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THE AQUARIIST
A Criticism of Fish Breeding

by A. Burch

THE successful breeding of fish is often thought to be the ultimate goal of every aquarist. It is the means by which every fish keeper is popularly judged. Why has fish breeding become so important to the aquarist's hobby? What rewards can be gained from breeding that cannot be obtained from the maintenance of a single community tank?

This trend from the small fish-keeper to the experimented fish-breeding club-member might be perfectly healthy as far as the hobby itself is concerned—but does not this fact indicate that there might be something rather wrong with the aims and ideals of the aquarist's hobby? For it cannot really be doubted that the local club is responsible for encouraging extensive breeding as a means by which it can perform its natural role, or perhaps not altogether desirable function as judge of the members' relative skills. I think perhaps I had better not try to cast this net too wide; a whole the existing relationship between the hobby and its following of clubs; rather I will try to deal only with breeding as an extension of the aquarist's hobby.

The beginner first attempts fish breeding from what might—far want of a better term—be called general curiosity. He does, I imagine, want to see his fish breed for the same reasons as those for which he took up fish-keeping in the first place; though what exactly those reasons might be is far too involved a subject for me to attempt to answer here.

The first problem which the freshly graduated fish breeder will come across is the rather inevitable fact that breeding produces more fish. What is he to do with these fish once they are old enough to be demanding large quantities of extra space? I am only making a calculated guess but I would suggest that few aquarists are able to sell all the fish they produce. To say the least, the inexperienced fish breeder will probably soon find that it is far easier to breed fish than it is to sell them. The wholesalers supplying the fish to the dealers will not willingly forego the relative commercial breeder for the fluctuating amateur market with its disease and transportation difficulties.

The aquarist could, of course, kill off his unwanted fish, but apart from the emotional conflicts arising from the
destruction of his well-loved fish, it does rather destroy the point of breeding in the first place; the trouble goes through hardly seems worth it. How can his enthusiasm, arising from the creation of life, withstand the need to destroy it again when the young fish become too demanding?

The aquarist facing this solution to his problem of an excessive fish population would, I imagine, soon despair and give up keeping fish altogether.

It might be that the aquarist attempts to keep all his young fish. This is probably the best short term solution for the aquarist who faces this dilemma. It soon becomes necessary, however, to provide more space for his growing stock and the price of new aquaria and their maintenance will deal a crippling blow to enthusiasm already shocked by the appearance of so many, seemingly identical, young fish. Fish breeding will be associated in his mind with the production of large numbers of fish which have to be kept until old age finally releases the fish-keeper of his irksome responsibility. Also as it is usually the more uninteresting type of fish which the beginner finds the easiest to breed, I can imagine nothing more likely to kill the beginner's spirit than the boredom and sense of anticlimax arising from the adequate rearing and subsequent housing of the 60 or 70 offspring of the more 'decorative' species.

When considering the pleasure to be obtained from the simple observation of a species in an aquarium there seems to be an optimum number of individuals which it is desirable to have—too few and you don't see them often enough or you can't see their behaviour as a group, too many and they lose their significance as individuals and become submerged in a shoal (this effect is only too noticeable in any large collection of fish; for example, the aquarium of the London Zoo).

This problem of dealing with large numbers of offspring may have dissuaded many aquarists, but it also created the fish-breeding specialist who has been able to solve the problem of space by dealing with only one species or group of fish. Thus have the guppy breeders solved their problem with special ease since they have adopted a species which may be changed with breeding—a factor which increases their interest in breeding. So, also, have other breeders who have turned to those fish which are not easy to breed and the achievement of breeding is rare and troublesome enough to maintain their interest in the subject. (In addition they find it comparatively easy to sell their fish because the market for uncommon fish is not easily saturated when such fish can be bred only rarely.) This probably accounts for the large numbers of fish species which are readily available—there is a constant demand for any new species which is difficult to breed, and any new species which appears is fairly established before it is discovered that it is easily bred after all.

I think therefore there is a need for recognition both by aquarists and their clubs that the reasons why a man keeps fish are more important than his actual achievements, when judged according to the traditional criteria of success in fish shows and in breeding records.

How to Keep Puffers and other Brackishwater Fishes

by W. HERING

Do you belong to the small group of lucky aquarists who can keep these fishes for years without difficulties? Is your mortality rate so high that you have to buy more every few months to make it another trial?

If you are a member of this second group, which in my experience is the majority, it will perhaps pay you to consider keeping them the way I do. The most popular brackishwater fishes today are Terragon fluviatilis, T. palumbarium, Stenotomus argus and Monodactylus argenteus. The two last mentioned present the least trouble. The two puffer species are more difficult to keep. Except for Monodactylus, none of these fishes occurs in our coastal waters here (Cape Towns), but we have comparatively a good selection of other puffers instead, belonging to the family Tecnodontidae, Diodontidae and Lagocephalidae, and all these fishes can be kept in fresh water or in water of a low salinity. *Terragon fluviatilis* and *T. palumbarium* are common inhabitants of estuarine waters of Malaysia, but occur also as landlocked populations in fresh water far from the sea, to which they never migrate. According to my information, most of these fishes are caught in brackish waters along the coast, thus saving the cost of long transport to port and aerodromes. Till the time of shipment they are kept in natural brackish water. Then they are transferred into fresh water, sometimes with added salt, sometimes without. No wonder that quite a number are already in a bad shape before they reach your tank. But if you are lucky, you may unknowingly become the owner of puffers caught in fresh water. In this case you probably have no problems at all and can give good advice to your unlucky fellow aquarists, which will not help them very much!

It has been said that brackishwater fishes must be kept in a hard, alkaline and slightly saline water. For this reason it is commonly advised to add some table salt to the tank. Nothing could be more wrong, as most of them are not dying because of the low salinity, nor do they care much about hardness and alkalinity. The majority of the higher alkalinity of the water the more are the fishes in danger of ammonia poisoning. In a slightly acid water no such poisoning can occur, as ammonia is immediately converted into ammonium salts.

The higher the alkalinity of the water the more are the fishes in danger of ammonia poisoning. In a slightly acid water no such poisoning can occur, as ammonia is immediately converted into ammonium salts.

Generally fishes can stand a high amount of ammonium but not of ammonia. Non-acclimatised puffers are especially sensitive. For instance ammonium salts are present in the water and you fill up the tank with alkaline tap water, resulting in an increase in the overall pH value, ammonia converts back into ammonia. This is one of the reasons why aquarists of the old school have been so afraid to change the water.

In a water of pH 7 there is no free ammonia present, all of it being in the ammonium form. At pH 8, 1 per cent of the ammonium forms ammonia, at pH 9, 25 per cent becomes converted and pH 10 is in this form.

Impressed puffers may respond to an amount as low as
This brackishwater species is the 'scrot' Scalopogus argus. It is of the variety possessing red blotches over its back and sometimes incorrectly described as a separate species (Scalopogus rubrofons).

0.05 milligrams of ammonia per litre with increased breathing: this can be a sign of the beginning of ammonia poisoning, in which case increased respiration is of no value. To check whether this increased breathing is due to lack of oxygen, I just add 1 drop of a 15 per cent solution of hydrogen peroxide per gallon of water. If the fish continues to breath heavily for longer than 35 minutes after this treatment ammonia poisoning is indicated. Lowering of the pH value by one unit may then bring good results. If it is not too late. In long-continued ammonia poisoning it is extremely difficult to cure the fish. On average, 60-70 per cent of fish of these not recovering 2-3 hours after reducing the pH value will die. Ammonia is a blood poison which destroys the haemoglobin of the red blood cells, the carriers of the oxygen in the fish.

A second poisonous factor is phenol and its derivatives. Even in a well-kept tank traces of phenol can be detected 5 to 6 hours after feeding the fishes. In small quantities it does not affect freshwater fishes, but brackishwater fishes are very sensitive to its presence. Scats, for instance, never come to tolerate it.

Phenol, as well as ammonia compounds, are eventually oxidised in the filter etc., to nitrate. If a run-in filter is employed, the formation of nitrate from decomposed organic materials takes some time. The shortest time I measured was 3 hours, the longest 68 hours, depending naturally on many factors which are too numerous to mention in this article. In the meantime the intestines of the fishes readily absorb the poison. Part of it will be excreted again, another part is oxidised in the body forming anilin, which may give the characteristic external signs of poisoning by blackening the white belly of the fish. Phenol is a slow-acting nerve poison. Signs therefore are: nervousness and convulsions, the fish darting wildly around the tank and has frayed fins and stops feeding.

Scats are especially sensitive. They may become so agitated that they ram their heads against rocks and glass panes and even shoot down at high speed to bury their heads deep in the sand. In one case I observed that the head was swollen nearly double its size with deep cuts and bruises. After analysing the water I found that it contained nearly 1 milligram of phenol/litre, curiously not produced by the decomposition of organic materials but by the use of a two-component resin containing phenol to render the steel frame and bottom of the tank non-oxidisable. (All metal parts of a tank with brackish water fishes must be protected just the same as with sea-water tanks.) To try to remedy such a disorder by adding salt is therefore futile. The fish must be placed immediately into fresh water of the same pH value and the same salt content, if any. To employ ozone as an oxidising agent is therefore an advantage. Nitrogenous compounds are oxidised in minutes to ammonia and an accumulation of phenolic derivatives is inhibited. Naturally ammonia has still to be converted to nitrate by bacteria in a filter. I hope that one day a convenient resin will be found to neutralise ammonia chemically, making a biological filter obsolete.

A third disorder, which I call 'pressure disease', is well known to aquarists: with bent tail fin and a black-grey colour, the fishes drift helplessly through the water, does not feed and eventually dies. Naturally all three diseases may occur simultaneously and often do.

In pressure disease the tissues and blood of the fish are flooded with water because of the osmotic effects produced by the difference between outer (aquarium water) and inner (body fluid, muscles). It is a sign of too short acclimatisation and is entirely the fault of the aquarist. The process of osmotic regulation in brackish water fishes is complicated and the nature of this mechanism is very little known. In simple words it could be explained as follows: A fish in sea water lives water constantly by osmosis (its body fluids are more dilute than sea water). They replenish this loss by swallowing large amounts of sea water. In their intestines the salts in solution in the sea water and of the food are absorbed and excessive salt is excreted by special chloride cells in the gill epithelium, called 'chloride' cells. Freshwater fishes practically do not drink water. Instead of the chloride cells they have minute filaments in their gills which can absorb water and salts from the outer medium. Excessive water and salt is excreted through the
kidneys. If one puts a sea-water fish in fresh water he does not stop his habit of swallowing water. Brackish-water fishes behave like marine fishes, but when transferred to fresh water they stop drinking this and slowly their chloride cells degenerate and (let’s say) ‘water cells’ appear, as in freshwater fishes.

The art of acclimatising sea or brackishwater fishes to freshwater is therefore to synchronise the dilution of the salt water with the gradual disappearance of chloride cells and the formation of ‘water cells’. In most marine teleosts this is impossible to perform, although many survive in water with the addition of 0.5 to 1 per cent of sea water, provided that the remaining salts are present in physiological proportions. Tap water can disturb these proportions; our Cape Town water is particularly unsuitable in this respect. I therefore have to use either rain or distilled water as a diluting agent. To cure a fish of the pressure disease is simple, but tedious. I put him back into a tank which contains 1,200 millilitres of sea water to 2 gallons of fresh water. In this tank he stays about 14 days.

Then I start from the beginning as described latter in this article. A very boring affair. The acclimatisation of brackishwater fishes takes some time; how long depends on the species. Scats and monos respond very quickly. For the puffer species mentioned, which are more or less already accustomed to fresh water, I need 18 days to one month. The longest time, up to 4 months, is required by Lagocephalus, Tetraodon and Diodon. The critical point for these fishes is the water density of 1.003. Diluting the water further, to 1.000, must be done pyrometrically. But even then the danger is not over, as the fishes may absorb any kind of salt in solution to counteract the hydrolysis of the blood, even if these salts are poisonous.

To prevent this, I use a simple trick. I feed the fishes with food for two or three times daily for the first four weeks. Then I slowly decrease this amount. If common salt or table salt is used for this purpose the fish would eventually die.

If I acquire some puffers, I observe whether they have a white belly which is a sign whether they swim actively around. However, this is by no means a sign that I have received healthy specimens. In fact, I calculate that four out of ten animals are diseased. At home they are first put in a darkened tank containing (for each 2 gallons of water), 600 millilitres of sea water and two drops of a 5 per cent methylene blue solution. In this tank they stay for 8 hours without food. From this quarantine they are put in the same mixture without the methylene blue. The tank contains no plants, no gravel and has no filter but a dark bottom (black paper under the glass) and some stones for hiding. Temperature is 70° to 75°F (21°C), and light aeration is given. In this water they stay for six days, but the water is renewed every second day. They are fed as usual.

For the next six days the water contains 300 millilitres of sea water and for the last six days 150 millilitres of sea water per 2 gallons. Then the fishes are transferred to a well-established tank with plenty of plants containing in 2 gallons 60 millilitres of sea water. In this tank they are slowly accustomed to a lower pH value. I decrease this value weekly by pH 0.5 to pH 6.5–7. At the same time I start giving the fish the sea water-soaked food. In this tank they stay for 1 or 2 months. Then they may be transferred to a tank with other tropical fishes without any salt water added.

Freshwater fishes liberate something in their tank water which is totally foreign to brackishwater fishes and may induce a shock. Therefore, before placing the fish into such a tank, the water is removed and filled up with fresh water which must have the same pH value as the water in which the puffers were kept.
ABOUT THE POND THIS MONTH

Avoiding Troubles and Exhibiting

by A. BOARDER

ABOUT this time of the year all the fishes in the pond
should be healthy and in the best of condition. It
is usually in the spring that goldfish become suscep-
tible to attack by fungus. I have got used to the
idea of fishkeeping I do not remember having any goldfish suffering from this
complaint after May, although I have, in fact, had no
trouble with this disease for many years and am not certain
why this is. One thing I can say is that I have had no
fresh fish in the pond, neither do I ever give any live food
from a natural pond. I do not suggest that this is the
reason why my goldfish have been trouble-free but I
think that it could have considerable bearing on the
problem.

For live foods I use only garden worms and white worms
(nematodes), and as these do not come from water I have
no fear that I may be introducing any pests or diseases
with the food. A point worth mentioning in connection
with this matter is that I try to keep my fish healthy
throughout the winter. It is when they are in a bad condi-
tion at the beginning of the season that they are liable to
be attacked. As long as a fish is healthy it has a good
covering of protective mucus. This prevents the entrance
into the body of the fish by any pests or germs.

Use Nets Carefully

It is often the careless handling or netting of a fish that
can cause trouble later on. The mucus can be removed
as patches if the fish is treated carelessly. I have had
enquiries from angling clubs about roach being covered
with fungus disease in their waters. I have suspected
that much of the trouble has been caused by the methods
of angling. In most club waters it is the practice to return
all fish caught as soon as they have been weighed or
measured. The roach is a fish with an abundance of
mucus, which easily comes off on the hands when the fish
is handled. I have also known some anglers use a cloth
to hold the fish whilst the hook is removed. It can be
realized how easy it would be for the spores of fungus
disease to get a hold on any fish that was so treated,
especially as the fish would be rather distressed by having
been caught which would lengthen the period of time taken
for the replacement of the mucus.

At this time of the year the pondkeeper might like to
exhibit some of his best fishes. I know that some aquarists
and pondkeepers do not believe in showing their fish, but
this is a belief I do not agree with. If it were not for the
exhibiting of the fancy goldfish there would be no standards
by which the strains could be kept true. Just imagine
what the dog world would be like if no shows were held
and the particular breeds of dogs were not bred true for
exhibition purposes as well as for other reasons. It
would not be many years before most of the breeds became as
inter-mixed that no true strain would exist.

The trouble will be happy to be able to exhibit
his best fish, not perhaps with the intention of winning
money prizes but to give him the satisfaction of knowing
that the fish he is breeding are of a good standard. It is
also true that any strain of fancy goldfish which had won
prizes would be of much more value than any cross-breds.
Not that the true aquarist worries much about whether
the fish he is rearing makes any money out of his hobby, but there is a
market for good fish and a satisfaction of being able to
breed something extra good.

Starting to Exhibit

The uninitiated might wonder how to make a beginning
at exhibiting his fishes. This is quite understandable as
many people have no idea that goldfish and their varieties
are exhibited and are bred to standards supplied by the
Federation of British Aquatic Societies. The first thing
an intending exhibitor should do is to join a club or society.
Most towns have a club within reach and if one does not
exist within easy reach then the aquarist should make
enquiries in his district with the intention of forming a
club. Sixteen years ago there were upwards of 400 clubs
in Britain and I know of some which had a membership
of one hundred and a waiting list of several prospective
members. I remember many happy hours at my club,
and anyone can obtain a mine of information by attend-
ing the lectures etc., and by conversing with other
members.

After about 1950 many clubs started to lose members
and today, although there has been something of a revival,
there are not nearly as many clubs as there were then.
I believe the introduction of more television about that
time had a lot to do with the falling off of attendances.
This is a debatable point I know but it is a fact that the
lack of interest in many clubs coincided with the popularity
of television.

Now that much of the novelty of television has worn off
I expect that more interest will be taken in aquarist clubs
and the hobby generally. It is not difficult to form a new
club and anyone sufficiently keen can do so. The best
way to make a beginning is to get the help of the local
newspaper. I have always found these to be very helpful
and usually willing to insert a primary notice in their paper.
All those interested would soon communicate with the
originator and a meeting could be called. From then on
it is easy to make a start with a new club. The Aquarist,
too, will gladly insert a notice of the intended formation
of a club.

The intending exhibitor would be well advised to show
his fish at a club table show before entering for an open
show. He would then learn something about the method
of showing and could obtain information on the merits
of his fish. I think the most important factor to remember
is that only the very healthy fish is the one likely to gain a
prize unless in very poor company. The fish in good
condition is the one that shows off to advantage. The
colours are always better and the fish shows off to its
quality to a greater extent than a fish out of condition. Those
who have never exhibited a fish I recommend them to
try their luck; I am certain that they will never regret
having taken the step.

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MOST aquarists have a fund of general knowledge concerning the majority of fishes and plants maintained in aquaria, and whereas the water content perhaps may come mainly from the ordinary household supply, nevertheless many aquarists make themselves familiar with simple aspects of water testing. But the other common factor of decorative aquaria—the rockwork, which supplies much of the attraction of the design, is sadly neglected and indeed the knowledge held by many fishkeepers is often quite fallacious.

Let us then consider the rocks, since they are truly an important part of the furnished tank and should be of sufficient interest to warrant a little study.

Rocks are many and varied and there are no distinct sections which might be described, as groups, as being wholly attractive and useful to aquarists. Therefore each specimen must be accepted or rejected on its own particular merits. Some that are useful are less than visually attractive; some are ornamental or perhaps well-coloured and malleable (such as ochreous clays), but would be disastrous in aquaria. Which brings us to what is perhaps the only real general guide, that soft rocks are dangerous—to which comment attention will be drawn in due course.

**Classification of Rocks**

The following notes are designed to assist aquarists to provide basic identification of rocks purchased or found during their travels, but are necessarily somewhat oversimplified and for this I trust that geologist readers will accept my excuses.

Except for quartz (silicon dioxide, silica), the pure minerals have been ignored for simplicity's sake. Under the heading 'chemical sediments' are to be included organic materials such as coal, again as a matter of simplicity. The sources from which particular rocks may be obtained are quoted at the end of each section but these are merely for general guidance and one should refer to the maps and literature, which will be suggested in due course, for finer details of the occurrences of particular rocks.

**Fig. 1.** Vesicular basalt (Archean). The fine-grained structure is due to the quick-chilling of the original molten magma. Tiny holes resulted from steam or gas in the cooling material (× 2).

**Fig. 2.** Biotite granite (Aberdeenshire). Coarse-grained but of fairly even texture; clear quartz, white feldspar and abundant black mica (biotite) make up this specimen (× 2).

**Fig. 3.** Porphyritic granite (Devon). Large crystals of creamy feldspar in a finely ground ground mass indicate a quickened chilling after an initial slow cooling (× 2).
Rocks — I

The world on which we live is composed of rocks, some hard and some soft, and the outer crust is the only part about which Man has any considerable knowledge. This crust is composed of a great diversity of materials arranged in an almost endless number of combinations, but they can be divided into three major groups, each according to the nature of their origin: (1) igneous rocks; (2) sedimentary rocks; (3) metamorphic rocks. Further sub-divisions are based upon such factors as the texture, the mineral components and the size and arrangement of the mineral particles.

Igneous Rocks

These are formed by the cooling and solidification of the extremely hot, molten material (the magma) which is held under great pressure below the hard surface of the globe. The magma is often composed of an incredible mixture of materials, and, when it cools, as it does when a weakness appears in the surface and permits the magma to rise up within the already solidified crust, then the chemical elements combine to form crystalline particles which we term minerals.

If the magma rises quickly and bursts forth as a volcano then it also cools quickly and the lava then forms solid rocks such as volcanic glass, frothy scoria and pumice or the dense and fine-grained rocks of the basalt/felsite groups (see Fig. 1). Magma which does not reach the surface cools more slowly, often under pressure, and in such cases the crystalline particles can grow in size. Additionally, those combinations of elements that have a high melting point will crystallise and grow quickly, other combinations will grow more slowly.

In some igneous rocks the minerals may have chanced to crystallise at approximately one and the same time and the separate mineral grains reach comparatively the same size, which conditions are to be found in the granites (see Fig. 2). However, in a slowly cooling magma it is possible that feldspar and certain other minerals may have reached a large size when, quite suddenly, the magma is cooled abruptly, with the result that the remaining elements grow to only a small size. The resultant solid rock has a uniformly grained ground mass in which are to be seen larger particles of some minerals and such a condition is known as a porphyry or porphyroclastic granite (see Fig. 3), a form which can be considered one of the visually more interesting of the granites.

From this can be gauged the importance, in classification, of the size and character of the contained minerals and it can be realised that these points depend largely upon the nature and rate of solidification.

Quartz

Although quartz (silica) is one of the most common minerals and many rocks contain large quantities of this substance, some rocks contain very little and a few have none at all—so we may be in mind the fact that the mineral content of the rocks is an important feature of their classification. At the same time it must be noted that it is impossible for the average person to determine the chemical constituents of any particular specimen, and reliance must then be placed upon the factors previously noted, plus some aspects of the colour of the rocks.

Quartz is an abundant mineral frequently found as a massive intrusion or as minor veins in other rocks (see Fig. 4). It is extremely hard, usually milky white in colour or stained by various impurities to reds, browns,
PLANTS FOR THE FISH HOUSE

"Wandering Jews"

by B. WHITESIDE

FOR easily grown pot plants, kept for their attractive foliage, the tradescantia family is a useful choice. Spathacea is another name for the wandering Jew, but tradescantia is the better-known name. Plants come in a variety of leaf sizes and colours, all of which are attractive additions to the fish house.

One of the most attractive is Tradescantia zebrina pendent, a creeping or trailing plant which has mauve and silver striped leaves with purple undersides. The plant is very easily rooted from stem cuttings about 6 in. long, having all the lower leaves removed after being cut beneath a leaf node. These may be rooted in an ordinary potting compost or in jars of water. T. zebrina pendent likes a well-drained compost and may be watered freely in summer, with a weekly feed of liquid fertiliser and an occasional spray of water to freshen the leaves. Watering should be less frequent in winter. The plant likes a light position out of direct sunlight.

When the plant becomes too long or straggling, the tips of growing shoots should be pinched out to encourage branching growth. This method is also used with T. tricolor, a plant with smaller leaves striped with white and bluish pink. Plants with variegated foliage need more light than do most green-leaved plants. Should a plant with coloured leaves produce an all-green shoot, this should be removed at once or the plant will devote its energies to the development of the green portion, to the detriment of the variegated portion.

T. fluminans is a variety with midden sized bright green leaves. This plant is a rampant grower even under adverse conditions. I have heard of this variety actually being used as an underwater aquarium plant, being rooted normally in the air and then planted in the aquarium gravel. The plant finally grew to the top of the tank and trailed over the frame and down the outside. Not having tried this plant as an aquatic myself, I would not recommend its indiscriminate use without a test trial in, say, a small aquarium stocked with cheaper guppies.

As an indoor decoration, plants of tradescantia can be attractive if placed round the home aquarium and allowed to trail over tank frames and stands. Plants are cheap to buy and are so easily propagated that, from one plant, many more can be produced.
Fishes of the CONGO

by A. VAN DEN NIEUWENHUIZEN

Translation by A. KLEE

In the southern portion of the Congo, well into Katanga between Jadotville and Elisabethville, lies an extended bog or marsh. This marsh is irrigated in one portion by links to flowing water, but in other portions the moisture content of the land is completely dependent upon weather conditions. The dry period in this area of Katanga extends from May to October, the rainy season from November to April.

During the latter, large pools and ponds can be found everywhere, varying from 5 to 32 feet in diameter and from 12 to 60 inches in depth. These pools come into existence as a consequence of rainfall. The rainy season starts in the middle of October or early November with the onset of localised thunderstorms, which release from 2 to 3 inches of rain within a short while. During and after these thunderstorms, the temperature rises to a level even higher than that in the hot summer months. Air temperatures vary from 66°F (19°C) in the shade to about 91°F (33°C) in the sun. These temperatures fall but slowly. In December, about 3 inches of rain falls; in February and March, about 12 inches each month; in April, more than 3 inches. Within the rainy season then, an average of 47 to 51 inches of rain is seen.

As soon as the rainy season commences life begins anew in the flooded marsh. For example, as the pools fill with water the eggs of Notothobranchus brieni hatch. More will be said later about the breeding of this fish. It is really a wonder that these eggs hatch out at all, since they lie on the bottom from May to November, undergoing extreme changes in temperature: the dry periods begin with temperatures of 75°F (24°C) during the day, dropping to 56°F (13°C) at night! In parts of this region, even slight frosts can occur. The temperature starts to climb again in July. In the extended marsh, when the ground is already cracked, the first change is seen in the colour of the landscape becoming a reddish-brown. In August, it is hot (96°F; 36°C), in September it is wet and hot and in October the thermometer reads an average of 91°F (33°C). Although the sun burns continually, the first leaves appear upon the trees. At the same time, in October, the first thunderstorms arrive and, in December, all brown coloration has disappeared and the countryside is green once again.

In December, specimens of Notothobranchus brieni from 1 to 1½ inches in length frolic about in the newly created pools. They are collected in areas with heavy growths of Nymphaea and Othilia which make it impossible to pull a net through to catch fishes. In February, these plants are in full bloom. In the backyard of the Glandore family, Othilia calypso (♀) is found in this region. One also encounters much Suedina and Utricularia. In the larger pools and streams, the water plant Eichhornia crus-galli is found.

Water temperatures of the smaller ponds can be relatively high. In the middle of March, for example, the water surface gave a temperature of 75°F (24°C) in the morning.
The Grahame family on their way into the marsh during the rainy season. The landscape is not flat but is broken up by alternating stretches of grass and woods (between which lay ponds and pools).

Here is a trap almost 10 feet high, constructed of bamboo. The native youngster shown is 5 ft. 2 in. tall.

Nymphoea, an undetermined species of water lily, is an enormously robust plant.

An irrigation stream near ....

In this stream Aphanius pavanii live in the shallow water.
and 81°F (27°C) at midday. At the 30 or 40 inch depth, these temperatures were a few degrees lower. In May, the mercury drops quite considerably. At the surface of the remaining water, not yet evaporated, the temperature stood at 86°F (29°C) and a few degrees lower in places where the water was still a yard deeper. These temperatures were measured at about noon.

Hardness and pH of this water was determined in one of the laboratories of the Union Miniere Company. The former was very low: in March it was 0.5 DH; in May it was somewhat harder, 2 to 5 DH. Water reaction varied from pH 6.5 in March to pH 7.0 in May; in other words, slightly acid to neutral. These results held also for water from the irrigation streams in the same region. In these waterways many species of Barbus were caught, together with species of Ctenopoma, Amphilius, Aplocheilichthys, small Synodontis and others in addition. The water in the marsh and irrigation streams is usually so clear that the fish can easily be seen swimming and sometimes it is even possible to recognise the species. In other streams, however, this is impossible since the water in them is turbid almost all the year round, decreasing somewhat in turbidity by the middle of the dry season.

In catching Notoheterotaxus and other fishes, one learns that the young are mostly to be found in open water, while the adults are mainly found under the overreaching thick plant growth along the banks. In the pools and small ponds of the marsh it is possible to make catches using just the hand. In fact, it is forbidden to catch them with mosquito netting since the former Belgian Government had severe regulations regarding irresponsible fishing. The minimum mesh size therefore is a bit less than 1.5 inches, but the aquarist generally cuts corners here. That these regulations are necessary to preserve the value of the fish resources is evident from the fact that the population of Central Africa disposes of great quantities of fish. In 1958,

for example, while 9,576 tons of fish were taken from Lake Tanganyika, 130,377 tons were caught in the Congo! This explains why fish hatcheries have been established all over, to expand the production of fishes.

Two types of nets are used by natives to catch their fishes: one is operated by a single scoop of the hand and the other is supported by cork floats and is thrown over the entire width of a large pond. The latter type

To catch aquarium fishes, a large, three-sided mosquito net must be employed. The end not containing a supporting line (left) is drawn through the small pool. When the net is lifted, the fishes are recovered from the mud. This method is especially useful when the ponds begin to dry

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Fishes of the Congo (continued)

A pair of Nethtoranos brelisi (male closest to the camera) in breeding mood
Photo: A van den Hoek van Norden

nears many Tilapia species, especially Tilapia malawiensis, a fish well known in the aquarium world. In addition, much use is made of large traps constructed of bamboo, varying in size from the smallest, 20 inches in length, to the largest, over 10 feet in length. One of the illustrations proves this to be no fishy story! Large Tilapia are caught in these enormous baskets and the fish are transported after first being dried. Then they undergo further treatment in the form of additional drying and smoking. A smaller trap is used for fishing in the marsh itself. For this purpose, a small causeway is dug between two ponds and a trap set within it. Frequently, they simply dam a pond across, into which the trap is dug in. Next to traps and nets, spearing is commonly used for catching fishes, especially towards the end of the rainy season and beginning of the dry. At this time, the water velocity in the pools slackens and many of the fishes are collected or left behind in the mud. Tilapia especially, finding themselves trapped, are easily speared. During the flood periods, the whole marsh region is faced with interconnected water courses, giving these large fishes access to this area.

The accompanying photographs afford a visual impression of the region as a whole and show the methods used for catching fishes. A number of interesting aquarium fishes originate from this area, more about which will be said in future articles.

The Leopard Catfish (Corydoras julii)

A n attractive tropical catfish of the Corydoras group is the one known as the leopard cat. A large number of black spots, arranged in pleasing patterns over the body, dorsal, anal and caudal fins, are responsible for the popular name. It does not grow much over 2 inches in length, and imported specimens are usually only about half this size. Some can be distinguished only in mature fish, the female showing a much deeper and rounder under surface, so that the would-be breeder needs to obtain several young specimens in the hope that a pair will show themselves as the fish grow. However, although this species has been bred in aquaria, it cannot be relied upon to breed. For the fish to achieve their full breeding size quickly it is advisable to keep them in a separate aquarium, since in community tanks the bottom-dwellers like the leopard catfish often fail to get adequate amounts of food.

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When a pair of the catfish seem ready and mature the breeding tank can be prepared. It should be about 20 in. by 10 in. and freely planted with clumps of green sword plant. The temperature of the water should be lowered to around 75°F. This may be done by stirring and feeding the tank and adding cold water, or by gradually lowering the temperature. It is advisable to add methylene blue to the water to give a stage of blue. This will protect the eggs or fry from fungus infections. The tank should be kept in a case of water for a short period and then placed in the tank after the temperature has been adjusted. The eggs are laid on the bottom of the tank and the fry feed on the algae. The fry are fed on small pieces of fish food, such as fish flakes or pellets.

M. M. Clark

AQUARIST'S Notebook

The beauty of fishes is now no longer confined to the aquarium; if one so desires, it is possible to buy wall-papers, adhesive sheeting, tiles, dress materials and even plastic cushions decorated with fish and aquatic life. Many popular aquariums are now available.

P. M. Fuller

The members of the Ammodrystidae family, and not true eels at all, come to the surface to feed on small insects. They are often seen in large schools, feeding on plankton and other small organisms.

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OUR EXPERTS’ ANSWERS TO TROPICAL FISH-KEEPING QUERIES

My local dealer has some of the spectacular-looking Monocentrus naucrates for sale. Is this species as easy to care for as the better-known M. argentea?

Provided that the specimens available are in good condition and feeding well, they should not be at all difficult to keep in captivity. Nevertheless, we presume you are aware that this fish, like M. argentea, does not always flourish unless it has a small quantity of sea salt added, after it has settled down, to its aquarium.

Please give me some information on the unattractive called Triopterus punnilus.

T. punnilus is native to South Vietnam and, it is said, surrounding areas of south-east Asia. It attains a little over 1½ in. in length, and mature specimens develop most beautiful metallic tints, greens and blues predominating. It is one of the so-called croaker gouramis, an appellation derived from the fact that during courtship both sexes sometimes emit croaking sounds. As a rule, T. punnilus builds a bubble nest among the plants growing near the surface of the water, which should be rather shallow, but not infrequently it prefers to spawn directly on the bottom. It is not difficult to breed but does not produce large broods. A temperature in the middle seventies to low eighties (°F) suits it best. It flourishes well in old, slightly acid water, and is easy to feed on any live or dried food small enough to be swallowed. The female is not so sparkly in appearance as the male, and her anal fin is rounded posteriorly. If introduced into a community tank, the fishes T. punnilus is associated with should be as quiet living and as inoffensive as itself.

Why does the ordinary three-spot gourami bear the same scientific name as the blue and the opaline gouramis?

The blue gourami is only a Sumatran colour variation of the silvery grey to silvery olive three-spot gourami (Trichogaster trichopterus), which is quite widespread over south-east Asia. The opaline gourami was produced in Texas several years ago by a clever breeder who presumably mated together different forms of T. trichopterus, and subsequently succeeded in establishing a true-breeding, distinctively patterned strain.

I have a pair of zebra fish, the female of which is almost habitually different sized, yet she never lays eggs. Can you give me any reason for this?

First of all, does the male show any marked interest in the female? If the male is not sexually potent, or is insufficiently interested (at the present time, anyway) to chase her around no eggs will be laid. Sometimes, however, eggs are deposited and immediately eaten without the owner of the fish being aware of it, and, then, a few days later, the female will be ripe for spawning again. Furthermore, as a mature female is larger bodied than a male of similar length and age, she will always show much fuller sides after every feast of live food. Your best plan, if you want to breed these fish, is to separate the sexes for a while, and then put them together again in a properly set up breeding tank. If they don’t spawn soon after, repeat the procedure, or try her with another lively male.

How much cement will I need to place a tank frame measuring 24 in. by 13 in. by 12 in.?

You will need at least 3 lbs. of cement to do the job properly.

I have spawned the cherry barb twice within the last 3 months, but I cannot keep many of the hatched-out fry alive for more than a day or two. I feel certain that they die of starvation. What food do you recommend to get the fry past the difficult stage?

Many queries from readers of The Aquarist are answered by post each month; all aspects of the fancy being covered. Not all queries and answers can be published, and a stamped self-addressed envelope should be sent so that a direct reply can be given.

You need very small Infusoria supplemented with green water. You can obtain this—water discoloured by microscopic floating algae—by standing a jar or two of tap water in a sunny window. As soon as the fry have made some growth, keep them well supplied with such variables as microgreen, brine shrimps and finely powdered dried food. Proprietary tubed liquid fry food is now used by many breeders of egg-layers.

Photo: L. C. Monteduro

A group of well-rounded cherry barbs.

I am new to the hobby of tropical fishkeeping, and some of the books give the most wonderful word-pictures of the colours of certain fishes. Yet when I visit dealers and see some of these fishes swimming in their tanks, they seldom seem to resemble the descriptions in the books. Do writers, generally speaking, exaggerate the colours of the fishes they describe?

Sometimes, yes. But you must remember that lots of fishes do not always show their colours to the best advantage in dealers’ tanks. Lack of plant life, too much light, flooding a pale background, or the wrong sort of lighting over a pale compact, tends to give many species a washed-out appearance. But the same species placed in aged, warm well-stocked with plants will often outshine the descriptions given in the books.

I have seen some beautifully marked Aphyobagrus simius in a dealer’s shop but have been told by an aquarist friend that they are too producers and savage to keep with other fishes. Is this true?

A. simius is better behaved in a community tank than many fishes normally kept there. For one thing, the fish keeps itself to itself and does not go around taking pieces out of other fishes’ fins. Another thing, it does not bully other species unmercifully. All the same, it is a predacious species, and will swallow any fish small enough to be swallowed without any difficulty, that is to say taken in at one or two quick gulps. Therefore, it is recommended to keep it with the bulkier bodied tropicals, or fishes of about its own size.

THE AQUARIST
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.

Blanket Weed

In the May issue of The Aquarist there was an article by Mr. N. H. Bennett on green water and blanket weed. I found the article interesting, particularly in regard to blanket weed. However, I do not agree that blanket weed is as difficult to eradicate as suggested in the article. The methods suggested probably produce results but I have found a much simpler solution which can be done quickly.

First make a concentrated solution of Condy's crystals (potassium permanganate). When all the crystals are dissolved add sufficient of the solution to colour the pond water evenly. After a day the water will clear but the blanket weed will still be there. However, if the Condy's crystals have started to work it will be dying. Observe the pond for a week and then treat it again. I do think a part change of water just before the second treatment is a good idea but I do agree it would make the water greener if the water was green beforehand. This treatment does not cure green water.

It should be quite apparent after the second treatment that the blanket weed is breaking up and dying. If necessary, after another 2 weeks, repeat the treatment but I doubt if it will be necessary.

The advantage of this treatment is that provided that an overdose is not given fish and plants will be unaffected. The only disadvantage is that should the pond contain small fry, the Condy's crystals will kill the natural Invertebrates and feed on the pond and starve the fry. Knowing this, of course, means you should feed any fry with stable foods until the pond is back to normal.

I have found that this treatment really works.

S. E. MILLER
President, Aquarium Society of N.S.W., Sydney, N.S.W., Australia.

It should be mentioned that manganese compounds remaining in water after treatment with potassium permanganate can be poisonous to fishes. There is a danger if a pond is repeatedly treated with permanganate without changes of water that poisonous concentrations will be reached by accumulation of the manganese compounds. —Borrou.

A Good Catch

YOUR July issue contained the contribution "Can you make a good catch"?

This brought to mind an incident some time ago when my large community tank was infected with disease. All my fish died except for a red-tailed shark. This I was determined to save as it was an excellent specimen.

I drained the tank so as to clean it out and put the shark into a bowl on the draining board until I had finished the job. There, it stayed for some time with me making periodical checks to see if the temperature was right.

On my last visit to the bowl I was just in time to see my Albino, standing with his front feet on the draining board, gobble the shark out of the bowl in one quick action.

This taught me two things. Never to leave my fish uncovered, and never to let my dog near them, since she, at least, can make a good catch!

JOHN LINDSEY,
Scunthorpe, Lincs.

Elimination of Hydra

WITH reference to the query about a tank infested with Hydra (The Aquarist, June), I would like to pass on the following information on how we have dealt with this pest. Also I wonder if the same method could be used for other problems.

For this method you need a 45 volt battery (the flat dry-cell type). Connect two wires to the contacts and bare about 1 inch of wire at the other unattached ends. These bared wire ends are placed in the tank and left for about 4 hours. During this time it will be noticed that the Hydra seem gradually to shrink up.

I have tried this method over the last 3 months with batches of quite young fish and while the treatment was going on in the molly tank some youngsters were born, and appear to be not affected.

This method has also been tried among some of our club members as a way to rid a tank of snails, but the treatment in this instance was repeated after 2 days as the snail eggs did not seem to be affected.

A. W. SKINNER,
Birmingham 24.

British Marines

MAY I be permitted to add a word or two to Mr. A. J. McLean's article encouraging the maintenance of British marine aquaria (The Aquarist, July)?

Until a few months ago, when I closed down the last of my tanks, I kept British marine creatures quite successfully in old angle-iron tanks, which received no special treatment whatsoever and readers who might consider...
experimenting with our own littoral fauna need not worry too greatly about turning a freshwater singletank over to this branch of the hobby without coating the frame etc. Except in the early days and when I might be temporarily overstocked, I did not use aeration or filtration. With careful feeding (the only rule I myself found necessary) I did not suffer from either water or sub-surface gravel "going off".

In 1962, in the Journal of the Small Geographical Society (where it is not admired), I recorded my findings on minimal quantities of fresh water suitable for maintaining various marine animals, and it may be of use to note that I then found that for most common species of aquarium one pint of such water was necessary for one individual, except for the pomacea anemone (Mediterranea estrella), which required two pints. The container in each case to be of such size that the depth of water never exceeded the length of the uppermost anemone and the jars were to be avoided owing to the need for a flow of air across the surface.

In the article in question an excellent line drawing by, I expect, our old friend Brightwell, illustrates this pomacea anemone, a species not mentioned in the text, but I think we should note that although beautiful this species is not perhaps one for the beginner. I have found it does not always take readily to pieces of solid food and the animals seemed to prefer plankton or meat juices. Possibly Mr. McLean has some suggestions on this point.

Of the species mentioned, although the dahlia anemone (Tulipa finula) is readily recognised by the short and thick tentacles and its generally large size, I see by my notes that I have only found it in the retracted condition, in which case it can be easily overlooked owing to the shelly debris and so on which adheres to the column as camouflage. When completely retracted this anemone may be about the diameter of a small saucer and little thicker! A very pretty and unlike an animal.

Regarding Cerati pseudoarctica, occasionally called the lobed anemone even though such a common name might better be applied to the pomacea, this can be confused with certain Sagaria spp., but not if one remembers the great number of tentacles of the latter (over 300 usually). Cerati might well be found in rock-pools and under overhangs etc. and I do not think Mr. McLean intended to confine them to muddy conditions.

On my next point I am afraid I must cross swords with your contributor, in the matter of the specific characteristic of the snakelocks anemone (Anemone sulcata). All the readily available literature, it is true, claims that the snakelocks cannot retract its tentacles, but several years ago (when experimenting with similar tank conditions), I recorded this species as appearing to retract its tentacles under certain conditions of temperature, food and water. Before further examining what I thought was a fresh aspect of the creature I commenced a more thorough search of the literature and immediately found that Stephenson himself had recorded this fact in both aquaria and under natural conditions (T. A. Stephenson, 1935). Therefore I think we should state that A. sulcata very rarely retracts the tentacles, but when it does they are withdrawn and concealed by the intertwined collar and the animal then very closely resembles a green or grey-green budlet anemone in contracted state. Seldom now do I see the sea shore, and not keeping animals in aquaria, I would be grateful to hear of anyone photographing this comparatively rare phenomenon.

Mr. McLean draws attention to the waste matter and it is worth noting that the waste is extruded as a "mucus wrapped lump" from the single orifice or mouth, so that the removal of such waste is thereby simplified. I found it essential to remove this waste almost at once to avoid pollution and that it was expelled by the animals between something like 1 and 4 hours after feeding.

Much has yet to be learned of various aspects of the breeding cycle of the anemones, but some reproduce by fragmentation, some by budding or the young may be born alive. It is somewhat of a shock when one first finds dozens of tiny anemones flooding a tank, but these can be reared successfully—and it is surprising how large a piece of flesh can be ingested by the often minute scrapes. Incidentally, size has little or no bearing on the age of anemones since this characteristic depends upon the food supply: to be brief, they can grow smaller.

H. J. Vose.
London, S.W.16.

With reference to Mr. A. J. McLean's article (The Aquarist, July), the method I have found very good for keeping dust out of tanks, is to use a self-adhesive foam plastic draught excluder. I place it all along the top edges of my tanks and rest the glass on the foam plastic strip, which stops the water from the glass running down the tank sides.

T. HURLOCK.
Rochford, Essex.

Fin Rot

I WAS most interested to read Mr. D. G. Crisp's letter headed Fin Rot (The Aquarist, July) as I have used phenol for this trouble for some years with 100 per cent success. I use I teaspoon of phenol to 1 pint of water and stir till cloudy and stir on till clear and add this liquid to 10 gallons (24 in. by 12 in. by 12 in.). I have also noticed that this has cured a black mottle with "poppy eyes" and on two occasions fighters have recovered from scale protrusion.

I have also tried acriflavine with success on velvet disease but only in bare and unpainted tanks.

Recently I have heard that a substance call malachite green is of great value for velvet, fungus and a number of other non-parasitic disorders. The person who told me was not sure of the dose, but as a guide gave a dose range as 1-2 grams to 4 gallons of water.

He also said that salt should be used in combination with this cure and extended the potency in stubborn cases. I would appreciate any further information that either you or any other readers can give. I have also heard that this is used in place of methylene blue for the protection of cichlid spawn during the incubation period by continental breeders.

J. C. Goodwin.

In our experience malachite green must be used with great caution as it is necessary with methylene blue. Reports vary of fungus in coldwater fish by treatment with malachite green give the dose as 1 in 200,000 (about 0.55 grain/pint), and the dyestuff has also been used in the presence of 0.25 per cent salt.—EDITOR.

Angels and Dried Foods

I WAS surprised and delighted to find that my angels had grown enormously during my absence from home at school. There are only two angels housed in an 18 in. by 10 in. by 10 in. tank with three very extra and one male Siamese fighting fish.

The sides of the tank are covered with light blue hardboard and so is the back, thus only the front is left clear. The greatest surprise was that they had been fed on dried food alone (admittedly I have what I consider to be the best seven make of dried foods, these are arranged in a sort throughout the week). The tank is densely planted and my fish are always swimming around with their fins
Angel Death

I had a large angel which moped, refused to eat and "coughed" as if it had an internal infection. Suddenly I found it dead. Examining it, I found four pieces of gravel down its throat, and a piece of narrow shell was across the entrance to its stomach. No wonder it would only take Daphnia! I think the cause was panic. They get into corners when the tank is upturned, and then panic and "dive" into the gravel. This one must have done that, and got a mouthful of gravel, which went further back inside it. Moral—don't panic your angel fish—soon.

A. RUTHERFORD, Reithill, Surrey.

Floating Plants

Commonly used in aquaria are plants which, although the aquarist may not realise it, possess some unusual characteristics in the plant world. Three notable ones are fairy moss (Anisla), duckweeds (Lemna) and bladderwort (Utricularia).

The term fern is often wrongly applied to certain plants, but Anisla is a true fern. In common use as a floating plant in tropical aquaria, it possesses no roots and obtains its food from the water in which it floats. Bladderwort is another floating plant with no roots.

Duckweeds of the Lemna species are unique in that they bear the smallest known flowers of any flowering plant. The flower consists of a single gynoecium (female part) and a single stamen (male part). The flower, when present, can be seen on the upper surface of a duckweed plant. All three plants are easily kept in aquaria and are quick in multiplying if suitable lighting is present. This is especially so with duckweed, which grows so quickly that it usually needs to be partly cleared from the water surface at regular intervals.

There are a number of reasons for keeping these floating aquatic plants. They help to complete or enhance the aquatic scene; they supply shade for submerged plants such as the Cryptocorynes which dislike intense illumination; they are often used by bubble-nest builders to help support the nest; they remove small quantities of dissolved minerals from the water and they provide cover for newly hatched fry.

Larger bladderwort has fine green stems, the leaves of which are modified into small bladders or traps which capture minute water creatures. Forming a closely woven mass of threads, the plant provides protection for young fry from hungry adult fish.

These attractive water plants, although small in size, have characteristics which make them notable in the plant kingdom and which make them useful and decorative in the home aquarium.

B. Whitaker

The AQUARIST Crossword

Compiled by L. BRADLEY

CLUES ACROSS
1. 4th II down in Pantano of 7 (6).
2. 15. Down.
3. A communication (6).
4. The worst in the sport is usually written (8).
5. O.K. but not around, but don't forget he makes up for it later (9).
6. Member of the tribe (5).
7. Small fly whose larva is good fish food (4).
8. Sweet little ground (5).
9. Habit (4).
10. New charge for the birds (4).
11. A name for 14 down (4).
12. The net must have a fine one for catching Daphnia (9).
14. Tape made from silk or cotton (6).
15. During what a waiter you tap into (7).
17. Tang on a fish (6).
18. Grain of flour (5).
19. Grain layer of skin (8).

CLUES DOWN
1. A name for fairy moss (5).
2. Fish of tropical fish belonging to Cypselidae (7).
3. Smallest (6).
4. Second hand (6).
5. Lowest of vases (4).
6. Not the game listed as I down but could be member of the bath family (6).
7. Name it for aqua (7).
8. Pterophylla name (5).
9. The side that is very edible (5).
10. Core of a gramophone (5).
11. A species of Echinops (5).
12. If not cultivated the aquarium (7).
13. A type of fish (6).
15. Claimed by the Chancellor of the Exchequer (9).
16. If you have not got one then you cannot play this (4).
17. Built as transport (4).

Solution on page 111
from AQUARIST'S SOCIETIES

Monthly reports from Secretaries of aquarists' societies for inclusion on this page should reach the Editor by the 15th of the month preceding the month of publication.

THE August Newsletter of the Bradford District A.S. contains quite an amount of information, for both young and old, about their activities and also the result of the Jolly Table Show which was held in July.

Cowdrey I, and X. M. L. Roth, 1; Mrs. M. T. Harris, 1; M. A. O.V.S., 1; and M. W. H. Harris, 3; and Miss E. J. S. Harris, 3.

The programme, which followed, was a success, and the result of the Jolly Table Show was a great amount of interest especially to the younger members.

The results of the table show were as follows:

M. J. Heptin (60 points); Mr. J. H. Wood (50 points); T. H. H. Wright (40 points); G. E. H. H. Jones (30 points); G. E. H. Jones (20 points). Miss E. J. S. Harris (10 points).

The Jolly meeting of the Duarte A.S. was attended by 31 members and friends.

The table show was a great success and the judges were W. Lockman and J. A. T. Milby, respectively.

The results were:

G. J. G. C. P. Russell (100 points); E. W. Russell (70 points); E. W. Russell (50 points); E. W. Russell (20 points).

The Duarte meeting of the IDC A.S. was attended by 31 members and friends.

The table show was a great success and the judges were W. Lockman and J. A. T. Milby, respectively.

The results were:

J. M. M. G. C. P. Russell (100 points); E. W. Russell (70 points); E. W. Russell (50 points); E. W. Russell (20 points).

At the South London section of the F.G.A. meeting for July a tipi was arranged by M. J. H. Phillips for 'The boxes of gold' which was of great interest especially to the younger members.

The results of the table show were as follows:

M. J. Heptin (60 points); A. O.V.S., 1; A. O.V.S., 2; T. H. H. Wright (40 points); G. E. H. H. Jones (30 points); G. E. H. Jones (20 points). Miss E. J. S. Harris (10 points).

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The results were:

J. M. M. G. C. P. Russell (100 points); E. W. Russell (70 points); E. W. Russell (50 points); E. W. Russell (20 points).

At the August meeting of the Airborouh and District A.S. the main event of the evening was a furnished aquarium competition for members which was won by M. H. Dunlop.

The specified class in the monthly table show was won by Mr. R. L. Lawton, second being Mr. R. H. Brown and third Mr. E. E. E. Evans. The A.O.V.S. class was won by Mrs. D. Alexander as also was the service class. Future shows include a furnished aquarium competition for members.

In July Blackpool & Fylde A.S. had a very successful table show at Mr. D. Jones of Marine World on "Life on the sea". The table show was won by Mr. D. Jones and second being Mr. D. Jones and third Mr. D. Jones and fourth Mr. D. Jones.

At the Duarte meeting of the IDC A.S. was attended by 31 members and friends.

The table show was a great success and the judges were W. Lockman and J. A. T. Milby, respectively.

The results were:

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At the annual general meeting of the Westwell A.S., held at the School, the following officers were elected: Mr. R. H. Brown as President, Mr. J. H. Smith as Vice-President, and Miss E. B. Wood as Secretary.

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THIS monthly meeting of the N.K.L. A.S. is
held on Wednesdays, 8th September.
These meetings are held at the National
Experimental Laboratory, East Kilbride, on
the second Wednesday of each month until May,
and are open to members only.

The Annual table show of the Yeovil &
District A.S. was held at the usual address, with
entries well up to average. Primaries--Goldfish: 1. Mr. J. T. Coyle (Yeovil),
2. Mr. J. C. T. Green (Yeovil), 3. Mrs. D. H. Stow-
ning (Yeovil), 4. Mrs. B. B. French (Yeovil), 5.
Mr. J. E. C. Pugh (Yeovil), 6. Mr. D. H. Stow-
ing (Yeovil), 7. Mrs. J. H. Stowning (Yeovil),
8. Mrs. J. H. Stowning (Yeovil). Pond or River Fish:
1. Mr. J. T. Coyle (Yeovil), 2. Mr. J. C. T. Green
(Yeovil), 3. Mrs. B. B. French (Yeovil), 4. Mrs.
D. H. Stowning (Yeovil), 5. Mrs. D. H. Stow-
ing (Yeovil), 6. Mrs. J. H. Stowning (Yeovil),
Stowning (Yeovil).

The special section of the show was won by Mr.
J. T. Coyle (Yeovil). The results were as follows:
Best exhibit in show: J. T. Coyle (Yeovil),
Best exhibit in show: J. T. Coyle (Yeovil),
Best exhibit in show: J. T. Coyle (Yeovil),
Best exhibit in show: J. T. Coyle (Yeovil),
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Best exhibit in show: J. T. Coyle (Yeovil),
Best exhibit in show: J. T. Coyle (Yeovil),
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The following meeting will be held at the National
Experimental Laboratory, East Kilbride, on
the second Wednesday of each month until May,
and is open to members only.

RECENTLY the Rugby A.S. held a table show
and quiz.
The judge asked comments on the entries
before the announcement of the winners, which were:
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<th>Plant</th>
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<tr>
<td>Aponogoton crispin</td>
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<td>Aponogoton Lindelatum</td>
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<td>Aponogoton Ulvaceus</td>
<td>3/6</td>
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<td>Amazon Chain Sword</td>
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<td>Bacopa</td>
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<td>Cabomba</td>
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<td>Myriophyllum</td>
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<td>Indian Fern</td>
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<td>Hygrophylla</td>
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<td>Wisteria</td>
<td>2/-</td>
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<td>Giant Hygrophylla</td>
<td>2/-</td>
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<td>Crypt. Bolianese</td>
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<td>Ciliata</td>
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<td>Malayan Sword Plant</td>
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<td>Madagascar Lace Plant</td>
<td>17/6</td>
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40 plants for 20/- Inc. Water Lettuce, 1 Cryptocoryne, 1 Aponogoton
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Northampton
Telephone: Northampton 38841
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R.C.T.P.A.A.

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147, Horsley Fields, Wolverhampton
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