorded by a number of authors there has not previously been a paper including all the major variations. The most important papers are by Chen (1925) on Chinese goldfish and by Matsui (1934) on Japanese ones.

Chen "collected fish without reference to any particular character or breed" and made measurements of the body,



A, Wild type or common goldfish (after Chen); B, wakin; C, phoenix (drawn from a Chinese import); D, rancho; E, ryukin; F, demekin. Fish depicted in the line drawings with this article are all after Matsui except where other sources are acknowledged.

fins etc. He stated that goldfish have no definite size when mature and so he converted the measurements of the body and fins into ratios of the head length.

Heterogenic growth (growth of different parts at different rates) is most noticeable in many parts of domesticated goldfish, and variations in diet, size of aquaria etc., also affect growth. As these factors were not considered by Chen some of his conclusions are inaccurate. Although it may be possible to compare the lengths of fish of one variety by using the length of the head as a standard, this method cannot be used when comparing the varieties because the shape of the head varies in different varieties.

Chen's records of the variations are particularly valuable as they include most of the major variations prized by goldfish fanciers and also a number of the intermediate types which are usually discarded.

Matsui (1934) described the external features of goldfish kept by Japanese fanciers. The only major variation in Japan not found in China was the caudal region of the *jikin*, where the four lobes of the paired fins form an X when viewed from the rear (K).

From many of the varieties Matsui took measurements of different parts of the fish, using "body length, body height, body width, etc." as standards. The adverse criticism of the units used by Chen applies to some of those used by Matsui. The height (depth) and width of the body are particularly affected by diet and also by the condition of the gonads. In particular, the width of a female increases considerably just before spawning. These factors were not considered by Matsui.

#### Varieties of Goldfish

The variations in external features described above occur in one or more varieties kept by goldfish fanciers. As mentioned previously, these are not varieties in the zoologically accepted sense of the word as none is homozygous for the main characters. There are 13 main varieties that have been kept by fanciers but not necessarily all at the same time or in the same country. These, with their main synonyms and characteristic features, are as follows:

**Common goldfish (*Hibuna*).** Fig. A. Illustrations in papers by Chen (1925 and 1928). A colour mutant of the wild-type fish.

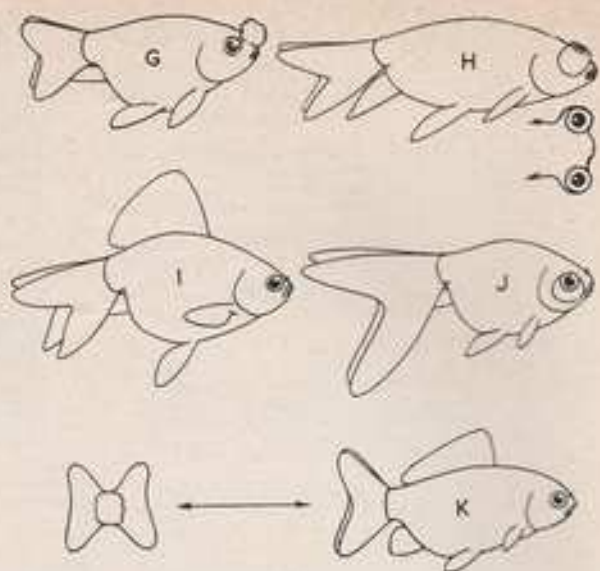
**Wakie.** Fig. B. Illustrations in Imperial Encyclopedia of China (1726), Kishinouye (1898) and Matsubara (1908). Wild-type body but with paired caudal fins.

**Phoenix eye (egg fish, phoenix).** Fig. C. Mentioned by Chen but not illustrated. Body is short and deep, dorsal fin is absent, caudal and anal fins are paired.

**Ranchu (*chusen*, *maruku*, tigerhead, lionhead, *shinigaitira-ranchu*, Korean goldfish, *brantlehead*).** Fig. D. Illustrations by Kishinouye, Matsubara and Chen. Body is short and deep, fins are short, dorsal fin is absent, caudal and anal fins are paired, head has rough appearance which is known as a hood or bramble. When the hood is confined to the cranial region the fish is known as a *takin* (*gourdhead*).

An *okasse* has the hood confined to the sub-orbital and opercular regions. When the hood is absent the fish is known as an *osaka-ranchu* (*sanrin*).

**Ryushin (*rakin*, *haku*, naginata goldfish, *loach* goldfish, *osago*, *vertical*, *mosaiki*).** Fig. E. Illustrations by Kishinouye and Matsubara. Body is short and deep, caudal and anal fins are paired, fins are long. Nacreous type is called *ryuriko* (*calico*, *azumamitsu*, *nacreous* *rainbow*).



G, Pompon (drawn from a Chinese import); H, celestial; I, pearl scale (drawn from a Chinese import); J, bubble-eye (after Chen); K, *jikin*.

Metallic type with wild-type colouring is called *tsurumomaya*.

**Densohin (*trilobes*, *dragon eye*, *papaya*, *glare-eye*).** Fig. F. Illustrations by Matsubara and Chen. Body is short and deep, fins are longer than in wild type, caudal and anal fins are paired, eyes are large and project sideways. Metallic orange type is called *aba-densohin* and metallic black is a *huro-densohin* (*moor*). Nacreous fish are called *sankoku-densohin*.

**Pompon (*narial* *haquet*, *retort* *bull*, *kanafusa*).** Fig. G. Illustration by Chen, mentioned by Matsui. Body is short, fins are short, caudal and anal fins are paired, dorsal fin is absent, nasal septa are enlarged to form pompons.

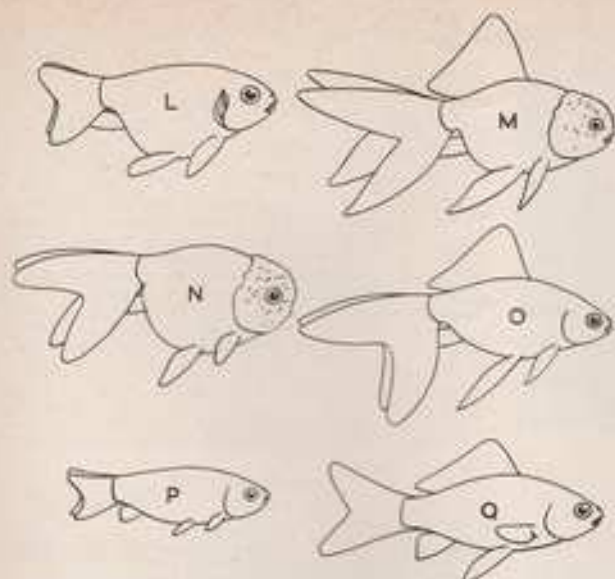
**Celestial (*chotengan*, *star-gazer*, *skynard eye*, *celestial eye*, *celestial telescope*).** Fig. H. Illustrations by Chen and Matsui. Body is long but a little deeper than that of the wild type, fins are longer than those of the wild type, dorsal fin is absent, caudal and anal fins are paired, eyes are large and project dorsally from the orbit.

**Pearl scale.** Fig. I. Illustration, scales only, by Chen. Body is short and deep, fins are longer than those of the wild type, caudal and anal fins are paired, scales are convex and push the outer tissues into ridges which are parallel to the lateral line.

**Bubble-eye (*water-bubble eye*).** Fig. J. Illustration by Chen. Body is short, fins are short, caudal and anal fins are paired, dorsal fin is absent, fluid-filled sac projects from the region between the eye and the orbit. Although the sac may extend completely around the eye, the part below the eye is always the largest.

**Jikin (*fin*, *ji-koyasu*, *shaku*, *hagata*).** Fig. K. Illustration by Matsui. Body is shorter than that of the wild type and deep, fins are short, caudal and anal fins are paired with four lobes of the fins forming an X when viewed from the rear.

**Puffy gills (*outfolded operculum*).** Fig. L. Illustration by



L. Puffy gills (drawn from a Chinese import); M. orange; N. shakin; O. watusi;  
P. kimronshi; Q. shubunkin

Chen, but only head shown. Body is short and deep, fins are short, caudal and anal fins are paired, dorsal fin is absent, posterior margin of each operculum folded outwards.

*Oranda (oranda shobogashira, noperhead)*. Fig. M. Illustrations by Kishinouye, Matsubara and Chen. Body is short and deep, fins are long, caudal and anal fins are paired, head with hood. An *houshou* has the hood confined to the sides of the head whereas a *ganshou* has the hood confined to the top of the head.

Besides these main varieties a number of others exist which have been produced by crossing two or more of the main ones, or which arise as inferior specimens from the main types. They are listed below.

*Shakin*. Fig. N. Illustration by Matsubara. Body is short and deep, fins are long, dorsal fin is absent, caudal and anal fins are paired, head has hood.

*Watusi*. Fig. O. Illustration by Matsubara. Body is long and slim, fins are long, caudal and anal fins are paired.

*Kimronshi*. Fig. P. Illustration by Matsubara. Body has the form of the wild type, fins are short, dorsal fin is absent, caudal and anal fins are paired.

*Shubunkin*. Fig. Q. Illustration by Matsubara. Body has the form of a wild-type fish, fins usually similar to those of wild type but may be longer; sacrosus arrangement of reflecting tissue.

*Comet (tetrago)*. Fig. R. Mentioned by Matsui. Illustration by Innes (1917). Body has form of the wild type, fins are long and pointed, caudal and anal fins are single with pointed ends.

*Nymph*. Fig. S. Illustration by Innes. Body is short and deep, fins are long, caudal and anal fins are single.

*Fantail*. Fig. T. Illustration by Innes. Body is short and deep, fins are long but not as long as those of ryukin; caudal and anal fins are paired.

From time to time other so-called varieties have been reported: blind goldfish, tumbler that swim upside down,

etc. Some of these fish were abnormal individuals, others sick fish, but most represented colour variations of the varieties mentioned. Minor variations are liable to receive new names in order to increase sales from a commercial establishment.

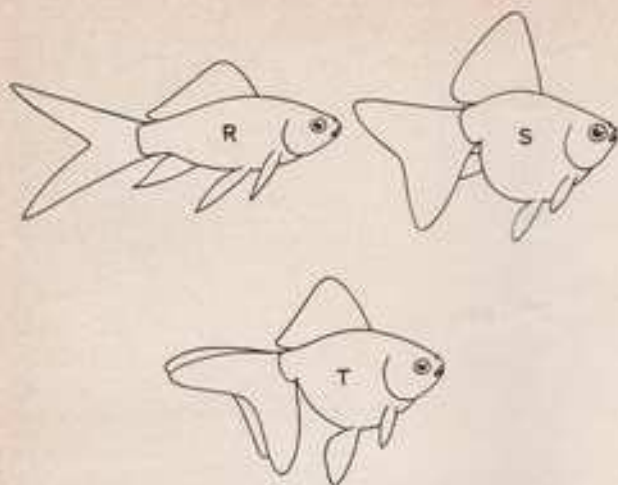
The illustrations of any particular variety by different authors are often not identical. In many cases the drawings come under the heading of artistic impressions rather than scale drawings. These inaccurate "artistic" drawings are often more attractive than the more accurate outline drawings with their "solid" appearance. Owing to an optical illusion, the artist, unless he measures carefully, nearly always places the dorsal fin too far forwards. Another cause of these differences is due to the fact that fanciers in different countries, or even in different districts, do not always agree on what constitutes a perfect fish, and fashions alter with the years. The shubunkin (Fig. Q), which is based on a Japanese illustration, would not be considered as a good specimen by British fanciers although they would probably agree that it was a shubunkin.

From the writings of Matsubara, Chen, Matsui and others it would appear that, until comparatively recently, most goldfish fanciers did not cross the different varieties but concentrated, by selective breeding, on producing greater abnormalities of the existing mutations. In a recent film of Chinese goldfish, however, there were domekins with pompons and hoods, pearl scales with the eyes of a demekin and other fish which combined the characteristics of two or more of the older varieties.

Amongst the important papers dealing with goldfish



A pearl-scale goldfish showing the domed scales arranged in parallel rows



R, Comet; S, nymph; T, fantail (all after Jones)

varieties there are a few discrepancies in nomenclature and descriptions.

Kishinouye (1898), referring to the wakim, ryukin, oranda and ranchu, stated that the "caudal fins should be three-pointed — i.e. somewhat triangular in shape or lozenge-shaped, not divided at the median line." Other authorities agree that these fins should be paired and not joined along the dorsal margins.

Koh (1934) gives the following as synonymous: wakim = common goldfish; ryukin = nymph or fantail; oranda = goosehead. No other author supports these views.

Matsubara (1908) illustrates a deme ranchu with eyes protruding laterally. From his description in the text the fish is supposed to have eyes directed upwards and would appear to be a celestial.

Initially the breeding and keeping of goldfish in China and Japan was confined to the aristocracy and only the best fish were kept for breeding purposes. Matsubara (1908) wrote: "Those kept by persons of wealth and position are superior breeds specially selected." In one large-scale breeding establishment he reported that 200,000 young ryukins were produced but at the end of the year, after a number of sortings, only 1,000 were retained.

In the twentieth century commercial breeding was started, particularly in the U.S.A., Italy and Japan and in many cases what would previously have been considered inferior types were sold in large numbers instead of being destroyed. To-day in Europe and the U.S.A. the shubunkin is the most popular fish and only a very few fanciers breed the more highly evolved types (Figs C—M).

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## The Guppy—King of Tropical Fishes

by PETER DENDY

THE choice of title for this series of articles is deliberate, as there is no finer fish to be found in aquaria anywhere than a show-quality guppy. I might add that breeding a champion guppy is more difficult and beset with more pitfalls than is breeding any other tropical fish, but the effort involved is so very worthwhile. A tankful of male veiltail guppies carrying every colour of the rainbow and in constant motion has to be seen to be believed.

To qualify these opening remarks I would point out that there are guppies and guppies, and I am not talking about those poor overcrowded, undersized, indeterminate-finned little fish that are too often seen in hobbyist's tanks. If you own a tankful like that, then my advice is to pour the lot down the sink and start again with an established strain; you will never regret it.

The affairs of the guppy world are controlled by the Federation of Guppy Breeders' Societies, which has an international membership and sets standards for size of

fish and finnage. At the moment there are eleven standards for male finnage, with two more to be added shortly, and one standard for females, which can be in any of five different colours or colour combinations. So there is a wide choice even for the most difficult to please. The F.G.B.S. is spread over the country on a sectional basis and there are, for instance, three sections in the Midlands and three in London. Each section holds a monthly meeting and table show and in addition during the summer there is an open show somewhere each month, so there is plenty of opportunity to show your fish and compare your efforts with other guppyists. The Federation publishes a bi-monthly journal and a monthly newsletter to keep members in the swim.

Judging is carried out by trained and qualified guppy judges who work on a detailed points system based on the laid-down standards, which ensures a uniform decision, whether the show be in London or Birmingham. Federa-

tion cards are awarded to the top fish in a class and a really good guppy may win a "pin." A pin is a silver replica of the Federation badge, a lyretail guppy, which may be proudly worn in the owner's lapel. The winning of ten pins entitles you to a gold pin, and after winning 20 pins you earn a gold jewelled pin. This, of course, is the target for all keen guppy breeders and sets the seal on your achievements, as it is the highest award made by the Federation and still comparatively rare.

The cult of the guppy is widely supported in America and on the Continent and fish are regularly sent across the Atlantic and the Channel to international shows. That is one thing about the guppy; he travels well by air and by post, but I will tell you more about that in a later article. British fish have frequently won major awards at top shows in Germany and last year at our own international annual show guppies from Holland took a cup home with them and the award for best male in the show.

I have sketched in the outline of the Federation's activities to show you that there can be much more to keeping a guppy, if you so desire, than merely having a tankful of pretty, lively fish. The guppy can offer you everything from beauty and purity of line to hard-fought competition. Veritably a king of fish this *Labretis reticulatus*.

#### The Guppy Bug

I might warn you that if you are bitten by the guppy bug, it is hard to recover, I might say almost impossible. I have 30 tanks devoted to the guppy, but that is nothing; two of my friends have 40 and 60 tanks respectively, devoted to the same good cause. Of course, it is not necessary to have that number of tanks, a few only will produce good results as well, but I mention it to illustrate how strong the guppy bug can be. An understanding wife is a help, but then that is required by all aquarists, when tanks seem to multiply themselves overnight!

If you feel already that you want to climb on the guppy bandwagon, then I suggest that you enquire amongst your fishy friends for the name of your nearest devotee, or if this produces no results then I give two names and addresses at the end of this article, but please enclose a stamped and addressed envelope to facilitate the reply.

All humans, even aquarists, have a streak of impatience in them and like to see results sooner rather than later, so to start yourself off, please beg, borrow or steal the best pair of guppies you can lay your hands on, even if it means parting with folding money. Any other course will probably be wasting your time. With few exceptions the various standard strains do not mix and the offspring from a mixed marriage will not be fish, nor fowl nor good red herring, and it will take you years of selection and careful breeding to sort out the faults and obtain a true-breeding line again.

#### Male and Female Characteristics

Male guppies when mature show by their finnage to what standard group they belong, but all females look alike and it is quite impossible to tell whether a female carries a veiltail or a swordtail factor, and if you want to breed veiltails and you mate to a swordtail female then you are in for a shock. All the present standards were evolved from the wild type of guppy by selective breeding through the years. During this process the males and females in each standard were gradually guided by careful re-selection until they bred true, generation after generation. Thus they both carry combining factors contributing to their own standard and together make a perfect pair. Generally speaking the male factor is the dominant one, but certain characteristics are in the possession of the female alone.

I will deal with heredity and genetics in more detail in a



This article is the first of a series devoted to the guppy as a subject worthy of special study by the serious aquarist.

later article; at the moment I am trying to show how important it is to start off with a true pair of which the pedigree is known. Suppose you see some quality guppies in a dealer's tank which appear to have everything. You are in, you think, and buy a pair. Now wait a moment, ask some questions first. The females swimming around with the males may not be of the same strain; the guppies you see may be a breeder's sort-out and the females, or some of them, may have been put in to make up the number of pairs sold to the dealer irrespective of strain. Perhaps there are, perish the thought, more than one type of guppy in the same tank so that everything is nicely tangled up.

#### What you Want to Know

There are certain things you want to know, and if the dealer can't give you the answers, then go to the breeder for them. As a matter of fact, unless you know the dealer's set-up very well it is best to go to the breeder anyway. I am not hitting at dealers here, don't think that, but just remember we are talking about show-quality guppies and cannot leave anything to chance.

When buying your basic stock then, there are certain things you want to know:

- (i) Are the males and females the result of line-breeding and in fact brothers and sisters?
- (ii) Are they breeding true to type, and if not, what proportion are throwing odd shapes? These odd shapes can be very interesting, but not when you are starting off.
- (iii) For how many generations has this particular strain been inbred? Too much inbreeding without an outcross for new blood can be the cause of so many troubles.

Here are the names and addresses you can write to if you want to find out more about the F.G.B.S.: Provincial secretary, Mr. C. W. MacRae, 23, Aldenham Road, Radlett, Herts. General secretary, Mr. B. G. Ashman, 19, Knighton Road, London Road, Romford, Essex.

(To be continued)



Stickleback aquarium. The nest was made in front of the broken butter dish used to provide a contrasting background for photography.

THE three-spined stickleback (*Gasterosteus aculeatus*) is probably the only freshwater fish that exists in identical form on both the European and North American continents. From scattered bits of evidence that I have been able to gather, I have judged that, on the west coast of Canada, these little fish are very nearly identical, in form and habits, to their congeners in Europe. From reading the works of some local writers, one might get a different impression. For instance, the species is included in Clemens' *Fishes of the Pacific Coast of Canada*, a book supposed to be devoted to salt-water fishes. There is also much difference of opinion on just how the well-known nest is constructed.

Since some excuse is necessary, it seems, to justify having given aquarium space to these humble fish, I can say that I did so in order to observe, for my own satisfaction, the truth about these nests. I found the fish more accommodating than I could have imagined; a pair placed in a 6-gallon aquarium had started operations within 2 days! What is more, the nest was being built close to the front glass. I was at once struck with the possibilities for pictures. The glass was a bit streaky, but not too bad. When the photographs were developed, they turned out none too well. The dirty glass would not have mattered much; the trouble lay in lack of contrast. Right behind the nest was a good-sized stone, which photographed so nearly the same shade as the fish that the latter could hardly be seen.

At the time, I concluded resignedly that I had missed a golden opportunity and could not expect another. But there was plenty of time to ponder the matter before another spring came round, and the more I thought about it, the more I leaned to the theory that those sticklebacks had not chosen their nest site by chance. The stone I have referred to was the only object projecting noticeably from the level floor of compost in the aquarium. The fish, though they could presumably see through the glass, nevertheless may have accepted it as a solid barrier, and viewed the space between glass and stone as they would a cleft between two stones. Possibly such a site was considered preferable for nest-building.

If the fish had filled up the space with nest material, the above conclusion would have been obvious. As things were, I could not, from where I stood, make out anything worthy of the name of nest. As far as I could see, the male fish had scooped a slight hollow in the sand, and had later filled it in again, adding a few bits of greenery to the final touches. Such an apology for a nest could be constructed anywhere, unless, of course, the bottom was composed of pebbles too large for the fish to move. This last

## STICKLEBACK P

by RICHARD

Photographs by

piece of reasoning brought on another brainstorm. I decided then, that when the sticklebacks were breeding again, I would set up an aquarium in which they would construct a nest in such a way as to facilitate, to the greatest possible extent, the obtaining of clear photographs.

I went about it as follows. Having spread over the floor of the aquarium a good layer of clean sand, I carefully covered it all with a crazy pavement of flat pebbles. One small area in the middle, next to the front glass, I left clear of stones. Back of this spot I set upright half a white china butter dish. The tank having been carefully filled, all was ready for the big experiment. To make more certain, I put in two male sticklebacks and four females. The pictures tell the story of my success.

I snapped a number of pictures with various lights and exposures. The best were those taken with an extremely rapid shutter, with big flashbulbs hung close over the aquarium. The difficulty with this plan was that changing the bulbs frightened the fish, and quite a long wait was sometimes necessary before operations were resumed. A drawback with ordinary roll-film cameras is that the whole roll must be used before anything can be learned about how things are going. By using film of even moderate sensitivity, I could have secured passable pictures by the sunlight streaming through the window. My camera was loaded with fine-grain film of very low sensitivity, and I did the best I could with that.

In the end I had reason to be glad that the previous year's attempt at photography had been a flop. While making this second attempt I also noted a good deal that was new to me about the habits of the fish. Three-spined sticklebacks have been intensively studied, and so much



Male stickleback dragging its belly over the nest.



## PHOTOGRAPHY

### ARD GUPPY

by the author

has been published about their breeding habits that I hesitate to add to it. Still it seems worthwhile to describe briefly what went on, if only to make clear what is happening in the pictures.

The nest-building procedure, as before, seemed to the human watcher to consist mostly of spitting out sand and then putting it back where it came from. The male stickleback repeatedly carried out two different manoeuvres, the purpose of which is not obvious. Frequently he rammed the nest site with his nose; at no time did I see him penetrate the sand further than about the level of his eyes, as shown in the photograph. The other stunt was to bend in an arc backwards, and drag the vent over the nest. This might be the act of applying some adhesive secretion to the nest, as sticklebacks are said to do. But, as my fish kept it up after the eggs were laid and certainly spent no time in the nest while the female was spawning, I am inclined to believe that it is by this means that semen is deposited in the nest. During the earliest stages of building, the male fish may be only going through the motions, as it were. The performance is then what biologists call a displacement activity; to put it in layman's terms, excess of excitement must find an outlet some way.

In the literature one always reads about the male stickleback driving his mate into the nest. The impression I gained was that the females were in a desperate hurry to get on with the business, while the male stalled them off in order to get the nest finished properly. Every few minutes a female would dash up to inspect the nest. The male would chirpy her off gently, not in the fierce manner he reserved for his rival, who, in default of a better site,



Female stickleback inspects the nest and the male watches. Exposure for this picture was  $\frac{1}{100}$  second but the activity of the fish still produced a blur.

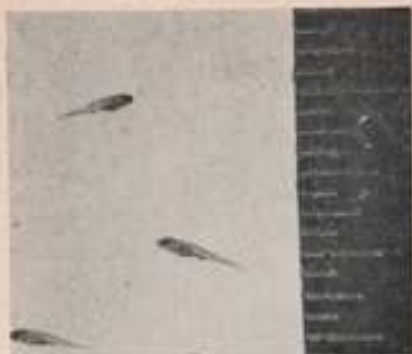


The purpose of this "ramming" of the nest site by the male stickleback, witnessed several times by the author, is unknown.

had somehow managed to set up housekeeping at the back of the aquarium.

I was not given any warning of when this behaviour pattern was to change; moreover, I supposed that the nest was only a few scraps of trash, on which the fish would rest while spawning. Thus I was taken completely unaware when one of the females dived into what looked like solid sand, and vanished. I cannot be sure that the subsequent behaviour of the male fish was quite natural, as I probably frightened him by fiddling with the camera. At any rate, he went out of sight and sulked for 10 minutes. On his return, he hovered over the nest for a few seconds, and then shot through it, the female coming out ahead of him.

This nest did not fit any published description of sticklebacks' nests that I have come across. Some writers mention just a depression in the substratum while others describe a tunnel-like nest attached to water plants. My sticklebacks made a tunnel nest completely sunk below the level surface of the sand, with openings that could not be detected by the human eye. I believe now that the previous year's nest had in fact been made in exactly the same way, but on that occasion the male fish had not allowed for the enormous wife which I had inflicted on him. These over-size fish are evidently the result of optimum feeding conditions. Two years after stocking a previously fishless pond with sticklebacks, there were a number of these fish in evidence, each up to 4 inches long. During the next 2 years they disappeared, being replaced



by normal 1½- to 2½-inch specimens. My first experiment was conducted with a 2-inch male and a 3-inch female. This giantess was presumably unable to get into the tunnel, so just spawned on top of it. This worked out all right, as the young fry duly appeared.

The arrival of the baby fish offered an opportunity to test Laurence Peckins' "rubber-tube aquarium" (*The Aquarist*, October 1958). The result is shown. There was no light problem here, as I just took the whole apparatus outdoors.

Incidentally, before reading Mr. Peckins' article, I used another method for photographing small water animals, which I still prefer for beasties which will insist on settling to the bottom, especially if they are more advantageously viewed from above. I select a glass jar with a concave bottom (to locate one without lettering on the bottom is the greatest problem). I stand this jar upside down on a sheet of white paper, and put my subject into the concave bottom, which has been filled with water. The camera must be fixed with the lens pointing directly downward.

Stickleback fry 2-3 days after leaving the nest. The scale on the right is in sixteenths of an inch.

## Grey-Foliaged Plants for the Pondsides

by JACK HEMS

FOLIAGE plants can beautify the area around a pond as much as flowers; more so, perhaps, for the beauty of flowering plants soon passes, and when the flowers have faded, the plants often look a trifle sad and forlorn. Foliage plants look attractive most of the year; not a few of them all the year round. And the foliage plants with grey or silvery foliage are the most attractive of them all. They look as though they have been sprinkled with green ice on a hot summer's night, and in moonlight look delightfully cool and romantic. In the day they provide an excellent background for green-leaved plants and brightly coloured flowers.

When I write of grey-leaved plants for the pondsides, I do not think of plants for growing in moist soil alone. I am thinking of plants to grow close to the water, though not necessarily in it or even in the bog surround. There are sun-baked rock crevices to be filled; there are the piled-up earth banks built up to provide a background and to preclude dallying cats from reaching their paws down to pat the fish.

For the dry bank, few plants look lovelier than *Senecio greyi*. This plant or shrub (for it is classified as a shrub), grows to a height of 3 feet and has branching stems well clothed with greyish oval leaves. During the summer it bears a profusion of yellow daisy-like flowers.

Even more grey, almost white, is the massed, finely cut foliage of *Saxifraga chamascyparicus*. This shrubby plant may be planted in dry rock crevices, or close to the water itself in moist soil. It is excellent for forming a windbreak or protective dwarf hedge for tender rock plants. It may be clipped to any shape in the early spring or late autumn, and about the end of June it will produce masses of golden buttons on short stems.

The foliage of *S. chamascyparicus* is delightfully fragrant, and may be dried and used to fill sachets or vases containing the dried petals of roses, lavender, bergamot and other scented treasures from the garden.

Then there is that plucky beauty known as lamb's tongue (*Stachys lanata*). One always feels impelled to touch and stroke the woolly leaves, ice-green with a silvery white nap. This plant thrives in a moist place in sun. It spreads quickly by underground runners, and though it averages about 9 inches tall, it remains evergreen and more prostrate-growing through the winter; so that it may be underplanted with spring bulbs such as tulips and scillas. In the

summer its leaves stand erect and it sends up woolly spikes clothed with insignificant crimson or cerise flowers. But who cares about its flowers? Its foliage is enough to warrant its inclusion in any water garden.

For the dry rock slope there is a delightful sodum or stonecrop known as *S. serotus*. This plant dies right back during the winter, but with the coming of spring its stems peep through the soil, and start to spread over the rocks. As the sunlight grows stronger, the pinkish stems become clothed with pale grey-green leaves. At the end of the summer it bursts into bloom; cluster upon cluster of tight rosette-shaped heads of pink flowers. And the flowers of *S. serotus* last well into the autumn.

## Royal Fern

ONE of the few hardy British ferns which is suitable for the water garden and pool margin, *Osmunda regalis*, the royal fern, is an impressive species which, owing to the depredations of collectors, is absent from many of the areas it occupied a hundred years ago. It is still abundant in several isolated bogs and wet heaths, particularly in the eastern and south-western counties. The species does not need bog conditions for its existence, but it always attains its most luxuriant form in peaty, well-drained soil close to the water of a pool or brook. In such a position in the water garden its thick, pinnate fronds grow from the stout rootstock to a height of 4 to 6 feet. All the outer fronds are sterile; the inner ones have lower sterile pinnae and upper fertile pinnae whose segments are densely covered with globular brown sporangia, whose superficial appearance to an inflorescence gave the fern its other common name of flowering fern. Rooted in a well-drained mixture of bog peat, fibrous loam and leaf mould, several specimens of this fern will provide a magnificent display of foliage contrasting well with the more usual types of marginal plants. The species enjoys sunshine provided that its roots are within reach of a good water supply; it is deciduous but hardy in all but the severest of frosts.

C. D. SCULTHORPE

THE AQUARIST

# AQUARIST'S Notebook

by

RAYMOND YATES



I HAVE now discontinued my polythene pond. It was, of course, a great success and proved just what could be done with this material. However, after the original damage by a teddy-boy element the pond suffered 18 patches. A year later these were showing signs of wear and I renewed about half of them with perfect results. The adhesive Evo-stik is certainly excellent for the job. The second winter had no adverse effect on the pond, which had stood up the previous year to 7 inches of ice. This last winter was a very mild affair with never more than 1 inch of ice. The fish did not show themselves all winter, but this was not so surprising because of the large mass of water plants which covered 80 per cent. of the surface. Visits by small boys in my absence have become too much of a good thing, and more damage, superficial, has been done. The trouble has been that one never has a happy moment when one has a pond of this nature at the mercy of the hooligan element. A single stone thrown in could pierce the polythene and drain the pond. To prevent this I layered an old thick blanket type of cloth over the bottom, weighted down with stones and this proved most successful, being quite invisible after a few days.

One morning I noticed the level was dropping, slightly but nevertheless obviously. I realised that one or more of my patches was losing the battle against the surrounding water and this proved to be true. I removed the fishes and was amazed to find them bigger and fatter and in better health than I had ever seen them in, after not seeing them all winter and feeding them nothing whatever. I retained some in aquaria and passed the larger ones on to a friend who has a delightful outdoor pool. I don't think I shall bother with a pool again of this nature. It is just not worth the worry of wondering if it will be there at night when one gets home, or even if it will be there in the morning when retiring to bed. A polythene pond works well if safe from the unwelcome attentions of modern youth; if not it is just not worth the worry. When I built the pond this aspect never occurred to me . . . we all live and learn.

In my previous notes I have not mentioned two points about the silver shark which are worth drawing to the attention of hobbyists who may not have yet kept this variety. I feel sure it is a plant eater; never have I seen it engaged on any plant degradation but the signs are too clear. Probably this tendency shows up only with increasing size and appetite. Large specimens are very nervous. They will often leap up from the surface (keep it covered) and also dash madly around their tank. This is mostly when a slight jar or concussion occurs which other fishes affect not to notice. The silver shark appears to panic and this can be troublesome. In my view this is all part and parcel of the vast size and the wide side expanse of body presented flat on to the front glass. The fish receives full vibrations on a wide surface and reacts accordingly.

Mr. L. R. Brightwell is still keenly interested in the hobby at his new home in Cornwall, and the marine side in particular. He would be pleased to hear at any time from marine aquarists; his address is East Cliff Cottage, West Portbolland, Portloe, near Truro. He mentions that in his experience no seaweeds grow in tank conditions in electric lighting. Most of the smaller coastal public aquaria use this and so also do Plymouth and Millport. One can understand this on the grounds of expense, the clearing of tanks of algae. Mr. Brightwell himself finds that sea

weeds do well, with daylight conditions, and the effect on the appearance of the tank is tremendous. He tells me that he finds grey mullet do very well in brackish, almost fresh water. They are notoriously long-lived, and those at Plymouth alone survived the "blitz." Some have been kept in captivity for 35 years. Mr. Brightwell will be able to show visitors to Truro quite a big display of local marine life, apart from fish, which will come later when time permits. There is a series of scale models of local whales, 12 species. In addition there is a scale model of a lampraria bed, as seen submerged. There are also models of four kinds of turtles—sometimes beached off Cornwall. Now you marine enthusiasts, do get in touch with Mr. Brightwell, he will be delighted to have your news and views.

The hobby is predominantly male but that is not to say that women have no part. The wives who put up with their husbands' addiction are legion and deserve our esteem and regard. Probably one of the main reasons why wives put up with fishkeeping is the very obvious fact that it keeps hubby at home. The definition of a married woman has been given as "One who gives up the attentions of several men for the inattention of one"; certainly many of our fish-widows must fall within this category. But the boot is also on the other foot. I have met many married women who are really dedicated to the hobby and in the expert class, too. Their husbands also show interest but to nothing like the same degree. What does surprise me is the relative lack of interest taken by unmarried members of the fair sex. They are few and far between. This does not apply everywhere; for example, it is not the case in U.S.A., but in Britain it is very much a hard fact. I always wonder what happens to the many thousands of girls who take biology through high school; do they drop all interest in the subject when they leave school?

The *Corydoras* catfishes are so quaint and so friendly that newcomers to the hobby might make the mistake of supposing that all catfishes are equally benign. This is not the case. Some time ago a friend of mine was bemoaning his bad luck. It seems he had a medium-sized *Pimelodella* smooth catfish, which is most attractive to watch with its long barbels. This fish is most active at night and then has no difficulty in locating and devouring other fishes of small size. My friend lost almost 40 small plaies, and he is now a wiser, if sadder, aquarist.

In these days of fewer club magazines it is heartening to be able to record the birth of a new one. This is The Scottish Aquarium Society Magazine, which began life with the February, 1960 issue and which will be issued quarterly. The Society was formed in 1927 and previously published a magazine under the title "The Scottish Aquarium Society Herald," which ceased to appear some years ago. The editor, Mr. A. M. Patrick, of 120, Burchhead Drive, Glasgow, S.W.1, will be pleased to hear from anyone interested and to exchange copies with other club-magazine editors. The first issue runs to 12 pages of duplicated typescript and includes an editorial, articles on "In defence

of the Tiger Barb," "Why Not Reptiles," "Breeding Siamese Fighters," "Fish around Town," "White Worms," "Crypto Plants," also Society News, Bookshelf, a discourse on plants and a page of advertisements in serried by four Glasgow dealers. This new venture will not prosper unless it is well fed with "copy"; perhaps aquarists in Scotland will take the opportunity it affords of giving us the benefit of their experiences through its pages.

A short film which is an absolute must for any hobbyist is the French production "The Golden Fish." Already the winner of an Oscar, this film lasts a mere 20 minutes but it holds the attention as few other films do. In really splendid colour, with music but without speech, it tells the story of a goldfish, a cat and a small boy. The famous French underwater expert J. Cousteau is the producer and the photography is by P. Goupil, which is sufficient recommendation for anyone.

A correspondent in a foreign magazine asks if dog fleas could be fed to guppies. The writer apparently had a lot available like some of these white worm and *Daphnia* enthusiasts one hears about but never sees. I thought I knew all the fishy jokes but this one tickled me. However, it is not so silly as it seems. Many years ago I lived in Amsterdam in some old property which was infested with fleas, where it was possible to collect 30 or more in 5 minutes. Unlike all the other members of this family I have met, these little blighters were incapable of biting human beings and were looked upon as of no more consequence than midges here.

Queer things fish, they have so many uses. Apart from their edible aspects they are often used for soil fertiliser, and it is well known that the Eskimo has many ways of utilising what the fish has to offer. A recent report from abroad tells of a man being beaten to death with the whip-like tail of a dead ray, possibly a sting ray. I do not know the circumstances of the case nor how the police acted, but it is certainly something very novel. One dreads to think what long-suffering wives of aquarists might be driven to do if they realised the piscatorial possibilities of letting the punishment fit the crime. What a pity it is that fish so rarely get an appreciative word. As a rule all references to fish by the public at large are derogatory. In the early days of motoring urchins used to love to shout "Fish face" at the be-goggled driver. Similar unflattering references still obtain such as "drinks like a fish" (a lie if ever there was one), "poor fish," "a fishy business," "cry stinking fish," "shaking hands with him is like shaking hands with a fish," "shark," "minnow," "hook, line and sinker," "taking the bait" and "hooked."

Some time ago I was asked to look at some dead fish and explain why they had died. If only it was so easy! This was, of course, another beginner. I wonder why it is that most people go the wrong way about things in the hobby when they start. The rule seems to be that newcomers to the fancy get an urge after seeing some beautiful tanks somewhere and cannot wait to possess something on similar lines. Instead of asking the opinion and advice of someone who knows the difficulties the newcomer all too often rigs up his tank, fills with water, plants and fishes and then grumbles when trouble starts. Surely it would be wiser to get the know-how on size and type of tank, best position in house and room, lighting possibilities, size

and heating before committing oneself to anything. Actually one is called in when the worst has come to the worst. Although anglers and aquarists are mainly very patient people newcomers to the hobby just can't wait and suffer accordingly. There's always to-morrow!

A report in *All Pets* magazine (U.S.A.) gives some interesting details of tropical fishes being kept by the inmates at the Missouri State Prison at Jefferson City. This is mainly due to the encouragement of the director of the State Dept. of Correction, who considers that if an inmate has something to occupy his time and mind he is much better off, more content and far less likely to get into trouble. One inmate tells of his collection of two 15 gallons and one 5 gallons tanks, two aerators, two heaters, plants and two dozen boxes of fish foods and remedies plus fishes and all for about £30 total cost.

## FRIENDS & FOES

### No. 81



*Planorbis dilatatus* (magnified  $\times 3$ )

#### Mollusca (continued)

**Planorbidae.** *Planorbis dilatatus*—the trumpet ramshorn.

IT cannot be said of the Planorbidae that what suits one species suits all. Some like large areas of water, some will do well in quite small quantities. Some like hard water better than soft, some prefer running to stagnant water. And some thrive in brackish water. These preferences affect their distribution, and explain why species common in one locality may be entirely absent, say, in a neighbouring county.

A good example of marked preference for a particular area is found in *P. dilatatus*, which although discovered nearly 100 years ago near Manchester, has not been reported anywhere more than a score of miles from its original location. This species is an American one, which seems to prefer warmer water than usual. It is quite small—about  $\frac{1}{2}$  in.

The name *dilatatus* is self-explanatory, being pure Latin for dilated. Magnification is necessary to make out any details of its structure.

It is just right as far as size goes to make a tit-bit for hard-mouthed fishes or for those that can swallow it whole. Manchester aquarists may like to report whether in fact their fishes will eat this snail or whether they spurn it. Any shells which appear to be rejected should, of course, be examined to see whether the snail has been sucked out or if it is still present, whether it is alive or dead.

C. E. C. Cole

## Breeding the Golden Orfe

by A. BOARDER

READERS have asked for directions for the breeding of the golden orfe, and an attempt will be made here to answer some of the problems. Although the breeding of these handsome fish is a possibility under the proper conditions it is almost an impossibility to breed them in ordinary tank conditions. It is said that nothing is impossible, but the breeding of these fish in any small container would be the nearest I can imagine to the impossible. The orfe is a very active fish and one which must have well-oxygenated water in which to breed. It must also be of a fair size, and to succeed with this fish the parents should be about a foot long.

Before attempting to breed with these fish it is essential to obtain a good understanding of their way of life and preferences towards water and food. Small ones can be kept in tanks, but once a fish gets to 5 or 6 inches in length it is far better to remove it to a pond. The orfe is a very quick-growing fish when given good conditions and the correct food, and a fish of 4 inches in length over all can grow to a foot in length in 4 years if looked after correctly. It can be seen then that it is imperative to make sure that orfe have plenty of room in which to swim. They are rapid swimmers and love to swim in shoals from one end to the other of a large pond.

Small ponds may be all right to keep a few small orfe in, but these small ponds become so very warm and foul in hot weather that it is always a problem to ensure that the water remains pure enough to keep the orfe alive. Water which may be rather foul and yet enable goldfish to live in it might be fatal to the orfe. Orfe die in ponds in warm weather, especially in thundery weather. They are usually the first kind of fish to show distress in a pond as soon as the water loses a quantity of oxygen.

To try to breed these fish in anything but a fair-size pond is really asking far too much. I have seen them breeding in a garden pond which was about 20 feet long and 10 feet wide, and of an irregular shape; the depth varied from 3 feet to almost ground level at the sides. The pond was well planted with oxygenating plants and there were several water lilies. One end of the pond was rather overgrown with *Potamogeton nodosus*, the pickerel weed, and this had made a dense growth in which the breeding fish liked to chase. In addition the pond was fed by a small waterfall supplied by a small pump in a nearby greenhouse. This pump was switched on only occasionally but more often when the weather was warm. The water ran over some rocks in a rocky and besides making a very attractive scene the freshly oxygenated water encouraged the orfe to breed. These fish were very large, about 18 inches long, and the other fish in the pond were goldfish and hi-goi carp.

These orfe spawned in late May, and they chased through some willow roots and other fine roots which had grown down into the pond. Their chasing was faster and more vigorous than that of goldfish but the eggs were laid on the roots and nearby weed, and adhered to the material quite strongly. The eggs are larger than those of the goldfish and hatch out in a temperature of about 70°F in about 4 or 5 days.

Another pond where I saw these fish being bred was a very large one, quite 30 yards long and almost as wide. There were only a few very large orfe in this pond and they always laid their eggs among the water plants right at the shallow edge of the pond. The weed was collected,

when any eggs could be seen and placed for hatching in large tanks in a greenhouse.

It is almost certain that to succeed at breeding orfe the following requirements are necessary: (1) A fairly large-pond; one about 15 feet long by 10 feet wide would do. (2) An important point is to ensure that either a fountain or a waterfall is installed so that during the breeding season or hot weather some fresh water can be run into the pond. (3) Four or five large orfe; the ideal would be to have a couple of females and three or four males. They are not easy to sex but during the spring the females will show by a thickened belly that eggs are present. Although it is not impossible to breed in such a pond without a waterfall or fountain, the chances of success would be greatly improved by the use of either.

Once the winter ends it is essential that the orfe should be very well fed. They have a preference for live food but they will take dried foods if nothing else is available. The foods that are usually fed to goldfish will be all right for the orfe but to get them into prime breeding condition they should have plenty of live food. The garden worm is, of course, a must, and frog tadpoles, gentles, wasp grubs, meal worms, fully grown *Daphnia*, white worms, *Tubifex* and, in fact, anything alive will be snapped up immediately. I have even seen orfe take live wasps with no apparent harm. As these fish are so active they require a large quantity of food, and during the time of heavy feeding see that the water does not become foul at any time. One thing is certain, orfe will not breed unless the water is absolutely pure. Should there be any doubt about the freshness of the water, pump out a fair amount and fill up with fresh water.

Once the fish are in breeding condition some suitable material should be provided on which they can spawn. Willow roots are ideal for this purpose, but thick bunches of water plants can be made up and tied near the side or nylon threads can be loosely bunched in the same way. When breeding is expected, say in early May, see that fresh water is run into the pond at least for a couple of hours each day, preferably in the mornings. The actual spawning takes the same form as that of the goldfish but is very vigorous and lasts some hours. Once some eggs are seen they should be removed with their holding material to a safe place for hatching. If the pond is large and there is plenty of cover it may be possible to rear some of the fry in such a pond, but like many other fishes the orfe will eat their eggs once the excitement of spawning is over or will eat the fry soon after they have hatched. The fry should have a live diet as far as possible, starting with Infusoria, then on to micro worm, mashed white worms and garden worms, small *Daphnia* and the usual increases in size of food as they grow.

Young orfe soon show the golden colour and so there is no long wait for a change of colour as with ordinary goldfish. Given plenty of space and the right kinds of food the fry grow quickly and become very handsome fish.

To sum up, the possibility of success with breeding golden orfe depends on having: rather large breeders; a good-sized pond; moving water, by fountain, waterfall or other running, clear, well-oxygenated water, and plenty of live food in the early spring. As a point of interest the orfe I have seen breeding in a garden pond were often fed on the entire entrails of a chicken, and to see these large active fish tearing at these was a sight once seen never forgotten.

## OUR EXPERTS' ANSWERS TO TROPICAL AQUARIUM QUERIES

I should like to know the breeding requirements of mollies.

Mollies like plenty of swimming space in shallow water. The ideal breeding tank for them is one having plenty of length and width and little depth. The water in it should be maintained at about 78°F. A teaspoonful of evaporated sea salt to every gallon of water contained in the aquarium helps to make the fish feel more at home, for, in the wild, mollies inhabit salty water. As mollies are green-succating fish, supply them with cooked, minced spinach, duckweed or algae scraped from other aquaria, or cultivated on submerged rocks out-doors. Apart from green stuff, they should be given *Daphnia* and chopped earth-worms to bring them into tip-top condition. Never net or move a gravid female molly. If you do, the shock may prove fatal to her, or if she gets over the shock she may give birth to deformed or dead young.

My male guppies look unusually fat in the stomach. Do you think that they have contracted some disease?

It is not usual for male guppies to look noticeably fat in the stomach, but unless they go off their food, or seem ill, do not worry. Perhaps your fish like the food you give them, and eat a lot of it.

I bought a Siamese fighting fish some time ago. It is a male and in lovely condition. But since placing it in my aquarium I have noticed that it has no ventral fins. Can you give me any idea why this fish should be devoid of these fins?

Perhaps your fish had the ventral fins bitten off by another fish. If so, the fins may grow again, but not so long as the original pair. Or it is not unlikely that the fins became diseased, and disintegrated. Here again, they will grow again as short stumps. Fish in which some of the fins are missing do not seem to suffer in any way.

I have tried to grow *Cabomba* several times, but after a short while it always becomes "leggy" and decays. Is it possible to grow thick bushy stems of *Cabomba* in the average home aquarium?

The chief requirements of *Cabomba* are strong light and a growing medium richer than washed sand. If the roots are planted in a small pot of loam or clay topped with sand, and sunlight can reach its stems, then the plant will flourish and grow thick and bushy. To encourage bushy growth, the growing tip of the main stem should be pinched out, and side branches cut back if they grow too quickly to the top of the water.

Are neon tetras easy to keep and breed?

Neon tetras are among the easiest of fishes to keep in the aquarium, but they are not easy to breed. Getting them to spawn, however, is easier than saving the eggs, which have a habit of disintegrating soon after being laid. Breeding requirements are acid water, partial shade, scrupulously clean conditions and a temperature of about 72-75°F. The eggs are scattered in the plant life, which should have been treated by immersion in alum water or a strong solution of potassium permanganate before placing in the aquarium. When spawning is over, shade the tank with paper or thin fabric to exclude most of the light. After the eggs hatch out, the fry should be given *Infusoria* taken from clean jars, or powder-fine dried food. No unclean dried food should be permitted to lie on the bottom.

Please will you give me some information on the breeding habits of *Apoecarauna agassizii*?

*A. agassizii* prefers acid water, a shady aquarium and an upturned flower-pot or rocky "cave" in which to deposit its eggs. After the eggs have been laid, the female mounts

guard over them and drives the male away if he approaches too closely to the spawning ground. It is best to transfer the male to another tank when spawning is over. The temperature of the water should average about 78°F. Gentle artificial aeration is helpful but not absolutely necessary so long as the tank is clean and spacious. The eggs hatch out within 3 or 4 days, and the fry should be given large *Infusoria*, micro-worms and tiny *Daphnia*.

My fishes are rasping on the bottom of the aquarium. Some of them have folded or closed fins. What is wrong with them?

Your fishes may have contracted a chill through a rapid fall in the temperature of the water, or they may be suffering from a bacterial or parasitic infection. Your best course is to give them extra heat, live food instead of dried food and to add five drops of a 5 per cent. solution of methylene blue to every gallon of water in the aquarium. Keep the bottom clear of decaying plant life and unclean food. Artificial aeration of the water will do a lot towards making the fishes more comfortable.

The leaves of my floating ferns (*Ceratopteris*) are turning brown. Will you please tell me the reason for this?

Your plants may be getting too much heat from above the water (electric light close to the cover glass causing the atmosphere to become too dry). Floating fern likes plenty of light, but not so hot or strong that it scorching the leaves.

Would granite chippings prove suitable as a compost for my tropical aquarium?

Well-washed granite chippings by themselves would be too coarse for most water plants to root in. But mixed with some coarse sand they would make quite a good growing medium for vigorous rooting species such as *Vallisneria*. The fishes, however, would have to be fed very carefully, for if unclean food got into the interstices of the chippings the water would soon become polluted.

I do not overfeed my fishes and yet the floor of my aquarium is soon covered with a carpet of brown sediment. Please will you tell me what causes the sediment to form?

In the well-stocked aquarium (plants and fishes) there is a gradual build-up of sediment from the disintegration and decay of plant life, the breaking down of fish excreta by bacteria, and so forth. Certain species of plants form sediment more quickly than others because their foliage is being constantly replaced by new growth. Duckweed, for instance, multiplies so rapidly that it pushes older fronds under the water and out of the light. In a few days the submerged fronds turn yellow, die and sink to the floor of the aquarium. There they are broken down into powdery sediment by the action of tiny organisms in the water. There is only one way of keeping the floor of the aquarium clear of sediment, and that is to employ a dip tube or siphon tube at regular intervals. If filtration is used the bottom of the air-lift stem should almost touch the compost. Short air-lift stems keep the sediment in the water itself from becoming too thick, but leave the sediment on the bottom untouched, that is, until stirred up by a fish or the aquarist himself with the aid of a piece of stick or dip tube. A small amount of sediment on the floor of the aquarium does no harm. In fact, it helps to feed the water plants, and

provides a breeding ground for tiny forms of life that make a useful first food for newly hatched fry.

I am a beginner in fishkeeping, but find one or two snags in it already. For instance, how does one keep *Tubifex* worms alive? If I leave mine in a jar overnight, most of them appear to be dead or dying in the morning.

*Tubifex* worms will keep alive for several days if you place them in a shallow bowl or half-filled can outdoors—but not in the sun! Another way is to stand the jar under a slow-dripping tap. The fresh cold water falling in the jar will provide the worms with life-extending oxygen, and keep them in good condition, if they are fresh, for about a week.

Do you think a 100 watt heater placed in a 26 in. by 12 in. by 13 in. tank will provide enough heat for tropical fishes during the winter? The tank is located in a heated room.

As your aquarium is kept in a heated room, a 100 watt heater should provide ample heat to keep the temperature of the water above danger level (65°F for most species). We advise you, however, to employ two 60 watt heaters controlled by a thermostat rather than one 100 watt heater. If the heaters are placed in a horizontal position, about a foot apart and close to the floor of the aquarium, you will obtain better distribution of heat.

Is the Malaysian angel fish good-tempered enough to share a tank with pearl gouramis, barbs and other medium-sized fishes? Please tell me the fish's temperature requirements and preferences in food.

The Malaysian angel fish (*Moenandryus*) is quite suitable for a community of medium-sized fishes such as those you mention. It has a temperature range of from 70° to 80°F, but thrives best at about 75°F. It is easy to feed because it will take any food. It grows more quickly, however, when given live food such as white worms and bloodworms. It also eats vegetable matter, and will soon make short work of bruised lettuce leaf torn into fragments and dropped on to the surface of the water.

I am not having any success in breeding platys. I get plenty of young, but they soon die. I maintain a temperature of about 82°F. The plants in the tank are *Ceratophyllum* species. Other plants do not succeed because the light is poor. I feed the fish on live food and dried food. Can you tell me where I am going wrong?

To get the best results from platys do not keep them at a very high temperature; 72°F is about right. A high temperature weakens the fish, though it definitely shortens the period of gestation in the female, and often results in large broods. Another thing is that the tank may be too dark. The platys likes plenty of light. If it is possible, fix an electric light close to the surface of the water and give the fish a few hours of strong light every day. Shallow water, say, 8 inches deep, is better for the fry than deep water. Cloudiness of the tank is important; platys do not thrive in dirty, scum-topped or sediment-laden water.

A few weeks ago I bought a large pair of pearl gouramis with the intention of spawning them in the near future. They are by themselves in a tank measuring 26 in. by 12 in. by 13 in. But the fish are so nervous that I do not think they will ever breed. As soon as I approach their tank they dash behind some rock-work, and will not emerge from their hiding place until I walk some distance from the tank. Even a sudden noise in the room will send them knocking against the glass sides of the tank in their efforts to escape from possible danger. What should I do to try to win their confidence, or break down their shyness?

Some fishes do get very nervous in new surroundings. Plenty of plant life along the back and ends of the aquarium will make them feel more at home. The introduction of live food, such as *Daphnia* or mosquito larvae, that scatters all over the aquarium may tempt them into open water. Do not stare at the fish or tap on the glass. Until they get really used to their surroundings it is best to leave them alone. In time, they will get used to noises in a room and movements in front of the aquarium.

I have just acquired a pair of barbs called *Barbus schuberti*. Will you please tell me something about them?

The fish you enquire about is a colour variation of *F. semifasciatus*, better known as the half-striped barbel. It was developed several years ago by an American aquarist, Thomas Schubert, of Camden, New Jersey. It is a delightful fish to keep and breed. It is peaceable and may be placed with small fishes in a community tank. It has a wide range of temperature but thrives best at about 75°F. It will eat dried food, duckweed, algae, the usual live food and chopped meaty scraps from the dinner table. It is an active fish and usually swims close to the bottom of the water, that is, when it is not hungry or when there is no food to be found on the bottom. If there is no food on the bottom, and it feels "peckish," it will swim all over the aquarium looking for edible matter. It breeds in the typical barb manner and it likes light. Given good conditions it will live for several years.

I have been told that green water can be used as a first food for rosy barbs and some of the gouramies. Is this true?

Yes, green water, very thick green water, makes a good first food for rosy barb fry, and also for the fry of several other species of "tropicals." For a large brood of about 300 fry, two half-cupfuls of green water introduced into the aquarium twice every day for about a week should help the tiny fish along to the stage when they can take other food such as dust-fine dried food, newly hatched mosquito larvae, micro worms and the like. Ploot the green water in a jar in the aquarium for about half an hour to get an equal temperature. Fry are soon harmed if the aquarist empties a quantity of water of a different temperature into their midst.

## FINNY BUSINESS

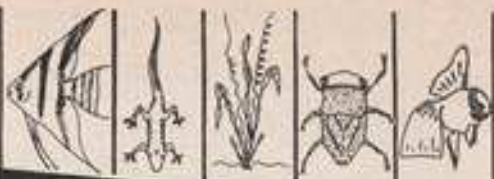
by  
**LD**



"You—you—you tidder, you!"

## our readers

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



# write

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

### Goldfish Groups

I HAVE enjoyed reading Mr. Scutthorpe's letters and articles. How right he is to remind us that uncritical remarks and superficial experiments should not go unchallenged, but, unfortunately, many of us are too lazy to take up a pen and write. However, I have now been spurred to action!

Mr. Hood (*The Aquarist*, March 1960) stated that shubunkins have been "decimated" by the existence of no less than three show standards. Having three standards is a regrettable state of affairs but I suggest that they have not had such a devastating effect as Mr. Hood suggests, because: (i) some of the shapes drawn in some of the standards are biological impossibilities and so the fish do not take much notice of them; (ii) the ten or a dozen fanciers in the country who consistently breed good fish do not follow all three standards in turn but concentrate on producing good fish, which, strangely enough, appear to win under any standard.

I hoped to read some interesting facts obtained from Mr. Hood's breeding, but when he got to the interesting part he stated "a high percentage of the fry were good". In other passages we read of "excellent results" and "excellent pedigree". I should like to know how many good fish were produced and in what ways they were excellent. I will pass over his next paragraph because everybody should know that talk of "full blood", "25 per cent. diluted blood" etc. comes under the heading of old wives' tales.

Inbreeding shubunkins does not produce twin-tailed fish unless the genes for twin-tails were introduced into the strain. These genes may have been introduced many years ago.

When compared with Ostwald standard colours the "blood red" of goldfish is orange! The opercula of some nacreous and matt fish appear red due to blood in the gills beneath. With the exception of haemoglobin in the blood no red pigment has been extracted from goldfish.

Mr. Perkins (*The Aquarist*, April 1960) refers to goldfish showing metallic, matt and nacreous scaling (p. 14). These terms refer to three groups of goldfish. A fish may be said to belong to the nacreous group, or be referred to as a nacreous fish, but its scales cannot be nacreous. The actual scales of goldfish are transparent. In metallic fish a maximum amount of reflecting tissue is present. That just beneath the scales acts like the "silvering" of a mirror and so the scales have a brilliant, metallic appearance. Where little or no reflecting tissue exists in a fish the whole animal has a dull, or matt, appearance. The

intermediate type has an intermediate amount of reflecting tissue, some of which may be in the layer beneath the scales, where it has a metallic appearance, while some is always in another layer situated at the base of the skin, where it produces a dull shine (nacreous appearance). Other parts of a nacreous fish may be without reflecting tissue and so appear matt.

The characteristics of nacreous fish are the noticeable nacreous regions. In some of these fish there is much reflecting tissue while in others there is very much less, but no matter how much, or how little, they all breed as intermediate-type fish.

In stating that "some of us did not think this" (the classification into three groups) "entirely accurate", Mr. Perkins is suggesting that he had, or has, some information which disproves the now accepted idea. I must point out that neither Mr. Perkins nor the others "of us" has demonstrated that there is any difference (concerning reflecting tissue) in the breeding performance of nacreous fish with much, and those with little, reflecting tissue. I cannot understand how a fish can have a "strong tendency towards metallic scaling". Such a statement is inaccurate and misleading.

I agree that "intuitive ideas" may provide a good starting point for an investigation but they should be backed up with a few facts before being published.

Mr. Perkins cannot claim as his own the idea that "external appearances are but the outward signs of internal change". This is one of the first facts taught in elementary genetics. However, I would be extremely interested to hear what facts lead him to believe that variations in reflecting tissue are due to "functional variation in the kidneys". Is this intention?

R. J. ASHLOCK,

President, The Goldfish Society of Great Britain.

The inaccurate references to "scaling" occurred in captions to the pictures and we must accept responsibility for not noticing that these did not agree with Mr. Perkins' text, where the words "types" and "groups" are correctly used.—EDITOR.

### Declining Interest?

WRITING in your February issue, A. Cawdron of March, Cambridge, deplors the decline in the numbers of active aquarists and asks the reason. Beyond the fickleness of human behaviour, I cannot find the reason, but I can suggest a remedy.

As a guest visitor to the Spring Meeting of the British



Aquarists Study Society at Regent's Park Zoo, I heard Mr. W. L. Mandeville speaking on conditioning water. He so interspersed his subject with wit and philosophy that even a dilettante aquarist such as myself was forced to listen.

When tedious through attentive listening might have been expected, he electrified the assembly with shafts of humour that resulted in roars of laughter; then resumed his subject, slipping in valuable practical information as if it was an afterthought.

If assemblies such as this, and speakers of this calibre, were more frequent, I am certain that any decline in interest would be arrested.

JOSEF MEYER,  
Manchester.

#### Beginner's Sympathy

MRS. D. A. HANNING of Plymouth has my sympathy. I have been keeping tropicals in a community tank for nearly 2 years and have lost at least 15 fish. Out of the original dozen there are only a couple of guppies and a White Cloud Mountain minnow left. How they have managed to survive the ravages of disease that hit my aquarium from time to time I cannot comprehend.

Recently I added two pearl danios and two swordtails to the tank. At the moment I am regarding them with more than a little concern since they have developed frighteningly swollen bellies. I am not sure whether this deformity is due to constipation or delayed pregnancy but a liberal dose of *Daplesin* was decided upon, with regretfully little effect.

It is all very well for know-alls to prescribe hospital tanks, extra heaters, sea salt and all the rest, and to talk wisely about protruding eyes and drooping fins. What does an ordinary, very amateur fish-keeper do when he sees his fish dying slowly and painfully (?) in front of his eyes, when he hasn't got all the extra equipment? Perhaps somebody can recommend a remedy that can simply be chucked in the tank—so to speak—without killing all the plants. I would be very grateful for any sane suggestions!

A word about beginner's luck—I haven't yet heard of a single tropical fish-keeper who has not lost some or all of his fish in the first few months. All I can say is persevere. Buy new fish—and more—if you can afford it.

R. DONATICO,  
Thornton Heath, Surrey.

#### Pest Sprays near the Pond

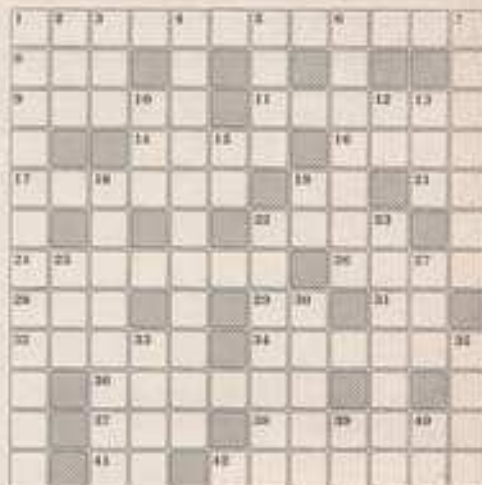
IF any pest-spraying is done in the garden near the pond be careful to ensure that none of the spray can be blown into the water. Also see that it is not possible for some of it to be washed off the plants by rain and carried into the water. Many insecticides contain matter which is very poisonous to fishes and so great care must be taken. Also be very cautious about the receptacle you use for mixing your insecticide. If this is used for filling fish tanks the residue of insecticide in it can be sufficient to kill all the fishes in the tank.

#### OUR JULY ISSUE

In next month's issue of *The Aquarist* there will be included photographs of tropical fishes in full natural colours, as illustrations to an article on the decorative aquarium as a feature of home colour schemes.

## The AQUARIST Crossword

Compiled by J. LAUGHLAND



#### CLUES ACROSS

- Smallest of the freshwater (8, 4)
- After nothing we are in debt (2)
- Would fifty haire give a fish this size? (3)
- Related on the eye's side or through scales only (6)
- Skin of peach rather than of perch (4)
- Caesal fish (4)
- N.A.C. in Plymouth's future for Roman poet (8)
- Guppies (1, 1)
- Mixed type (2)
- First hat amongst the golden (4, 4)
- hair (7)
- Smaller than grayling but physically bigger (A)
- Boy Samiel served him in the temple (3)
- Crustacee of a tank? (2)
- Probably warm dry wind (1, 1)
- Baby pet (3)
- Abdominal limb of an arthropod (6)
- Of a grasshopper (6)
- Meadow (3)
- Mosses in the rushes? No, a little salt in the grass (6)
- Think of Victoria Station (1, 1)
- Methods?—Say in a more solemn way? (7)

#### CLUES DOWN

- This rickish shifter is young in its month (12)
- Stuck in the fish bowl? (3)
- The Club official will be with you in half a moment (3)
- Bladderwort (11)
- Namrelack, perhaps (8)
- Goldfish or gibbon? (7)
- Kole—occupation of the soldier?—Not (7)
- Age (3)
- Motors' organisation (1, 1)
- 16 Across in a way (3)
- A cold wind (1, 1)
- Value, the 1. For taxonomic (6)
- Silent Service (1, 1)
- River mouth (7)
- Put side up in a way that may cause trouble (7)
- Hardest money for loans (3)
- 12 Across always loses a pound (4)
- Rupee, possibly, or pouterfish (4)
- Little angel? (2)
- Little Emma knew her number (2)

(Solution on page 60)



## from AQUARISTS' SOCIETIES

Monthly reports from Secretaries of aquarists' societies for inclusion on this page should reach the Editor by the 5th of the month preceding the month of publication.

**THE Wirral Aquarist Association** opened the month's meetings with a "winter night." Mr. J. W. Tomlinson spoke on Cryptocoryna species, and members divided into smaller groups for further chatter on plants, fish and other topics.

The Association was entertained by Chester A.S. for their second meeting of the month. A very informative talk by Mr. Peter Woodbrook of Chester, on different methods of fish tank and fish house insulation and heating, was the main part of the evening. Many relevant queries were answered.

An interesting talk on the recent annual plants found in aquaria was given by Mr. McChonell of Balford who recently visited the **Sheffield & District A.S.** A table show for white clouds on a recent visit to the **Worthing Aquarist & Zoological Society**, the Sheffield members received a very warm welcome when the two clubs met for the first time. Working under one of the Sheffield's Biotope Trust by making more representative when a recording was given at a recent meeting. The recording was taken at a recent visit to the new establishment of Mr. J. Onozuko in Liverpool, and described the new fish house and his future plans.

An interesting evening was spent by **Riverside A.S.** when **Uxbridge A.S.** were the visitors for the purpose of an inter-club match which resulted in a win for Riverside. First place winners in recent table shows and inter-club competitions were: R. Bigns (identifying beads), I. Buss (Aphrodisiac) and I. Flintham (Iridium). A social evening was held on the 25th April and was attended by a good number of members and friends.

On the 20th June, Riverside set the first club for the second round of the N.W. London Group Competition. The venue is "The John Bull Hotel, Chiswick High Road, W 4 (opposite Gunnersbury Tube Station). While judging is taking place a talk will be given by Mr. Percy Parlow, who is the president of the National Harpist Council and the largest body of cultured harpists in the country. A number of exhibits will be on show and an interesting evening is assured. Visitors are very welcome.

On the 4th July the Riverside A.S. will be taking an open table show at their headquarters, **Thames Valley Gardens, Hammersmith Road, W 6.** Classes will be decided upon when entries are known. All aquarists are invited to compete. Further information and details of membership etc. may be obtained from the secretary, Ian Phillips, 367B Chiswick High Road, W 4 (Chiswick 3749).

**RECENTLY** the **Barnford A.S.** had an inter-club table show with the **Thameside Club**, which resulted in a win for Barnford with 22 points to Thameside's 2 points. The judges were Mr. I. Murphy and Mr. A. Bevan, of the **North and East London Aquarists' Association.** While judging was in progress a quiz-competition was held between the two clubs, the results of which were: Barnford 4 pts., Thameside 3 pts. On 7th May members attended the **Barnford Green A.S. social.**

A table show between **Thameside A.S.**, **Thameside A.S.** and **Barnford A.S.** is to be held on 20th June—classes being for birds, fish and

and character. Two new members were welcomed to the club at the last meeting, the rest of the evening being given over to Mr. A. Pearson, of Barnford Green, who spoke about the hobby in general which produced quite a bit of discussion. The table show results—**Labyrinth**—were as follows: 1. Mr. J. O. Farrell; 2. Mr. J. Hayes; 3. Mr. A. Smith.

An interesting series of film strips was shown at the meeting of the **British and District A.S.** dealing with the many forms of life to be found in English ponds and rivers, as well as one on the stocking and maintenance of aquaria. The start of the meeting was delayed and the table show had to be postponed owing to members being busy setting up tanks of fish, for the Arts and Crafts Exhibition, held in behalf of the **Metropolitan Relief Fund.** At this exhibition the society was given pride of place, occupying the platform. The exhibition was well attended, and the display which consisted of a dozen tanks of tropical, coldwater, and marine freshwater aquaria, as well as terrariums and cacti, attracted considerable interest, many questions being asked. It is gratifying to know that a sum of £30 was raised for the fund.

On 29th May the society held their outing to Colchester, when a visit was made to **Whitwell's Aquarists**, and in June they are taking part in the **Arts and Crafts Exhibition** being held in the **Crayford Town Hall.** Aquarists living in this district would be well advised to visit this display, when members will be present to answer

questions and give advice.

**THE Bedford and District A.S.** are holding an open show in conjunction with the **Bedfordshire Agricultural Show** on the 15th and 16th July. Show schedules and entry forms are now available from the show secretary, R. H. Pope, 51, Ashbury Road, Bedford.

**APRIL** activities of the **Oxford A.S.** included a "Fish Forum," which proved a great success, and it was decided to hold another one in the near future. The following meeting took the form of a table show for changing, the results were as follows: 1. Mr. A. Henderson (red-eyed tetra) 90 pts.; 2. Mr. L. Tamms (carp) 89 pts.; 3. Mr. L. Tamms (crossed) 88 pts. The points for the **Chairman's Cup** stand as follows:—Mr. B. Sherratt 3, Mr. L. Tamms 1, Mr. A. Henderson 1, Mr. R. Voad 2, Mr. A. Laker 1. During this meeting two new members were awarded bringing the total membership up to 77.

**AT** the annual general meeting of **The Haden A.S.** Mr. A. T. Smith was re-elected chairman for 1960-61. The following officers and committee members were also elected:—Vice-Chairman, Mr. G. Adams; secretary, Mr. B. Layton; 27, Boscawen, York Avenue, Cradley, Staffs.; treasurer, Mr. D. Cox; show secretary, Mr. R. Coningham; Librarian, Mr. J. Morgan; publicity and press secretary, Mr. H. Billings and Merril, Solway and Bowles. In his report to the society, Mr. Smith told members that since the society was formed in May of last year it had more than doubled its membership and could now be considered well established. He said that the winning of a major award at the first attempt by the society in last year's Midland Show, had done much for the society in this respect and he thanked all members for the effort they had put into this venture.

At the close of the meeting Mr. Adams presented the **Haden Trophy** to Mr. J. Price, of Cradley Heath, the trophy being a handsome silver cup presented each year to the most successful member exhibiting in the society's own shows. The secretary will be pleased to hear from any aquarist in the area who is not yet a member of the society and a cordial welcome is accorded to all who wish to attend the society's meetings.

**THE Dagenham Town Show** will be held on Saturday and Sunday, 6th and 7th July. The Aquarist Section will have 20 open classes, including a special Junior Class and the Doughton Trophy will be offered for the best Breeder Class. The **Vegetable Society** also will be putting on a special display. All enquiries for schedules, etc., should be addressed to Show Secretary, Mr. W. Carter, 6, Chatter Case, Hornchurch, Essex.

**ON** 30th April the **Belle Vue (Manchester) A.S.** organized an outing to the **Blackpool Tower Aquarists**, which proved to be the most popular trip for some years. At the May meeting an interesting discussion arose through the reading of an American paper on neon in their natural habitat.

**THE** annual general meeting of the **Inverness and District A.S.** was held recently and the following officers were elected: President and treasurer, Mr. I. Clark; vice-president, Mr. R. Stacey; secretary, Mr. J. A. F. Bain, 52, Dunoon Road, Inverness. Council members elected were Messrs. R. Curtis, G. Main, J. Rowley and O. L. Thompson. New members are always welcome and details of the society's many activities may be obtained from the secretary.

**AT** the last meeting of the **Bford and District Aquarist and Pondkeepers' Society** members took part in a quiz cross quiz. The table show was for breeding pairs and the winners were: (fisheries)—Mr. Ranger (pair of goldfish); 2, 3 and 4, Mr. Hunter (black head angels, tetraodon and level guppies); (live-bearing)—1 and 2, Mr. Tubbing, black mollies and guppies; 3 and 4, Mr. Hunter, platy varietus and black mollies. A series of meetings



### The Aquarist's Badge

PRODUCED in response to numerous requests from readers, this attractive steel, red and blue substantial metal emblem for the aquarist can now be obtained at cost price by all residents of The Aquarist. The design is pictured here (actual size). Two forms of the badge, one fitting the lapel button-hole and the other having a brooch-type fastening, are available.

To obtain your badge send a postal order for 2s. 6d. together with the **Aquarist's Badge Taken out from page 49**, to Aquarist's Badge, The Aquarist, The Broom, Half Acre, Barnet, Herts., and please specify which type of fitting you require.

are also being held on Thursday evenings once a month at St. Lawrence's Hall and on Thursday, 26th April, the discussion was on freshwater.

WHILE clearing seaweed on Kyle beach recently, a Corporation workman discovered one of the finest known sea anemones, a sea mouse. He picked up the strange oval-shaped animal in a patch of seaweed and took it to Mr. Sidney Soyren, a member of Kyle A.S. After referring to various natural history books they were surprised to find that it was *Anellia polychaeta*, or sea mouse, a rare type of animal which inhabits parts of the Atlantic. About six inches long it has 40 long downy tentacles on its body and is covered with golden-green fur. Now Mr. Soyren has it alive in a tank at his house. Shortly he hopes to offer it to the Council for their aquarium at Pockpool Park.

DESPITE the lack of good weather, a full Winter crush and low gas, completed the conveyer on the occasion of the Independent A.S. annual outing recently to R. J. Whitwell's tropical fish establishment at West Fargate, Nr. Colchester. The Independents had as their guests on the outing, two well-known members of the Borough Council, Councillors G. A. Barnard and Mrs. Barnard, and Mr. G. Dwyer, the Bertrams Entertainment Manager. Councillor Barnard was recently elected as chairman of the Integration Civic Arts Council.

All the members of the society, their guests and friends, enjoyed the day out and came back with some fine specimens of tropical fish for their collections. The Independent entered a very warm welcome to new members at the meeting venue on Mondays at 8 p.m., Room 12, Islington Men's Evening Institute, Morning School, Upper Hornsey Road, Holloway, N.T.

MR. WILLIAMS won first place with a rare glass catfish worth 80 points in the table show for "any other variety" held at a social meeting of the **Beaconsfield and District A.S.** Second was Mr. Pratt's blue acan (80 points) and Mr. Woodward and Mr. Willis tied with 60 points, both with bronze catfish. Judges were Mr. Suddard and Mr. Chisver.

Mr. Arnold from the East London Society gave an interesting talk on the successful breeding of worms for feeding all types of fish.

THE number of visitors to the Aquarists was 37,171 compared with 1956's 27,362. Larger numbers than in 1956 attended the Regent's Park two occasions of entering societies for Fellows and their friends. The practice of evening openings will be continued this year.

RECENT events in the programme of the **Breadford and District A.S.** have been two table shows for freshwater and carp and minnow, also a talk by Mr. H. Foden and some fish. On the 12th June the open table show will be held and there is a table show with Slippers on the 18th June.

AT a recent meeting of the **Goole and District A.S.** the club was entertained by a highly interesting lecture on diploids, given by Mr. Manning of Thorne Museum. The titles of the table shows held were as follows: 1. Live herons—1. Mr. R. Lockwood (Pair of green herons); A.D.V.—1. Saunders Bros. (*Pelecanus erythrorhynchos*); 2. Mr. F. Darby (*Nannacara anomala*); 3. Saunders Bros. (renewal).

SEA life, ranging from seaweed to fish and crabs, can be found in their hundreds in the heart of Cumberland's famous Windscale Atomic Energy Station. They are in the aquarium. A Windscale spokesman explained that the atomic aquarium is in two of the station's fuel water tanks. Nearly every form of British sea life is kept including seaweed, crabs and fish, and recently the Atomic Energy Authority made a request to the Cumberland River Board for 4,000 salmon eggs.

The spokesman added that the idea was to see what the intake of radio-activity was with different specimens of sea-life. This gives to

valuable information to scientists on hydrogen bomb fall-out. The sea life is put into radio-active tanks and afterwards the fish are killed to see what the intake of radio-activity has been.

The spokesman said that Windscale said that the 4,000 salmon eggs were to help a new side of research—the effect of radio-activity on fresh water life. "These experiments and research gives an immediate background to radio-activity," he said.

AT the last meeting of the **East London Aquarists' and Pondkeepers' Association**, Mr. E. Goss of 8, Wallington Road, Seven Kings, Essex, was elected joint secretary, and all communications to future should be sent to him at this address. Schedules are now available for the club's Open Show on 9th, 9th and 10th September at the Central Hall, East Essex, and are obtainable from the show secretary, Mr. J. Brydon, 22, Kingsway Road, Harlow, Essex.

#### AQUARIST CALENDAR

**19th-11th June:** Colford A.S. second annual open show at the Catholic Secondary School for Boys, Bevernall Road, Colford, London. Show schedules can be obtained from the show secretary, Mr. S. Corrick, 34, Howard Road, Brentford, Kent.

**19th-11th June:** Slough Aquarists Society. Annual open show at the Slough Community Centre, Furzeham Road, Slough. Schedules can be obtained from Mr. E. C. B. Knight, Jamaica House, Hatch Bridge, Windsor.

**24th June:** British Herpetological Society meeting (Snakes); 7 p.m. at the Linnet Society Rooms, Burlington House, Piccadilly, London, W.1.

**21st-25th June:** Southampton and District A.S. annual open show at The Avenue Hall, The Avenue, Southampton. Information from the show secretary, Mr. D. E. King, 55, Magdalen Road, Bitterne, Southampton.

**1st-2nd July:** Three Counties Show. Annual open show at Reading. Show schedules from the show secretary, Mr. G. Thompson, 11, Royal Avenue, Calcutt, near Reading, Berks.

**9th-10th July:** Dagenham Town Show (Aquaria Section). Schedules and particulars from Mr. W. Carter, 6, Chessel Close, Hornchurch, Essex.

**10th-10th July:** Mersydale A.S. Open aquatic show at the Liverpool show, Waverley. Details and schedules from Mr. W. T. Kelly, 11, Salsbery Street, Liverpool, 17, or Liverpool show secretary, 49X, Victoria Street, Liverpool, 1.

**15th-18th July:** Bedford and District A.S. open show to be held in conjunction with the Bedfordshire Agricultural Show. Show schedules can be obtained from the show secretary, Mr. R. Pope, 31, Aylesbury Road, Bedford.

**22nd July:** Goldfish Society of Great Britain meeting, 2.30 p.m. at the Kingsway Hall, London, W.C.2.

**1st-6th August:** Portsmouth A.S. eighth annual open show at the Treford Theatre, Portsmouth Community Centre, Treford Avenue, Stanbury, Portsmouth. Show schedules can be obtained from the show secretary, Mr. W. Hyder, 493, Commercial Road, Portsmouth, Hants.

**24th-27th August:** The Midland open show, Triangle Hotel, Birmingham. Schedules available from Mr. J. Edwards, 6, Army Terrace, Oley Street, Birmingham, 16. Entries close 9th August.

**9th-10th September:** East London Aquarists' and Pondkeepers' Association annual open show at the Central Hall, Barking Road, East Ham, London, E.8. Details can be obtained from the secretary, Mr. F. Saunders, 31, Clarendon Road, Forest Gate, London, E.7.

**20th-24th September:** Leeds and District Annual Open Show at Trinity Hall, Boat Lane, Leeds.

**24th September:** Kingston open show. **22nd-23rd October:** British Aquarist Festival, Belle Vue Zoological Gardens, Manchester. Schedules from Mr. Geo. W. Cook, Spring Green, Fieldhill, Bailey, Yorks.

#### Crossword Solution

MOSQUITO FISH  
O W E T O A E E  
U L C E R A G N A T E  
T R I N D T A I L  
H O R A C E R A P I  
B E U E N I D N  
R I V U L U S L I N G  
E L I A T A S E  
E L V E R U R O P O D  
D A V I T A L U U  
E L E A R E S T E D  
R S R S Y S T E M S

#### DO YOU KNOW THE NAMES? (Solution)

From above downwards the names of the men are: Brazner, Roosevelt, Ramirez, Thayer, Buckner, Moffat and Spornitz. Then the club vertical columns read: Everett.

AN inter-club show between Chelsea Aquarists and Streatham Aquarists was won by the latter Society with 871 pts. to 827 pts. The placings were as follows: 1. Mr. Springer, Streatham, (Cardinal Tetra); 2. Mr. Betts, Streatham, (Parrotfish); 3. Mr. Foster, Chelsea, (Cherry Barb).

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E.C.D. Wednesday. WR. C.T.P.A.A. R. & A.  
**Tachbrook Tropicals**  
244, Vauxhall Bridge Road, Victoria, S.W.1  
Telephone: Victoria 5179  
(Open all week except Sundays).  
WR. C.T.P.A.A. R. & A.

**LONDON (West)**  
**Owen Reid's Aquarium Dept.**  
12, Spring Bridge Road, Ealing Broadway, W.5  
Telephone: Ealing 3299  
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**NORTHAMPTONSHIRE**  
**The Pet Shop**  
120, Kettering Road,  
Northampton  
Telephone: Northampton 841  
E.C.D. Thursday. R.C.T.P.A.A.

**NOTTINGHAM**  
**Taylor, H.**  
201, Denman Street,  
Radford, Nottingham  
E.C.D. Thursday. R. T.P.A.A.

**OXFORDSHIRE**  
**Headington Pets Supplies**  
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Headington, Oxford  
Telephone: Oxford 61706 and 58673  
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**STAFFORDSHIRE**  
**Walsall & Wolverhampton Aquatics**  
47, Oxford Street, Bilston  
46, Stafford Street, Walsall and  
147, Horsley Fields, Wolverhampton  
Telephone: Bilston 42604, Walsall 21785 and  
Wolverhampton 24147  
E.C.D. Thursday. R. C.T.P.A.A. R. & A.

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**Thameside Tropicals and The Pet Shop**  
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Walton-on-Thames  
Telephone: Walton 24076 WR. C.T.P.A.A. R. & A.

**SUSSEX**  
**The Hastings Pet Shop**  
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Hastings  
Telephone: Hastings 4418 R. C.T.P.A.A. R. & A.  
**Preston Aquarium**  
44, Beaconfield Road, Brighton  
Telephone: Brighton 29620  
(Open all week). R. C.T.P.A.A.

**WARWICKSHIRE**  
**The Coventry Aquarist (Prop. W. Dymond)**  
43, Melbourne Road, Earldon, Coventry  
Telephone: Coventry 72772  
E.C.D. Thursday. R. C.T.P.A.A.  
**Funday Aquaria**  
Funday House, 129, Stratford Road, Sparkbrook,  
Birmingham  
Telephone: Victoria 3537  
E.C.D. Wednesday. WR. C.T.P.A.A. R. & A.

**WORCESTERSHIRE**  
**The City Aquaria, Bird and Pet Supplies**  
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34, Friar Street (opposite Union Street), Worcester  
Telephone: Worcester 2005  
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**YORKSHIRE**  
**The Corner Shop (Prop. J. Wilde)**  
526, Abbeydale Road, Sheffield, 7  
Telephone: Sheffield 54172  
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**SCOTLAND**  
**Aquarists' Rendezvous**  
164, Albert Drive, Pollokshields, Glasgow, S.1  
Telephone: South 4255  
E.C.D. All day Thursday. WR. C.T.P.A.A.  
**Forbes, James L.**  
176, Blackness Road, Dundee, Co. Angus  
Telephone: Dundee 68398  
E.C.D. Wednesday. R. C.T.P.A.A.

**NORTHERN IRELAND**  
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PREPAID ADVERTISEMENTS—Continued from page 6

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(Continued on preceding page)

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All above are good stock and fully quarantined at Shirley.

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30 plants in variety 10/-  
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