



The
AQUARIST

THE
ORIGINAL
MONTHLY MAGAZINE
DEVOTED TO AQUARIUM
FISH AND REPTILE
KEEPING

Volume XV Number 9
December 1950

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John G. Shedd Aquarium

Several species of hatchet fishes have arrived with recent imports. *Gasteropelecus levis* is pictured here, and recent name revisions in this family are described in this month's special feature.

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1950

Editorial

At first sight aquarium-keeping would seem incapable of providing opportunities for its devotees to make themselves nuisances to their fellow-countrymen, still less to make it possible for them to become law-breakers by the pursuance of their aquatic interests. Without giving thought to the matter many would believe the aquarist, quietly busying himself with his collection of aquaria, to be the quintessence of spare-time activity harmlessly and enjoyably engaged. Few spheres of human effort in modern society do not call for some sense of responsibility and thought for the possible consequences of apparently harmless actions, however, and the aquarist must be mindful of some potential troubles that aquarium-keeping can originate.

In tanks and ponds aquarists often have charge of living specimens that are foreign to the waters of this country. They should never be tempted to use rivers, canals, streams or natural ponds as dumping places for any unwanted stocks. The results of introducing alien species to the established flora and fauna of any region are unpredictable; this has been proved time and again in ecological experiments made in countries all over the world. What may seem a beneficial introduction of a new species has often proved a curse, and no less than deliberate attempts to establish an alien (without facilities for its control should it be necessary) are introductions made by carelessness to be deprecated.

Just over a hundred years ago the Canadian pond plant *Elodea* was loosed here and by its lusty growth did incalculable harm to our canal systems and inland waterways. Last month aquarium-keepers were blamed in a leading article in *The Times* for the appearance of a species of *Lagarosiphon* in a Middlesex river. This foreigner has already choked the water and crowded out other plants, and in view of the close relationship of the genus to *Elodea* legitimate anxieties about its future spread have arisen. But thoughtless disposal of aquatic plants is not the only matter meriting the aquarist's attention.

There are still rivers unspoilt by industrial pollution in these islands in which tragic results could accrue were diseased and unhealthy fishes imported from abroad to be

released in them. Introduction of foreign fish parasites and bacterial diseases by such action is an offence against our fisheries regulations, and legal consequences should act as a deterrent to the thoughtless even if biological considerations cannot dissuade them. A real responsibility rests here with all aquarists: to see that no careless action of our own brings about any trouble and jeopardises our interests and the delights of our natural waters, and to see that similar awareness of the risks involved is aroused in the minds of others in our ranks.

* * *

No one who has ever spent any period in a hospital bed needs reminding of the boredom which develops during the recovery period, and physicians are agreed that lack of interest in the patient's surroundings can undo a great deal of the good brought about by skilled treatment and nursing. With very young patients their natural ineptitude to remain engrossed with any one interest for long makes the problem of providing a sufficient number of suitable diversions especially difficult. All children love animals, however, and although pets cannot be tolerated in a hospital ward, it must be a source of pride to aquarists that aquaria are suitable for this purpose, a tank of fishes then becoming, by virtue of the attention it provokes, an instrument of real therapeutic value. This is being increasingly realised by those in charge of hospitals and convalescent homes all over the country, and

many requests for information and help have been addressed to this magazine.

Aquarium societies have provided, installed and maintained tanks in quite a few hospitals now, with very gratifying results. The need for more work of this sort is still great though, and it seems a great pity that eagerness to carry out the practical details has often in the past been hampered by lack of money for the initial outlay on equipment. Members of the public would be willing to donate a small sum towards this, it is thought, only the lack of a liaison between them and the societies preventing this.

Accordingly, *The Aquarist* is to institute a Hospital Aquarium Fund. Public donations are to be sought, the Fund to be administered by a committee now being formed. Money will be used to provide complete outfits for installation in hospitals all over Britain, economy in outlay being possible by such central administration. Practical help from aquarium societies in the vicinity of hospitals is essential to the scheme; secretaries willing to participate are asked to write to the Editor as soon as possible.

Next month, details for sending donations will be announced and all readers are requested to invite their friends to join in so that the Fund can be got going with minimum delay. Remember, our hobby benefits from all advancements of its interests, and the value of this particular humanitarian application can be readily appreciated.

British Aquarists' Festival

A major attraction of a year of special events



2nd—5th May, 1951

at BELLE VUE, MANCHESTER

Entry to the competitive classes for prizes and awards is open to all aquarists in Great Britain at the B.A.F., to be sponsored by "The Aquarist," and next month's issue will contain full details for society secretaries and others concerning entries and the attractions of this unique occasion in the history of British aquarium-keeping.

Fishes of the Hatchet Family

by ————— A. FRASER-BRUNNER

Now that the little "freshwater flying-fishes," or hatchet fishes, are once more making their appearance on the market, aquarists may like to know something about them and the way the different kinds may be distinguished. There are not many species, and they form a small family which is fairly closely related to the great family Characidae to which so many aquarium species belong; in some books, such as Innes' *Exotic Aquarium* they are actually included in the larger family for convenience.

Their most remarkable feature is the great expansion of the lower shoulder bones to form a large keeled lobe like a hatchet-blade along the lower surface of the thorax. This lobe is to support the very strong muscles (representing a portion of the weight of the fish) which operate the long pectoral fins, and the arrangement is therefore closely similar to that of birds. It is, however, very doubtful indeed whether these fishes fly like birds, but they certainly come closer to it than any other fish. The pectoral fins are held stiff by a very thick upper ray, and can be flapped up and down (the down-stroke being by far the most powerful) very rapidly.

When the fish leaps up from the water it is thus able to rise to the surface rapidly with its "wings" and skitter along with the keel cleaving the water like the prow of a boat (Fig. 1). On looking at the fish it does not need a great knowledge of aerodynamics to see that the likelihood of its becoming airborne is very small; the base of the anal fin, marked by a black line, will be level with the water, and the whole caudal fin will be below water. It is interesting to note that the lateral line is bent abruptly downwards and crosses the body to the anal fin, so that the end of it

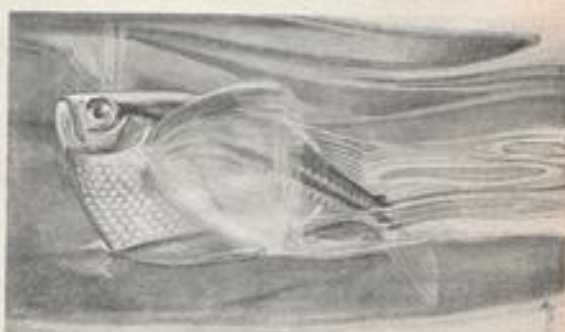


Fig. 1. Surface "skittering" of the hatchet fish

will be in contact with the water during skittering, presumably serving some function such as balance.

If the fish is airborne it is likely to be due to a leap by means of a stroke of the tail, the impetus gained during skittering carrying the body forward, the pectorals possibly supplying further lift; but such a flight would be very short-lived. This habit of rising above the surface no doubt aids the fish considerably in catching insects (for which purpose some species have large hook-like teeth on the maxillary bones of the mouth) and may also help it to elude enemies.

The fish leaves the water primarily by a strong leap, the skittering being only a means of prolonging its stay above the surface. Needless to say, care has to be taken to see that a cover is kept on the aquarium when dealing with fishes of such considerable jumping powers. They have been known to jump from one tank into the next, then into the next and so on along a series of six tanks.

Treating New Specimens

Hatchet fishes are reputed to be delicate, but they are certainly not more so than many popular characins. The reason for this belief seems to lie in the fact that they will not take dried food except when extremely hungry and then only if at ease in their surroundings. Consequently they take no food during their transit to this country, nor when first removed, frightened, from their dark containers. Moreover, most dealers place them among other species, where they are shy to take even live food. Consequently they are very weak and the first few days after arrival may see many deaths.

The proper treatment is to give them a tank to themselves, treating for white-spot (which they often develop on arrival) and feed them with small *Daphnia* and finely cut *Tubifex*.

For the ordinary aquarium the small forms (*Carnegiella*) are the most suitable, as they are less active and at home among plants. The larger species require a big tank (36 inches or more) with plenty of clear space in which they can swim. All are sociable creatures, being found in the wild state in little shoals, often in company with small characins.

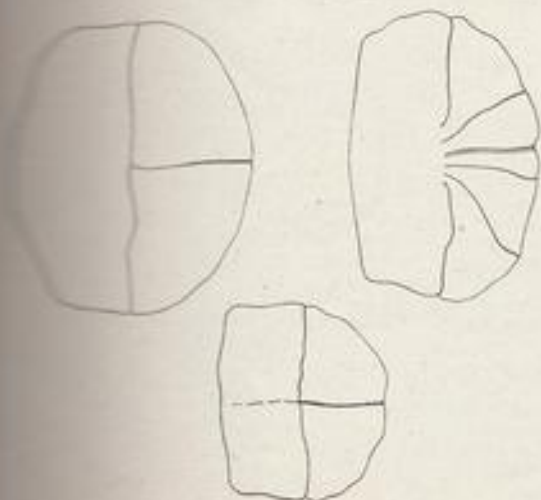


Fig. 2. Types of scales from *Gasteropelecus*, much enlarged; the scales of *Carnegiella* are similar in essential details

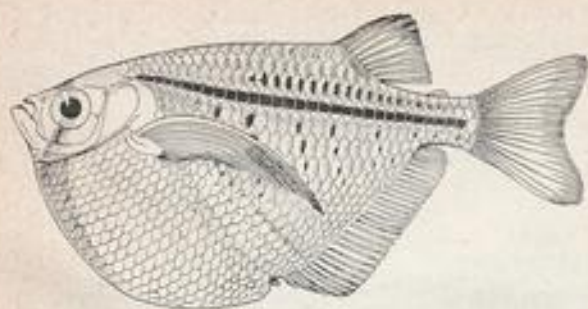


Fig. 3. *Gasteropelecus maculatus* ($\times 1\frac{1}{2}$)

The family is confined to South and Central America, and includes several species which have been somewhat confused in the past. There has also been some confusion as to the grouping of these species, owing to the fact that, except for *Carnegiella*, the genera had not been properly defined until the present writer studied them recently. It is now clear, however, that there are only three genera.

The first is *Gasteropelecus*, in which we must at present recognise four species, though we may eventually find that there are only two. These have comparatively small scales, numbering 26 to 35 along the side of the body, with very few grooves radiating from the centre as in Fig. 2. There are 10 or 11 dorsal fin rays and 22 to 36 anal fin rays. The upper jaw has only one row of teeth, or a second row is represented by one tooth only. An adipose fin is present.

Gasteropelecus sternicla was the first species ever described, by Linnaeus in 1758, and comes from British Guiana. It is bright silvery, with olive-green back, and along the side there is a black stripe bordered above and below with pale stripes of nearly the same width. There are three or four strong teeth on each maxillary bone.

Closely related to this are *G. coronatus* Allen, from the western Amazon in Peru, and *G. levis* (Eigenmann) (pictured on page 165) which is common in the eastern part of the Amazon system. These differ from the preceding only by their teeth, *G. coronatus* having only one tooth on each maxillary, *G. levis* having none at all. In the aquarium

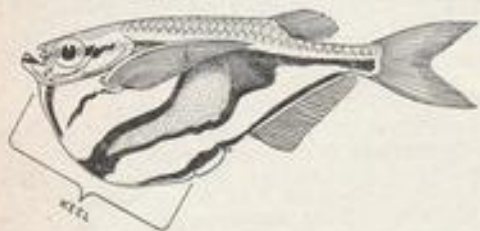


Fig. 4. (Above) *Carnegiella strigata vesca* ($\times 2$) from the Mazaruni River, British Guiana. (Below) *Carnegiella strigata* ($\times 3$) from Manaus, Brazil

they look exactly like *G. sternicla*, and I believe we shall one day find that they are only sub-species or local races of the same species.

Quite different, however, is *Gasteropelecus maculatus* Steindachner, an attractively spotted fish which we have not yet seen in the aquarium. It inhabits the waters flowing down the Pacific side of the Andes in Panama and Colombia (Fig. 3).

The Genus *Carnegiella*

The only difference that can be clearly stated between the genus *Carnegiella* and the foregoing is the absence of an adipose fin, but members usually have a different look about them. They are smaller, more delicately built, and have a more distinctive colour-pattern. This at least could be said until very recently, but now there has been found a fish which is like *Gasteropelecus sternicla* in all respects except that it lacks an adipose fin, which raises doubts as to the importance of this feature in distinguishing genera; this new fish is *Carnegiella myersi* Fernandez-Yepes, from the Peruvian Amazon, and so far is known only from the original description.

Much better known is the pretty *C. strigata* (Günther), recognised at once by the oblique stripes which traverse the

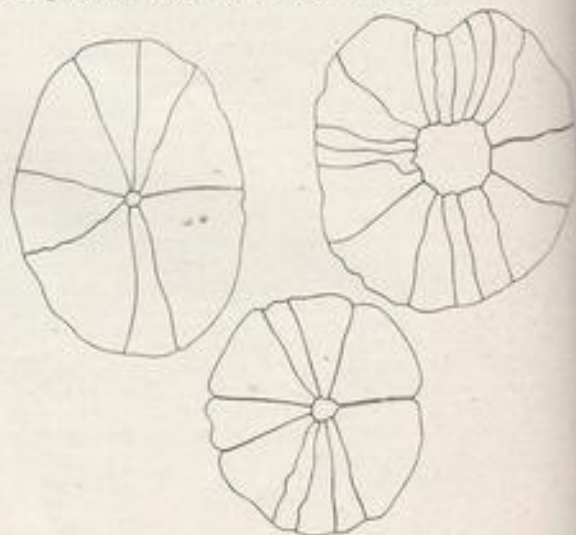


Fig. 5. Scale types from *Thoracocharax*, much enlarged to show the arrangement of grooves (see page 170)

body. There are two forms, shown in Fig. 4, which are regarded as local sub-species. The one from British Guiana, which I have called sub-species *vesca*, has the second oblique dark band double for most of its length, and reaching the ventral edge near the middle of the keel; also the dark band along the base of the anal fin reaches well forward along the keel.

The sub-species from the Amazon, on the other hand has the second oblique band single for at least its lower half meeting the ventral edge well behind the middle of the keel while the dark band along base of the anal fin hardly extends to the keel at all. These differences can be seen also in the accompanying photographs of living specimens. Both sub-species have been seen in our aquaria in the past, and specimens of *C. strigata vesca* have recently been imported again; not long ago I had the pleasure of seeing some in the aquarium at Belle Vue, Manchester.

The second species, *Carnegiella marthoe* Myers, has not yet been seen in the aquarium.

(Continued on page 170)

Hatchets of the Genus *Carnegiella*

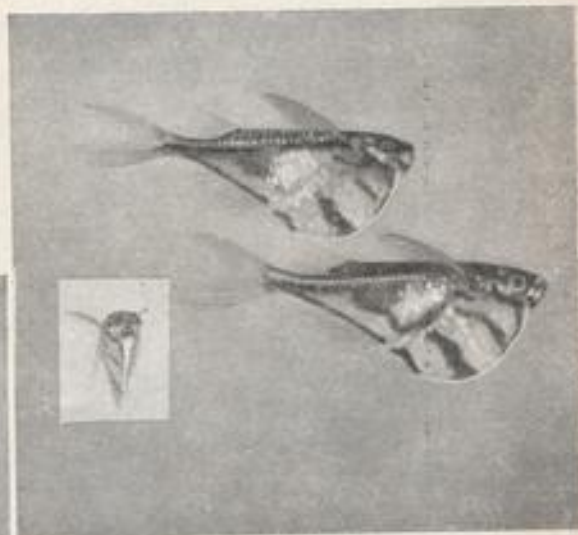
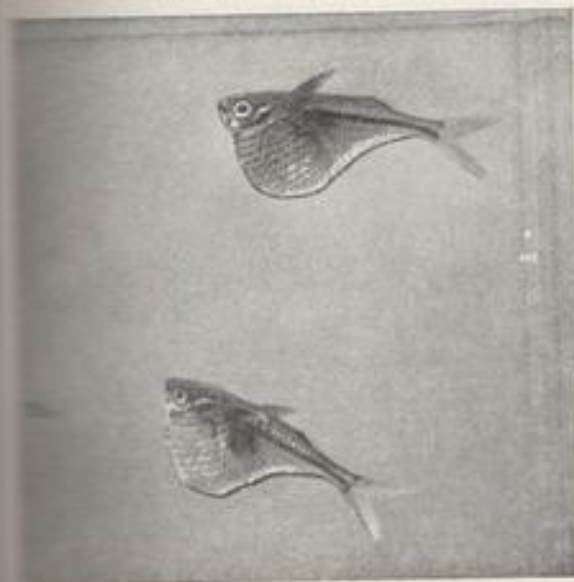
WITH the generous cooperation of Mr. Wm. T. Innes we are able to illustrate, by means of photographs of the living fishes, differences between the three well-known forms of the *Carnegiella* genus of hatchet fishes.

Upper right is a pair of *C. strigata*, sub-species *vesca*, from British Guiana, in which the two middle stripes are thin and separate until they join at the middle of the abdominal keel, and the black stripe along the base of the anal fin extends well forward on the edge of the keel. These fishes can be compared directly with the typical sub-species, *C. strigata strigata* from Brazil (lower right). Note how the two middle oblique stripes in this form become



Photo: Wm. T. Innes

Valerie Lilley



united as a single broad stripe, joining the keel farther back, and the anal stripe does not extend forward on the keel. The inset to the illustration of this species shows a head-on view of the fish.

Shown on the left of this page is another species of the genus: *C. marthae* from the Orinoco. This also has a sub-species in the Amazon, (*C. marthae schereri*) apparently differing only in the more numerous rays in the anal fin.

(Photos: W. T. Innes)

reached this country to my knowledge; some specimens sent to me under this name some years ago turned out to be *C. strigata*. The well-known photograph by Mr. Innes, which he has let me reproduce, shows its main colour-pattern, a continuous black line along the lower margin of the body, no oblique bands, and a few rows of black spots on each side of the breast. This species, which seems rather scarce, has been taken in the Peruvian Amazon, the Rio Negro and the Orinoco system.

These little fishes are said to be found in shady forest streams rather than in the open waters favoured by *Gasteropelecus*, and it is perhaps for this reason that they adapt themselves more readily to the aquarium.

The Genus *Thoracocharax*

There remain to be mentioned two other species which I have not seen alive, although they have been pictured by the German aquarists Arnold and Ahl (who unfortunately transposed the names). Except for the depth of the body and the length of the pectoral fins these species are so alike that they may easily be misidentified.

They constitute the genus *Thoracocharax*, which is very sharply distinguished from those which have gone before, firstly by the remarkable scales, which are very large, numbering only 19 to 22 along the side of the body, and have numerous grooves radiating from a circular groove in the middle, as shown in Fig. 5. There are 14 to 16 dorsal rays and 39 to 44 anal rays, and an adipose fin is present. There are two rows of teeth in the upper jaw, the front row consisting of three teeth on each side.

The commonest species is *T. stellatus* (Kner) which is found throughout the upper Amazon system, and southward in the La Plata system as far as Santa Fe in Argentina. The colour is silvery, olive on the back, sometimes with a brighter silvery stripe along the side; there is always a dark mark at the front of the dorsal fin.

The other species, *T. securis* (Filippi) is recognised by its deeper body and longer pectoral fin, as shown in the illustration (Fig. 6); there is no dark mark on the dorsal. It



Fig. 6. (Above) *Thoracocharax stellatus* from the Rio Jurua. (Below) *Thoracocharax securis* from the same locality. (Both about natural size)

is known from Amazonia, where it is sometimes caught together with *T. stellatus*.

So far as I am aware, no one has yet bred any species of hatchet fish, but there seems no reason why it should not be done with a little care and patience. Here is a chance for someone to be a pioneer.

Luxurious Fish Room



Photos:

"Canada Wide"



The professional and elegant appearance given to a fish room by panelling the tanks is shown in the picture of a Canadian reader's collection on the left, contrasting with the practical arrangement of equipment "behind the scenes" pictured above

Why Not Grow the Sacred Lotus?

asks—W. E. SHEWELL-COOPER

THERE is always something very mysterious and beautiful about the whole idea of lotus blossoms—probably because it is so often sung about in the more sentimental type of ballad. The beautiful Indian maid is said to be like a lotus flower—or her eyes are lotus like, or even her hair is fragrant like the scent of lotus. Curiously enough, if you study Indian poetry you will discover that almost every part of the body has been compared at some time to the lotus plant. The lotus can be said to be the flower of the Indian Empire as it once was, and this sacred blossom has been used again and again by so-called "doctors" to form a love potion which could ensure the reciprocal affection of a beautiful maid.

It is difficult to come down to earth after such thoughts but in reality the lotus is largely grown in the East as a food. Undoubtedly when the Bible says "Cast thy bread upon the waters, for thou shalt find it after many days"—it is referring to the lotus. The Egyptian put the seed into a moulded ball of clay about the size of a tennis ball and then threw this into the water and the plant grew. Flour came from the centre of the bloom or "seed pod" which was dried and ground into powder—the roots were eaten also. Both are composed, in fact, of a flour-like substance.

Nelumbo Growing

If you would like to grow a sacred lotus in your garden, or at any rate a very near relative to it, you must consider the *Nelumbo*. One of the troubles is that the bigger kinds send out very long roots which, it is claimed abroad, may easily spread thirty feet in a season. The pool grower therefore will try to confine the roots into some receptacle sunk into the water and will provide at the same time, say, the John Innes Potting Compost No. 3. Another trouble about *Nelumbo* is that they are easily damaged by frost and the tropical summers we get in Great Britain do not seem sunny enough or warm enough to ripen the tubers properly. Therefore, you may have a plant one season and lose it in the winter. The advantage of the tub system, however, is that you can get the plant up and get it into the greenhouse or somewhere that is frost-proof during the winter.

Keen gardeners will think of all kinds of ways of coping with the demands of the lotus, which wants to grow in quite rich soil—think of the silt of the Nile—and which likes to be planted firmly, for the seed which is thrown in by the Oriental fairly well anchors itself firmly in the soil by those long roots. Some of the plants are, of course, not natives of the Nile at all but come to us from as far away as North Australia or Japan or even the Philippine Islands. There will be some readers who are lucky enough to have pools in the greenhouse and they, of course, will have no problems of bad winters to cope with. It is a pity that the lotus cannot be grown more easily over here because it is obvious from fossil remains that it used to be quite a normal plant in early ages, almost all over Europe, but after the climate changed it became lost to the bulk of the Western Hemisphere.

My American friends tell me how in Minnesota one of the most popular lotuses is *Nelumbo lutea*. This bears flowers which are often ten inches in diameter and are the most lovely shade of pale yellow. It usually takes about five or six years before it flowers properly, but the leaves make

quite a show before then, standing about thirty inches above the water, often being eighteen inches across. It is evidently quite an easy variety to cultivate but does insist on plenty of heat for tuber ripening in the winter.

The Hindu lotus is the *Nelumbo mucifera*. The blooms are a lovely rose colour and they gradually get paler as the flowers age. They may easily be a foot across. The leaves themselves are most attractive because they are deep green in colour and have a kind of metallic sheen to them; they can easily be seen because they are always well out of the water. There's a Japanese kind which collectors like to include if they can, *Nelumbo mucifera alba pekena*—this, as its name suggests, bears double flowers which are of a beautiful creamy white colour to start with and then the creaminess gradually pales until on the third or fourth day the petals are snowy white. There's the most lovely scent about them and once you can get this variety happy it goes on living throughout the summer months.

I must not end without mentioning the baby variety *N. pygmaea alba*. This produces flowers about five inches across, pure white and usually scented with leaves only five inches across also and borne about 1 foot 6 inches above the general level of the water. There's a double form of this variety and there's one which produces beautiful pink coloured blooms with the apt name "Dawn." These are the kinds that are usually grown in tubs and which may therefore prove just what readers need.

Waterproof Labels

NOT infrequently the aquarist requires to place in experimental or exhibition tanks labels to remind him of some special treatment the tank has received or to give information about the identity of plants etc. for non-aquarist viewers or beginners. Labels placed on the outside are not always satisfactory from this point of view, unless they bear illustrations of the subjects they name, and paper labels in such a position are liable to be very short-lived when exposed to the splashes and scrapings of aquarium maintenance. Labels within a tank can be placed in close relationship to the objects, and specimens other than animals, named. The problem is to find a material that is waterproof, non-toxic to fishes and not too unsightly in the aquarium, on which the data may be written indelibly without any great trouble.

Very useful for this purpose have been found the Hartley etched and anodised plant labels sold for use by gardeners. These grey metal labels and tags, made in various shapes and sizes, do not affect the water in an aquarium and their specially prepared surfaces readily allow pencil or indelible ink notes to be made on them without fear of losing decipherability under water. Several months testing has shown that only growth of algae causes the writing to be lost. Another use for the labels is in identification of fish specimens preserved in spirits—including the label in the preservative together with the specimen solves the problem of the jar from which an external label has disappeared. The makers are V. & N. Hartley Ltd., Greenfield, Nr. Oldham, Lancs.



Metallic (left) nacreous (centre) and matt (right) goldfishes. The metallic specimen's scales appear like burnished metal, some parts of the nacreous fish show a dull mother-of-pearl appearance, while the matt fish lacks such characters and is orange over most of the surface with a pale pink region behind the vent. It also shows a few black markings

IN 1938 I became interested in the inheritance of calico fishes and before the war put a temporary stop to my efforts, I was convinced that British goldfishes were not exactly fitting the groups described by scientists whose work was reviewed in my article in *The Aquarist* last month. In 1945, I was able to resume work and finally in 1947, completed "The calico group of the goldfish, *Carassius auratus* L., with an analysis of the pigmentation found in these fishes." During that period, I was lucky enough to buy and breed a great variety of fishes. Part of the range of fishes found in the second of the three groups (the mottled or mosaic transparent) is shown by the following examples:

1. The whole fish is pale pink with the exception of two small streaks on the dorsal fin and two extremely small orange spots at the base of the caudal fin. Three scales appear metallic. From Chen's description, this specimen would appear to belong to Group 3 but a test cross proved it to belong to Group 2.
2. The fish is mottled in colour. None of the scales appear metallic while the opercula and eyes lack reflecting tissue (i.e., they are not shiny). According



For experiments comparing rates of growth etc. from two or more spawnings and controlled breeding carefully standardised conditions are necessary, provided by uniform tanks and ponds such as those of the author illustrated above and on the opposite page

The Three Gr

(A continuation of the

by

to Matsui, this fish should belong to Group 3 but a test cross showed it to belong to Group 2.

3. The fish is self-orange in colour and might at first be mistaken for a common goldfish. Most of the scales, however, appear transparent. A test cross showed this to belong to Group 2 although it does not fit Chen's definition.
4. The fish is self-yellow in colour but most of the scales appear transparent. A test cross showed it to belong to Group 2 but it does not fit either Chen's or Matsui's description.
5. The fish is blue in colour with black markings. In the second part of the work it was discovered that the colour blue is produced by black pigment situated deep down in the body. This fish, therefore, only contained one pigment, viz., black, but most of the scales appeared transparent. A test cross showed that this specimen belonged to Group 2 although it does not fit either Chen's or Matsui's description.

Other specimens examined possessed two or more colour pigments and a few or no scales with metallic appearance. From these observations it is clear that British fishes in Group 2 exhibit a greater range of variation than that recorded in either China, Japan or both countries.

Light Reflecting Layer

The reason why some scales appear metallic is because under them there is a layer of reflective tissue which acts in the same way as the "silver" of a mirror. When the scales appear transparent, this reflective layer is absent. In all cases, therefore, the scales are transparent and the difference in their appearance is due solely to this reflective tissue layer. Besides the reflecting tissue just under the scales, it may be found in a layer much deeper down, when it gives the fish a dull, mother-of-pearl-like shine. This is characteristic of Group 2. The reflecting tissue may also be found in other places still deeper down in the body.

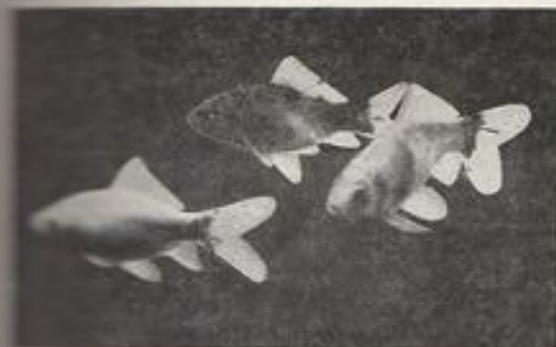
When a scaled fish is dissected and the scales with their reflective backing removed, the layer of tissue responsible for the mother-of-pearl appearance in the calico fishes will be found to cover the whole area. It cannot be seen in the live scaled fish, of course, because it is masked by the outer layer of reflecting tissue. In calico fishes, the mother-of-pearl shine can be seen in patches and sometimes occurs all over the fish. In a heavily pigmented specimen it may not be very noticeable but it is there, and can be seen if the fish is examined carefully.

Transparent fishes normally lack reflecting tissue in both the layers described although occasionally there may be an isolated scale or two with a metallic appearance and very small areas showing the mother-of-pearl shine. The latter characters are the exceptional ones. Most aquarists with a little practice will have no difficulty in recognising these fishes, although when having much pigment they are not transparent. How may one distinguish between Groups 2 and 3 with certainty, if neither colour nor scales may be used as guides? The essential difference is in the amount of reflecting tissue.

s of Goldfishes

(continued from last month's issue)

HENRY AFFLECK, M.Sc.



Some of the author's original coloured matt goldfishes. The left fish is mainly orange with a few black markings in the tail region; the middle fish is heavily pigmented and appears blue, black, and brownish brown. At the right is a powder blue fish with orange marking behind the head.

Having demonstrated the above facts to the Goldfish Society of Great Britain, the members of the committee unanimously supported by the other members of the society, have, after two years' deliberation and tests, recognised three groups of goldfishes. In an attempt to clarify the distinction between the groups so that all aquarists, and particularly newcomers to the hobby, will not be misled by inappropriate names, the G.S.G.B. has adopted the following for the groups:—

Group 1.—METALLIC. Fishes in this group have the appearance of polished or burnished metal.

Group 2.—NACREOUS. Fishes in this group have a mother-of-pearl-like (nacreous) shine. They may or may not possess scales with a metallic appearance and they may, or may not, possess areas without any shine.

Group 3.—MATT. Fishes in this group generally have a matt (matt) appearance, although small isolated areas may appear metallic or nacreous.

In 1948, I noticed some well-coloured matt fishes in a spawning. As these specimens came from a late batch of spawn they were only about one inch long by the end of September. Mr. Katterns fortunately came to my aid and offered to keep them in his heated fish house over the winter. I was extremely gratified to find that by the following May, their colours had improved considerably, and some of them had colour ranges as great as that found in common fishes and that some were almost as intense as those found in a good shubunkin. These coloured matt specimens have been used this year as parents.

As the G.S.G.B. has recognised that there are three groups that may be crossed, it follows automatically that a fish with the shape of a shubunkin, for example, should be



recognised as metallic, nacreous or matt. The committee of the G.S.G.B. has decided that all specimens should be as colourful as possible, so that it is useless exhibiting metallic fishes that have only one colour (self-orange), or matt fishes that are colourless (pale pink), expecting premier awards. Members of the society are, therefore, endeavouring to produce new strains possessing the desired characters. This year I have been concentrating on producing nacreous and matt specimens of the singletail.

The following is a list of all possible matings and the offspring to be expected from them:—

Metallic \times metallic produces 100 per cent. metallic;
Metallic \times nacreous produces 50 per cent. metallic, 50 per cent. nacreous;
Metallic \times matt produces 100 per cent. nacreous;
Nacreous \times nacreous produces 25 per cent. metallic, 50 per cent. nacreous, 25 per cent. matt;
Nacreous \times matt produces 50 per cent. nacreous, 50 per cent. matt;
Matt \times matt produces 100 per cent. matt.

Breeding Potentialities

From the above it will be seen that a nacreous \times matt cross will give the best results for my purpose. At this point it must be stressed that although the above matings will produce so many matt, nacreous or metallic specimens, they will not necessarily be good ones from the exhibition point of view. Before good specimens will be produced strains must be built up by selective breeding and test crossing.

How is it possible to learn something about the potentialities of a fish for breeding if its pedigree is unknown? This is a question that is often asked. The answer is that you must make test crosses and raise the whole of the spawnings. This second point is very important because in animals like goldfishes where so much variation occurs it

is possible to obtain a very inaccurate idea of the kind of young being produced if only a hundred out of over a thousand youngsters are raised.

I possess two female matt fishes which have fairly intense mottled colours, and Mr. Upchurch loaned me an extremely good nacreous male. I only know the pedigree of the matt fishes for one generation back—they arose from two matt specimens with very little colour. My first problem was to know with which female I should begin to build up a strain. The obvious thing to do was to mate each of the females with the same male and see what happened. As a result I now know that one female has produced some well-coloured fishes while the other one has not done so.

Spawning Diary

The female matt that gave the better result had a body length of just under two inches when she spawned, so that I expected approx. 400-550 eggs—the actual numbers were 499 fertile and 14 infertile. Counting eggs is rather a tedious job, but if unplanted tanks are used and the eggs thrown on raffia, the job is much easier than one might imagine. My diary for the spawning reads as follows:—

- 16.5.50. Fishes spawned.
- 17.5.50. 499 fertile, 14 infertile eggs counted and transferred to two other tanks.
- 19.5.50. Eggs hatched.
- 21.5.50. 499 alevins counted into two tanks. All fertile eggs hatched.
- 30.5.50. 484 alevins alive. Loss, 15.
- 11.6.50. 483 alevins alive. Loss, 16. Of the live ones four were killed for detailed examination, and 479 transferred to two ponds (approx. 6 ft. by 3 ft.).
- 18.7.50. Ponds drained and fish counted. In doing this job two were accidentally killed. 474 live fishes counted, which, allowing for the two killed, means that three have died since last count. Fishes are very uniform in size. Body length of smallest approx. 1 inch, largest approx. 1½ inches. The smaller were almost entirely matt fishes and the larger nacreous.
- 22.7.50. Specimens exhibited at G.S.G.B. meeting.
- 23.7.50. 474 live fishes. Losses due to natural causes, 19. Killed, six. Live fishes placed in three ponds (approx. 6 ft. by 3 ft.).
- 28.7.50. Fishes are a little overcrowded and feeding is becoming a real problem. Variation in size becoming apparent.

Achieving Uniformity

The young fishes are still in the ponds and I have not yet made a detailed examination of them, but *not one of them is a metallic*, as was noted by *The Aquarist's* photographer. I do know, however, that the spawning has produced a comparatively large number of coloured matt specimens and that approximately one-quarter of the nacreous ones appear fairly good. It is still a little early to obtain a really accurate idea of the colours in the matt fishes as, at least in my experience, they appear much slower in developing than their metallic or nacreous brothers and sisters. Even some of those that are quite pale at three months (1½ inches long) may be very intense in colour at a year old.

In case readers should wonder how the fishes were kept fairly uniform in size, the method is to feed extremely heavily and to change the water as often as possible—every three days if you can manage it. When they are transferred to a pond, this becomes a difficult matter; as a result, feeding cannot be so heavy (the water will soon become foul if you over-feed) and the "natural bullies" will have more than their share of food and so increase in size more rapidly than their more unfortunate relatives. In a mixed spawning (i.e., including more than one group) the matt fishes always tend to be smaller than the others and will quickly die out if food is scarce.

Harlequin Spawning

recorded by

THE harlequin fish (*Rasbora heteromorpha*), is one of the most beautiful tropical aquarium fishes, but aquarists have had to rely on imported specimens as the fish has proved most difficult to breed. The writer was inspired by Wing-Commander A. H. Marsack's article in *The Aquarist* (August, 1949), entitled "Exploring the Jungle Streams of Malaya," to attempt to breed this fish.

Eight young harlequins had been bought in the spring of 1949 and were about half an inch long at the time of purchase. They were placed in a 48 by 15 by 15 in. aquarium with a miscellaneous assortment of other varieties. As they grew it became possible to sex them by the deeper body of the female and the more golden appearance of the males. This is very apparent and is a sure method of sexing. As luck would have it the eight harlequins turned out to be four true pairs. During the "growing up" period the fish had been fed on a mixed diet, garden worms, *Tubifex*, *Daphnia*, white worms and dried food. They showed a marked preference for white worms.

The first attempts at breeding were made with individual pairs in separate breeding tanks, but no inclination to spawn was observed, although the females were heavy with roe. The pairs were separated and placed in different tanks for a few days.

A 24 by 12 by 12 in. aquarium with bottom heat was then set up with fresh tap water at a depth of six inches; no gravel was used and about six Amazon sword plants with the roots weighted with lead strips completed the set-up. The temperature was adjusted to 82° F. and strong aeration applied for 24 hours. The aeration was then reduced and all the eight harlequins placed in the tank late at night. As soon as the lights were turned on the following morning intense activity was noticed. All the four females were observed periodically to be upside down, rubbing their underparts on the undersides of the sword plants, but no eggs were laid at this point.

The males were "showing off" to one another, swimming side by side with all fins extended and in beautiful colour. After some time the males joined the females under the leaves and the actual spawning took place. Each male wrapped himself around a female in an embrace similar to the Siamese fighting fish and the eggs were deposited on the undersides of the leaves. The eggs are large, as big as angel fish eggs and are crystal clear. It was noticed that although some of the eggs remained attached to the leaves the majority fell to the glass bottom of the tank, and were clearly visible. All the fish took part in the spawning and no individual mating up was noticed.

The spawning continued at intervals all day, being still in full swing at 10 p.m. that evening, when the fish were removed. The bottom of the tank was covered with eggs.

The next morning a considerable number of the eggs had become white but a large proportion remained clear. One was examined under a microscope and found to be fertile. The following morning, however, fungus had developed on the infertile eggs and spread out, covering the fertile ones and presumably killing them. No fry hatched from this spawning. The writer previously had this trouble when spawning *Hyphessobrycon rosaceus* and in this instance the use of boiled tap water was the solution.

Accordingly, cooled boiled tap water was used in the

in Home Aquaria

JOHN ALRED

attempt ten days later. The breeding tank was set up as before but with the addition of a layer of quarter inch pebbles on the bottom, the idea being to try and isolate the eggs from each other. During the ten days' interval the females had filled up with spawn and were introduced together with the males late at night as before. Spawning took place but the result from this effort was two fry only.

About this time other aquarists in the district were complaining of the poor results from spawnings and attributing the cause to local tap water, which appeared to be heavily chlorinated and formed a scum on the surface after a few days in an aquarium. For the next spawning attempt fourteen days later a quantity of water was obtained from a nearby underground spring. This water was crystal clear and had a pH of exactly 7.0; as it flowed through a rusted iron pipe it presumably had a small percentage of iron.

The breeding tank was arranged exactly as in the second attempt. This time, however, it was decided to experiment and the fish were left in the tank for two days, spawning being continued on the second day. They were removed about 5 p.m. on the second day although still spawning. At no time did the adults make any attempt to eat any of the eggs. Three days later numerous fry could be seen hanging on the plants and on the glass panels. Five days after the spawning they were free swimming and were surprisingly large, being slightly bigger than *Barbus tetrazona* fry. They were given newly hatched brine shrimps which they took at once and at a week old, micro worms. At ten days old the familiar black triangle of the harlequin appeared. At the time of writing they are a month old, feeding on chopped lettuce, chopped white worms and fine dry food. They are just over half an inch long and in full adult colour. Their number between fifty and sixty.

A further spawning has resulted in about twenty fry, but it was proposed to give the adult harlequins a rest before



Photo

Harlequin fishes (*Rasbora heteromorpha*)

W. S. Pitt

any further breeding. To sum up, it appears that for breeding (1) the water used is of great importance; (2) harlequins are community spawners; (3) the spawning period continues over two days or more.

The writer hopes that the above notes will encourage other breeders to try and breed this fascinating fish, for the sight of a shoal of them makes all the trouble well worth while.

How and Why?

Can I keep male and female fighting fishes together in the same aquarium?

Separate specimens may be kept together without trouble, but once the males are of breeding size the temperamental relations is unpredictable. Individual males vary in their pugnacity; in cases where constant chivving of the female occurs it is best to place the pair together only when both are in true breeding condition—with the male blowing white foam and the female well coloured and plump with eggs. A thickly planted corner as a retreat for her should be arranged, as the spawning may leave her weak and unable to resist attacks.

Will fighting fish eggs hatch in the absence of the male?

When males lose interest in a nest of eggs or for any reason become removed from the tank very few of the eggs hatch, as they suffer from the lack of attention given by the constant reaching and bubble-blowing of the good parent.

The numbers hatching out can be considerably increased, however, by scooping up the nest of eggs, before it disintegrates, in a shallow dish of the aquarium water. This may be floated in a tank with three or four inches depth of water, into which the fry may be tipped gently after hatching.

Why do my young fighting fish fry do well for about a fortnight and then begin dying off rapidly?

The deaths are the result of insufficient food and space. It is not possible to rear a full brood unless as the fishes grow they can be "thinned-out" into other aquaria. A twelve gallon tank will raise enough for most aquarists' purposes providing a good supply of Infusoria (the cultures need to be started when spawnings begin) is given. The fry commence eating after about forty-eight hours and from this time onwards to the brine-shrimp or sifted *Daphnia* feeding stage a continuous drip of the strained Infusoria culture organisms dispersed in clean water should be arranged. A suspension of hard-boiled egg yolk made by squeezing it through muslin and shaking it well with water, can also be employed.

J.F.

Artificial Spawnings from Goldfish

by ————— A. BOARDER

FOR some time I have considered whether it would be possible to spawn goldfish artificially. There were many points of advantage which I thought might be obtained. A while ago I had a very interesting talk with a man who bred trout and he described how he stripped the fish of the eggs and milt. If this were possible with trout I thought that it might be worth trying with my fantail goldfish. Whilst I was turning the matter over in my mind an aquarist friend lent me an old book which describes how the trout are stripped and the subsequent treatment. After I had sorted out all the necessary information and considered several points I decided to try to spawn some of my fish artificially.

The method described in the book was to strip the eggs from the female fish first, and then to strip the milt from the male over the eggs and add water. The water was then swilled around the eggs and they became fertilised. I decided that I would try to obtain the milt from the male first so that when the eggs were extruded into the pan holding the milt the male germs (spermatozoa) would be there to enter the eggs as they absorbed water and increased in size, as is usual.

On 1st August, some of my best fantail goldfish were spawning. I knew that it was necessary to have a ripe pair of fishes, and felt sure that they must be ripe or they would not have the inclination to spawn. To start with I took a clean porcelain bowl, quite dry, and caught up a male fish. I held it over the bowl in my left hand. With the thumb and fore-finger of my right hand I gently squeezed down the fish's belly towards the vent. I used as little pressure as possible as I was afraid of doing damage to the fish (which I required for an exhibition later in the week). It seemed rather difficult to extract any milt from the fish and being loath to give too much pressure I stopped rather sooner than I might have done. When I thought that I had succeeded in obtaining a little milt I replaced the male in water and took the female fish in the same way as I had the male. I was immediately able to get quite a few eggs from the female fish. I only used a light stroking action and the eggs simply flowed out in a stream into the bowl. The whole process was over in a matter of seconds and the fishes did not appear to have been harmed in any way by the pressure or being kept out of the water for a short time.

I then quickly introduced some water to the bowl and swilled it around and over the eggs for a minute or two. The eggs stuck to the bowl quite strongly and the washing around did not loosen them in any way. The eggs looked amber in colour, a much deeper colour than they appear to be when they are laid naturally on water weed. I think that there were from one hundred to two hundred eggs in the clutch and I decided that if I made another attempt at any time I would endeavour to spread the eggs out more in the bowl. It was noticeable that many of the eggs were in a close group and although they were not exactly on top of one another they appeared too crowded for my liking.

After an hour or so I washed the water out of the bowl and allowed some fresh water to run over the eggs. This washing did not loosen the eggs from the bottom of the bowl at all; their adhesive qualities were enough to hold them fast. This was all that I could do at the time. All

that I knew definitely was that I had obtained plenty of eggs but did not know whether I had been able to fertilise them. The temperature of the water in the pond where the fishes had spawned on their own was 65° F. and I tried to see that the temperature of the water which I added to the eggs was about the same.

The following day the eggs appeared just the same as when they were extruded. None seemed to show the fungus of the infertile egg but yet none appeared to have altered in any particular. I could see no signs of darkening of the eggs and had to wait for events. I had placed no water plants of any kind in the bowl and as I thought that the water might be lacking in oxygen, I changed it. The eggs stuck well to the bowl.

On 3rd August the eggs appeared the same and though I saw hardly any signs of life in any of the eggs they certainly did not have the covering of fungus that is usual with infertile eggs. On the 4th I could see a slight darkening of some of the eggs but dared not hope that any would hatch. The effect of the white bowl under the eggs made it very difficult to make sure whether the eggs were good or not.

At about 2 p.m. on 5th August, I was delighted and not a little surprised to see that several tiny fry had hatched out. By the evening I could count about three dozen fry and they appeared quite normal, although it was of course too early to say for sure whether they would turn out healthy and perfect. From this date the fry made normal progress and seemed to feed quite strongly on Infusoria. I shall have to wait some time, I know, before I know whether there will be any show specimens among the hatch but in any case it will be very interesting to watch their progress.

Having been successful in obtaining some fry from this artificial spawning I can now examine the process and consider whether I can in any way improve on the technique another time. I was perhaps helped in my experiment by the fact that the fishes which I attempted to strip had actually been spawning that morning. Further experiments later on will prove whether the recent spawning had much effect on this particular experiment. Obtaining the milt in the bowl first I consider quite a good plan as the male germs are then waiting ready for the eggs when they drop into the bowl. The part which did not seem very satisfactory was the way that the eggs grouped. I would have preferred that they were spread out more and not touching each other in any way. I shall try the use of some selected cleansed water plants to see if the eggs stick to these and so keep apart. I shall also see if it is possible to use enough water in the bowl so that the fishes can be held in the water whilst they are stripped. This method would probably ensure the eggs were spread about more as the female would no doubt help to spread them around with the swishes of her tail.

Will artificial spawning be of any value? In the first place it will enable fertile eggs to be obtained from any selected pair of fish. It will also be possible to get the eggs at any time convenient to the aquarist, which is a very important point for many. At the same time one could use more than one bowl and after having used one male to fertilise the first bowl of eggs another one could be used for the next one. Only a few eggs need be expelled into each container for experimental purposes. Another very good

point is that if one is troubled with any kinds of flukes which may be introduced with water plants the artificial method would ensure that no pests of any kind are introduced, clean tap water only need be added. Spawners can also be given an antiseptic bath before they are stripped so that no parasites are introduced into the bowl with the eggs. If an antiseptic is used I suggest that the fish are then well washed in clear water in case any disinfectant from them harms the eggs). Where fish are reluctant to pair or spawn the eggs required could be immediately obtained from them. Altogether I consider that with a few more experiments I shall be able to obtain all the eggs I need at any time I require them. The only consideration will be that the fishes must be in good breeding condition.

AQUARIST AT HOME:

Mr. R. Mackrell

Interviewed by JAS. STOTT

RECENTLY I spent a pleasant and interesting evening with Mr. R. Mackrell at his home in Beechwood, Sowerby, Yorkshire. Of course, the topic was fish and the keeping, with the centre of interest his fish house and its contents.

Upon entering the fish house it is soon obvious that behind the compact arrangement of tanks and equipment lies experience, and Mr. Mackrell has had fourteen years of fish keeping and breeding. He had the place specially built as a tropical fish house. The walls are double thickened, as also are the glass panels in the roof which provide the top lighting. It houses thirty tanks, the sizes ranging from 18 in. by 9 in. by 9 in. up to 36 in. by 15 in. by 15 in. and at the time of my visit all these tanks were being used. A two-stroke piston type pump supplies aeration for all tanks when required.

All the tanks are base heated, by gas. In the opinion of Mr. Mackrell this is cheaper and more reliable than electricity. He also has the fish house heated by a system of hot water pipes with which he attempts to maintain a house temperature of 70°F. throughout the year. A controlled circulating system is incorporated in the roofing of the house.

Several species of fish were to be seen against a background of strong, healthy plants. Neon tetras were much in evidence, as were lowlights. One tank contained some fine *Nemotomus anomalus* but I was particularly interested in the grand display of *Ambassis lala* or glass fish which, Mr. Mackrell told me, were something of a speciality with him at the moment.

He has been extremely successful in the breeding of these fish this year and told me the method he uses. A tank 27 in. by 9 in. by 9 in. was used and filled with old matured water. Plenty of plants with fine-cut leaves such as *Ambulia* and *Cabomba* were used in the planting with a floating canopy of loose plants consisting of Indian fern and *Vallisneria*. The fish were conditioned up to a brilliant colour on live food in variety: white worm, *Daphnia*, finely chopped earthworm.

A suitable pair was selected and placed in the breeding tank after which the temperature was gradually lifted from 70°F. to 80°F. It is interesting to note that the adults were

Having dealt with the advantages of the method I will deal with the disadvantages. As far as I can see at present the only thing against the stripping is that some damage may be done to the parent fishes. In my case the fishes which were stripped on the Tuesday were taken to an open show on the Thursday following and did not appear to have been harmed in any way. The fact that they were unbeaten proved that. If only slight pressure is used I do not think that harm can be done to the spawners. The female stripped quite easily and no doubt with practice I should be able to get milt from the male more readily.

Weighing up the pros and cons I think that the benefits which are possible with the method far outweigh any disadvantages that can be seen at present.



left in the tank until fry appeared or were noticed; the actual period of time from placing the adults in the spawning tank to the appearance of the fry was three full days. When the fry were first seen adhering to the underside of the floating plants, the adults were removed.

Twenty-four hours later an Infusoria solution was given in a steady supply for three days; then the youngsters were put on a diet consisting of a heavier or more concentrated solution of Infusoria which Mr. Mackrell prepares from a mixed infusion of potato and hay. They were fed with this for a fortnight.

During this period, every other day, one gallon of water was siphoned off and replaced with old matured water taken from other tanks in use which were stocked with healthy adult fishes. In a fortnight good growth was achieved; then brine shrimps were given, and to provide variety, small *Daphnia*. When feeding brine shrimps Mr. Mackrell recommends the siphoning off of one gallon of water FROM THE BOTTOM every second or third day to avoid the concentration of salts. His previous experiences with this food indicate the necessity for this practice.

Ambassis lala may be easily sexed at five weeks old if good growth has been made. The males show distinct blue on the anal and dorsal fins, also there are heavier black markings to be seen than with the females. Mr. Mackrell is also experimenting with the breeding of neons, and the proceedings in this direction looked interesting but I am sorry, no information is available yet.

Decidedly a tropical enthusiast, Mr. Mackrell has only a few coldwater fish which he keeps in an extremely attractive little pond. His stock in the pond consists of goldfish, higo and golden rudd.

Two Unusual Tropical Aquatics

by JACK HEMS



Photo:

L. E. Perkins

Young Amazon sword plant grown in poor light

THERE is no denying that to look into clear water and see gracefully formed and bright green plants growing beneath the surface is a pleasure that most of us can enjoy; for the underwater scene is one that never loses its interest or its power to stir the imagination.

In the early days of the tropical aquarium keeping hobby, there were few plants from which to choose—eel grasses mostly, and one or two swamp plants such as *Ludwigia*. But during the last two decades new plants from the warm parts of the world have been introduced to aquarists almost as often as new fish, which is, I think, as it should be, for the tendency to grow bored with too familiar things is one of the failings of mankind. Change is a marvellous tonic.

The two plants mentioned at the head of this article are highly decorative and will flourish in a temperature of about 75° F. and a medium to bright natural or artificial light. As the roots are vigorous, it is best to provide a rather deep compost for them to spread around in. A two inches thick layer of coarse sand spread over a shallow bed of loam or clay makes an excellent planting medium. Given the necessary warmth, the rich compost and the right degree of light, both species tend to outgrow the average small aquarium. They need a tank at least twelve inches deep and as wide across.

The Amazon sword plant (*Echinodorus intermedius*) was introduced into this country from America in 1938. It makes a fine feature plant for the deep tank containing angel fish or similar species. The strong-stemmed, somewhat translucent leaves measure about two inches across and eighteen to twenty-four inches long. They taper away Roman sword-like to a fine point. A strong rib extends down the underside of each leaf. A large plant will have as many as twenty leaves.

During the early summer, runners are sent up from the woody crown. Baby plants soon make their appearance at various points along the runners. The young plants grow faster if the runners are weighted to the bottom of the water, and left undisturbed for a few weeks. When the new plants have several leaves, each about five inches long, they may be separated from the parent stem and planted.

The Texas mud baby (*Echinodorus radicans*), one of the loveliest plants the writer has ever seen, will almost fill a twelve-gallon tank with its elongated shield or heart-shaped foliage. The leaves average about three inches across by five inches long. They are held at right angles to the substantial stems. In water not more than nine inches deep, the plant produces both floating and aerial leaves as well as the conventional submerged foliage; the leaves in contact with the atmosphere develop a highly glazed, water-repelling surface.

Of the two species, *E. radicans* needs the more light. During the summer-time the plant sends up a stalk which in due course bears attractive white flowers. Large fertile seeds make their appearance as the flowers dwindle away. Baby plants are also formed between the seed pods.

When this delightful plant was first made available to aquarium keepers in the U.S.A.—sometime in 1934—it was erroneously listed as *Sagittaria guayanensis*. A few specimens came into this country in 1935. But in 1936, Dr. John Fogg, Jr., of the University of Pennsylvania, identified the plant as an *Echinodorus*. According to William T. Innes, the range of the plant is "from Florida to Texas and along the Gulf of Mexico."

Unfortunately for the tropical aquarist, the plant seems to have become as elusive in this country as that other aquatic beauty, the Madagascar lace plant. Let us hope, however, that its name will reappear in the dealers' lists before long, for there is no question that the Texas mud baby is something worth waiting for, like most of the good things in life.



Photo:

Ashford & Boddous

A present rarity—the beautiful Madagascar lace plant

Useful Tips

Silken Siphon

I HAVE found, originally by accident, and by perfection from experiment, that the easiest, safest and incidentally, the cheapest method of removing surplus water from tanks when drip-feeding Infusoria is to use a length of silk stocking. The end in the tank should be kept at the lowest level below which the water must not fall, and the end outside should be slightly lower, as with the usual siphon tube.

The lower end can drip into a jar and the flow can be altered by the amount of material used. To ensure an immediate drip the material should be soaked before use, although a dry piece will commence to drip after about three minutes. I defy any fry to swim up and out when this method is used!

JAMES NOTT,
Carlisle.

Electric Lamp Protection

EVERY time I have been concerned about the amount of condensation that forms on aquarium shades, causing the lamp holders to become wet. Being in the electrical trade I know how dangerous this could be, so I have devised the precaution, which takes only a few minutes to fit. First roll a short length of old bicycle inner tube on to the glass end of the light bulb, then insert the bulb into its socket, and roll back the rubber tube over the connection to make a nice water-tight seal.

G. H. HICKS,
Teddington, Middlesex.

Miscellany

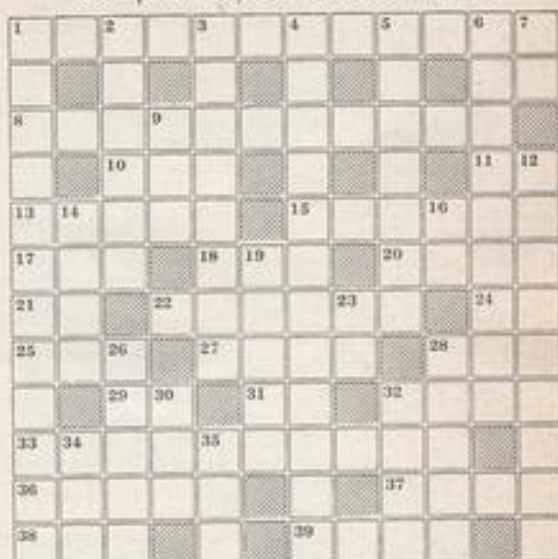
To conclude with here are a few tips culled from recent issues of *Hot Aquarium*: to obtain *Tubifex* free from mud and collection from a river, place it in a bowl, cover with a little water, pouring it on to paper to avoid stirring up the mud and place the bowl over a low gas flame. The worms separate to the surface and can be picked up with forceps. Smells from paraffin heaters can be eliminated by adding a little naphthalene to the oil. When adding fresh sand to an already filled and planted tank pour the sand through a glass funnel. It can then be directed to the chosen spots without causing cloudiness or any trouble.



December, 1950

The AQUARIST Crossword

Compiled by J. LAUGHLAND



CLUES ACROSS

- 1 Sealife genus (12)
- 8 *Sphaerichthys sphaerocauda* from Malaya (7, 4)
- 10 Unsuitable for troubled aquarium water (3)
- 11 The Spanish of eels (2)
- 13 Reverse of night (5)
- 15 Expenditure (6)
- 17 A strait between banks but sometimes carried by crooks (3)
- 18 Bladder or bag (3)
- 20 Slippery catches (4)
- 21 Gold of the oranda (2)
- 22 Catcher of fish (6)
- 24 Small tree of lily family (2)
- 25 Put to some purpose (3)
- 27 Variety (4)
- 28 Unit of electrical resistance (3)
- 29 Little girl in viper's nest (2)
- 31 Look! in loaches (2)
- 32 Think of income tax (1, 1, 1, 1)
- 33 Ascending rivers to spawn (10)
- 36 Fashions (5)
- 37 Rivers do after rain (4)
- 38 Mix die for fish (3)
- 39 May be waves (4)

CLUES DOWN

- 1 Oyster gem, Indian fish (5, 7)
- 2 To implant firmly (6)
- 3 An unhealthy condition caused by overcrowding (8)
- 4 Mouth breeder genus (12)
- 5 A salmon spear (7)
- 6 Ochlesia, perhaps (9)
- 7 Objective case of I in Madaga (2)
- 9 Girl or sweetheart of the Sincowet (3)
- 12 Instrument for measuring percolation of rain through soil (9)
- 14 Main limbs of water boatman (4)
- 16 The French of *Lefinus* (2)
- 19 An unconcerted fan (1, 4)
- 23 And French again, tetra (2)
- 26 Escape artfully (5)
- 28 Fertile spot in desert (5)
- 30 Orfe (3)
- 32 Aqua — is pure water (4)
- 34 As good as a wink (3)
- 35 Warrant Officer, Class 1 (1, 1, 1)

PICK YOUR ANSWER

(1 mark each. No cheating, if you please)

1. The naturalist Pallas was: (a) Greek. (b) German. (c) Russian. (d) Swedish.
2. While we are about it, he named: (a) *Toxotes jaculator*. (b) *Betta splendens*. (c) *Betta badii*. (d) *Anabas tetradon*.
3. The scientific name of the dragon fish is: (a) *Hemiodus unimaculatus*. (b) *Pseudocorynopoma doriae*. (c) *Corynopoma ritae*.
4. *Hyporhamphus niger* is popularly known as: (a) The rosy brycon. (b) The fire characin. (c) The loreto characin. (d) The dwarf tetra.
5. Which of these fish has a supplementary breathing organ: (a) *Phago maculatus*. (b) *Glyptothorax sinensis*. (c) *Acetorhynchus microlepis*. (d) *Chalcinus elongatus*.
6. *Belontiopsis* (the comb-tail) is native to: (a) Cuba. (b) Madagascar. (c) Sumatra. (d) Ceylon.

G. P. H.

(Solutions overpage)

Society News

FILM shows have been popular features of meetings of the **Blair Aquatic Society** in recent months. The society is building up a library of books of interest to aquarists, and the subjects covered in lectures at the weekly meetings, ranging from water plants to reptiles, indicate how wide these interests are.

LAST month's Open Show of **Bristol Aquarists' Society** is reported a great success, the hall being filled throughout the two days with visitors viewing the 353 coldwater and 122 tropical entries. The Annual General Meeting of the society followed the show, which the president declared to be the largest one ever staged in Bristol.

GARDEN pond construction was the topic treated by Mr. A. J. Staden, a member of the **Cambridge and District Aquarists' Society**, at their November meeting. Siting, building methods and planting were fully covered. A members' table show was arranged for the early part of this month.

AT the November meeting of the **Coventry Pool and Aquarium Society** Mr. E. S. Walker of Birmingham gave a talk on setting up furnished aquaria, preparing fishes for shows and the care, breeding and wintering of shubunkins and veiltails.

FROM data obtained from Japanese goldfish breeders, Mr. G. F. Hevey was able to pass on a lot of valuable information to members of the **East London Aquarists' and Pondkeepers' Association** in a recent lecture. In November Mr. A. Leuschner gave a talk illustrated by lantern slides on snakes. Plans for a revival of the association's annual dinner and dance are being made, and it is hoped that this popular event of pre-war days will be held early in the new year.

LAST month's table show of the **Guppy Breeders' Society** staged nearly 60 guppies, and this event was followed by Mr. W. G. Phillips' lecture on line-breeding. The society's Annual General Meeting is to be held this month.

MEMBERS of the **Hounslow and District Aquarist Society** were fortunate in being entertained at the home of Mrs. Kathleen Cooke last month, when they were able to examine her fine collection of tropicals kept in a well-equipped fish house. At the previous meeting a table show of gouramis and black line tetras was held.

AQUARIUM problems of members were answered by Mr. Tomlinson after his lecture on mollies and barbs given to the **Nelson and District Aquarists' Society** last month.

OWNERS receiving awards at a recent table show of breeders' fishes held by the **Newcastle-upon-Tyne and District Aquarists' Society** gave talks afterwards to other members, describing the methods and details of breeding of their specimens.

NEARLY 7,250 people visited the three-day show of the **Scottish Aquarium Society** held in Glasgow last month. It was the society's sixteenth annual show, and a new feature was the inclusion of an inter-club class which made the event an "international" one since societies from Ulster and Newcastle entered. A well prepared catalogue of exhibits, covering the 300 entries, included hints on aquarium keeping and enjoyed a full sale of all copies. The panel of three judges included one artist member of the society, the combination working excellently.

GREATER attention to the needs of beginners in aquarium-keeping is the future aim at meetings of the **South London Aquarists**. No time is to be allotted to "official business" at general meetings unless this should be essential. Last month a fine table show of this year's fry was staged, tropical fishes being represented by fighters, mollies, zebras, white clouds, flames, nigger, rosy and *algolapia* barbs, and dwarf gouramis. Coldwater fishes included veiltails and fantails but shubunkins were absent. Membership of the society is rapidly increasing but the secretary, Mr. R. H. L. Read, Beverley, Wilbury Avenue, Chess, Surrey, is still glad to hear from any others interested in joining.

SECOND meeting of the **South Western Aquarists' Societies Association** was held in October last. Mr. L. F. M. Baker (Mid-Somerset) passed round for inspection a home-made heater during his talk on making this appliance. Mr. P. Campion (Bath) read a very interesting paper on cichlids as aquarium fishes.

KINDLY set reported last month concerns a well-known London aquarist and a sick member of **The Study Aquarist and Pondkeepers' Club**. During this member's illness he derived great satisfaction and experience from keeping and breeding his fishes, and when he required specialist help the club's committee approached Mr. R. G. Meisland, who, despite the many calls on his spare time, visited the aquarist and gave him the necessary advice.

MEMBERSHIP of the **Swansea and District Aquarists' Society** after only three meetings now exceeds forty and is steadily growing. A talk was given last month on live foods and their substitutes at which living specimens in small glass tubes were passed around the audience. Shubunkin breeding and standards is the subject of December's lecture.

SPECIAL efforts have recently been made by members of the **Walthamstow and District Aquarists' Society** to interest junior aquarists in their meetings. Several local schools were notified and a good attendance resulted at the next meeting. Various fishes were on show and members answered many questions.

THE **Wandle Valley Aquarists' Club** will be increasing its membership in the new year to a maximum of fifty, and a special meeting for this purpose is to be held on Friday, 5th January. Interested aquarists in the Mitcham area are invited to communicate with the secretary, 40, New Barns Avenue, Mitcham, Surrey.

FOLLOWING a long run of lectures and demonstrations of such practical subjects as making and glazing tank frames, heating aquaria, setting up decorative exhibits and community tank keeping, members of the **West Greenwich and District Aquarium and Pondkeepers' Association** last month heard a talk on the way that a fish swims. A Sunday outing of members to the London Zoo aquarium also took place last month.

AQUARISTS of the **West Middlesex Aquarists' Society** have gained awards for tanks entered in open classes for furnished aquaria at the last four shows that have been entered, a matter on which the chairman of the society has given congratulations. A film show was the main feature of the society's November meeting.

MEMBERS of the **Palmerton Junior Aquarium Society (U.S.A.)**, young folks from 12 to 14 years of age, will be glad to correspond with aquarists of similar ages in Britain. Miss Betty Reinhard, 439, Lafayette Avenue, Palmerton, Pennsylvania, U.S.A. is secretary.

COPIES of the first issues of the *Bulletins of the Federation of British Aquatic Societies* and the *Federation of Northern Aquarium Societies* have been received. The F.B.A.S. Bulletin is issued free with the aim of acting as a liaison between club and non-club aquarists. The F.N.A.S. Bulletin is for the publication of new information on matters of aquarium interest, and contains a review of the tiger barb and breeding in the first issue; it is priced ninepence.

New Societies

ANNOUNCEMENT is made of the formation of the **Paigley Aquarist Society**, secretary of which is Mr. G. Clark, 10, Well Street, Paigley.

SECRETARY of the newly formed aquarists' society in **Rugby** is Mr. C. Cook, 45, Fisher Avenue, Rugby, and meetings are held at 7.30 p.m. on the first Friday of each month at the Hillmorton Community Centre in Rugby.

Crossword Solution

P	T	E	R	O	P	H	Y	L	L	U	M
E	N	C	A	E	N	E					
A	I	R	S	H	I	P	F	I	S	H	
R	O	I	L	L	S	E	L				
L	O	O	S	E	O	U	T	L	A	Y	
G	A	T	S	A	C	E	E	L	S		
O	R	F	I	S	H	E	R	T	I		
U	S	E	S	O	R	T	O	H	M		
R	V	I	L	O	P	A	Y	E			
A	N	A	D	R	O	M	O	U	S	T	
M	O	D	E	S	I	R	I	S	E		
I	D	E	M	S	E	A	S	R			

PICK YOUR ANSWER (Solution)

1 (b). 2 (a). 3 (c). 4 (c). 5 (b). 6 (d).
6 marks—That's champion!; 5 marks—Excellent; 4 marks—Very good; 3 marks—Good; 2 marks—Fair; 1 mark—Poor; 0 marks—Read *The Aquarist!*

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This is a pity, but please do not despair. You can make quite a good job of it in spite of this serious but quite common defect.

In cases of this kind, always keep that part of the frame which must receive a thicker deposit of cement than other parts located at the top of the aquarium. In other words: bed the glass evenly into the bottom section of the frame and to allow any discrepancy to lay as near the top of the tank as it possible. In this case allow the newly glazed tank to stand empty for a further 48 hours, when all should be well. (I trust this will not be an inducement to frame makers to be careless with their work when they are aware that even badly made frames can be made into serviceable aquaria thanks to Black Magic—of course!)

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etc., etc.	

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