No. 147

WATER LIFE

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INCORPORATING AQUARIA NEWS

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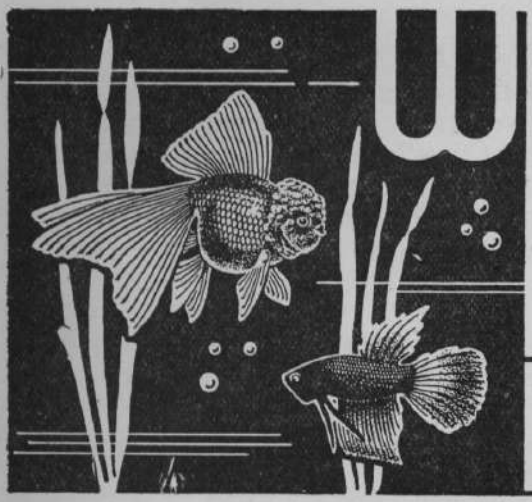

WATER LIFE

INCORPORATING AQUARIA NEWS

A weekly paper devoted to the study of every thing which lives in or near the water

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Are You a Food Waster?

AMONG the many requests we receive daily asking for advice, a large proportion describe a state of affairs which has arisen simply through the fishes in an aquarium being offered far more food than they are able to consume. We usually speak of this rather loosely as "over-feeding," though, of course, the fish are not suffering as a result of eating to excess, but from the results of the putrefaction of excessive amounts of *uneaten* food.

Usually it is surplus prepared fish foods which, putrefying, poison the aquarium and kill the inhabitants; but excessive amounts of live food which remain uneaten, die, and then decompose, bring about exactly the same state of affairs, and often much more disastrously.

In aquarium literature of all kinds the basic principle of offering as much food to the fishes as they will completely consume in five to ten minutes is constantly reiterated. In these pages this statement is frequently made in one form or another, and yet apparently it is not easy to follow such simple instructions. If it is desired to discover how much food a group of fishes will consume at one meal it is only necessary to spend ten minutes or so at the aquarium introducing repeatedly small quantities of the particular foodstuff as long as the fish continue to eat it readily. Introduction of further food should be stopped as soon as there appears to be any falling off of interest in it, and then the more hungry members of the family will go around clearing up the fragments.

Now, there are several factors which govern the amount of food any fish will eat. First of all, some foods are more palatable to fish than others; live food, *Daphnia*, bloodworms, and so on we recognize as being most acceptable. Such foods will be taken in greater quantity at a sitting than dried foods. Secondly, the food offered must be of suitable size. It is no good offering large Goldfish a powdered prepared food or trying to feed young Guppies on large pieces of chopped earthworm. Both procedures will eventually lead to disaster. Another important factor to consider is the frequency of feeding. Fishes fed once a day will eat relatively more at that one meal than will others who have two or three meals a day. Finally, there is the influence of temperature. Within their normal range of temperature fishes will eat considerably more when warm and active than when cooler and rather less active. This is, of course, particularly well demonstrated by the seasonal requirements of fishes in outdoor tanks and pools. Note, too, the fishes' reactions to any new or unusual food.

A little close observation and the knowledge of your fishes' likes and dislikes, which comes only from close acquaintance with them, are the essential requirements if you are to be a good fish chef. It is always safer to underfeed than to give too much. In a state of nature it is not likely that fishes are continually in the well-fed condition we associate with aquarium fishes, and it will be advantageous rather than harmful if your fish are, excepting immediately after a meal, eagerly anticipating a little more when you approach their aquarium. By this do not assume that we like to see fish in that underfed condition in which they positively fall over one another, setting the water surface boiling, when they think a feed is imminent. We know that some misguided persons—we will not say aquarists—do keep their fish in such a condition because they find that feeding so little, the aquarium keeps much cleaner, and so a little "work" with the dip-tube and siphon is saved.

Finally, perhaps we may be permitted to note again the signs of "over-feeding." First of all, of course, excess food will be seen in the aquarium. If it is live food it will be very obvious, and, provided only a small quantity is present, will be likely to be consumed before it dies and does any material damage. Where excessive amounts of dried food are successively introduced in the same part of the tank and the food sinks to the bottom, a grey patch will form, which will grow a filmy sort of mould, and the sand will change from its clean yellow-brown colour to a dense black. Dying live food and floating prepared food may eventually come to rest in hidden places scattered about the aquarium floor, and may not be so obvious. In any case the

putrefaction soon has its effect on the water, which assumes a grey and unhealthy appearance, and loses its pleasant and clean " pondy " smell, becoming quite offensive. The fish become listless, and their fins are not held erect and jauntily. In advanced stages, of course, they continually swim at the surface, and begin to die one by one.

The best remedy is, naturally, not to introduce excessive amounts of food, but when the damage is done and the tank fouled, then clean it right out and start all over again, this time taking care to use your eyes and the dip-tube intelligently.

We hope that these notes will prove valuable to many beginners, but we have a shrewd suspicion that it will not be a very great time before they have to be repeated in some shape or disguise for over-estimating the size of a fish's stomach is the beginner's most frequent mistake.

The Walthamstow Albino Frog

THE Albino Frog, described and illustrated in WATER LIFE, July 12, 1938, has been successfully mated with an ordinary light-coloured female frog. Needless to say I am waiting anxiously for the spawn to appear. Owing to the severe weather that we had in December last, I was greatly relieved to see this frog come out of hibernation, although I had taken great care with it.

There have been many queries recently in WATER LIFE concerning the hibernation of frogs, owing to the large numbers which have been found dead in garden ponds; and my experience this year may be of interest to readers.

The Albino Frog was kept in an outdoor vivarium containing a small pool, about 6-in. deep, and towards the end of the summer months I dug a tunnel under this pool, into which the Albino retreated when the cold weather began. The entrance to this tunnel was covered with straw, leaving a small space, so that the frog could, during mild weather, come out of his retreat. He eventually came out of hibernation at the end of February, and on March 5 I managed to find a light-coloured female. I put them both into an aquarium 30-in. by 15-in. by 15-in. The water was from 2-in. to 4-in. deep, and plenty of *Anacharis* and some large pieces of stone for landing places were present. The frogs soon settled down in the aquarium and within three hours they mated; now I am waiting with much interest for the result.

In conclusion I wish to add that all the frogs that hibernated in my pond, which is 2-ft. deep, were found dead during the cold spell in December last. I have had this experience previously, and that is why I took care that the Albino did not share this fate. It appears that frogs prefer to hibernate as near as possible to a pond. Some unfortunately choose the garden pool, and if this is a cement one, the results are often fatal. In my garden I have sunk a bath, and round the edges I have left a margin with some rockery on top, and on disturbing this rockery recently I found quite a number of frogs hibernating. These are the only ones that have survived this winter in my garden.

This convinced me that the rockery is the place for frogs to hibernate in safety, although I have found them in the mud at the bottom of a garden pond, when I have to empty it during winter, but in their natural surroundings, I believe they prefer a damp spot close to the pond in which they intend to spawn in the spring months.—F. B. Fox.

* * *

THE ZOO'S SLEEPER AWAKES

A sure sign that spring is at hand is the wakening of Agamemnon, the Zoo's 25-ft. Python, from a sleep that began last November. As he roused himself he prepared to go through the annual procedure of changing his skin before breaking a long fast. The keepers seized this opportunity to examine his jaws, which had a lop-sided look. That something was wrong with the Python's mouth was first noticed after he took his last meal in the autumn, and it was thought he had strained the jaw in some way. Close examination has revealed a small cyst inside the upper " lip." By holding the head in a noose the keepers managed to lance the growth, but could not remove it completely, for Agamemnon is a formidable and difficult patient. When he had finished changing his skin, the Python sought a meal, and greedily swallowed a duck. Now he has taken another meal, and since his mouth gave no trouble it is expected that the cyst will disappear.—*Birmingham Post.*

The Amboina Box Tortoise

By "AMPHIBIUS"

ASIA has its own Box Tortoise, and quite a sizable consignment of one of the species arrived in London early last summer, and they were christened erroneously by the importer, "North African Terrapins."

The animal in question was the Common or Amboina Box Tortoise, now known as *Cuora amboinensis*. Readers will find it referred to in the older literature as *Cyclemys amboinensis*. The other members of *Cuora* are *C. yunnanensis* and *C. flavomarginata*, which are extremely rare here, and *C. trifasciata*, which is occasionally to be had.

The Amboina Box Tortoise is found in Burma, south-east to the Moluccas, and also in the Philippine Islands—an immense range. It grows to a larger size than do the American Box Tortoises; my largest male and female measure twenty-five centimetres over the shell. From being typically Terrapin shaped (*i.e.*, flat and rather oval) when young, the females become dome-shaped with age, while the males remain flat, although, of course, increasing considerably in length and breadth. The carapace in the young is dark brown, and it becomes blackish with age, the plastron being yellow and flecked with black throughout life. The head markings are remarkably constant, consisting of lemon-yellow streaks passing backwards along the side of the head and part of the neck. The top of the head is covered with a very smooth and shiny-black skin which may have a greenish tinge in the young.

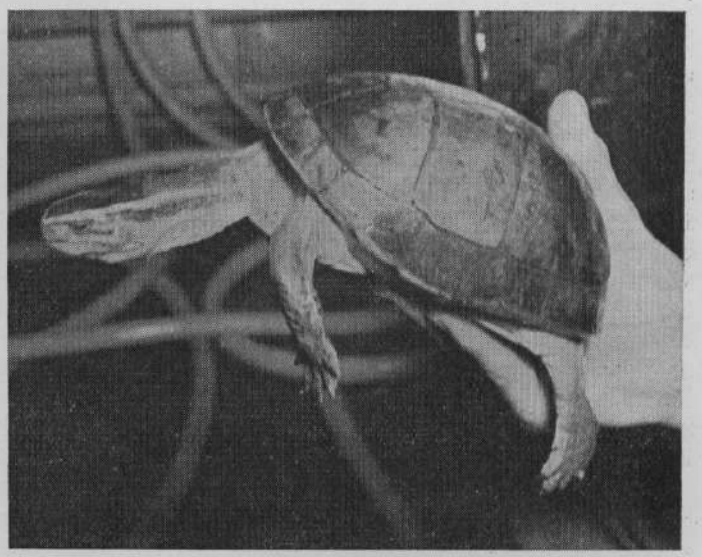
The shell has three longitudinal ridges in youth. The adult male completely loses his, but the female may retain the middle one throughout life.

Although those specimens available were only about half grown, they could be easily sexed, since the males early develop a concave plastron and have a large tail. The female's plastron is slightly convex, and her tail is reduced to quite a ridiculous rudiment. Limbs are quite well developed in front, but the hind limbs always seem to me to have been made for a much smaller animal and to have been put on *C. amboinensis* by mistake.

In disposition I regret that this species cannot be put among the most attractive tortoises, and adults might even be described as morose. The young ones exhibit more response, but, even so, activity is always related to food, which seems to be the only thing which will overcome their persistent shyness.

Now, as regards food. Dr. Malcolm Smith, in "The Reptiles of India," states that they are dainty feeders and strictly vegetarian. Readers will, therefore, be well advised to offer them vegetable foods in suitable small quantities. I, however, find the animal to be not only strictly carnivorous, but also a remarkably heavy feeder. One female in my possession has eaten the following meals at various times: A ten-inch alligator, which she killed and of which she left only the last inch of tail, eating even the head; twenty-three baby mice; two and a half smelts; four inches of a large eel, and four tablespoonfuls of chopped raw beef. She is fed every day, of course, during autumn, winter and spring, when the quoted meals were taken; less regularly in summer. The rest of my specimens are no less heavy feeders, and it falls to them to clear up each day everything in the meat line which is left over from feeding the other animals. I might mention here that the examples at the Zoo eat only meat, as do all the specimens of *C. trifasciata* in the Musée des Colonies at Paris although the last have fish as well. Also, in the letter that has called forth this article, the writer says that her specimen began by eating worms.

They do not seem to me to be very good subjects for outdoor life in this country, but, being swamp animals, it ought to be possible to fix them up an enclosure in which they would be happy. They are very awkward in deep water and swim very badly, so their enclosure requires to have a pond not more than six inches deep. My enclosures are unsatisfactory for them apparently, and the creatures seek out the most densely planted spot into which they creep as far as they can, and then sit down and shut up. In the wild these tortoises are found only in very damp places. It is difficult to get them to feed except during the hottest parts of the summer, but this is not of much importance, and the enormous quantities of food they eat indoors during the cooler seasons are apparently enough to keep them going during a summer outdoors as well. They can eat either in or out of water.



Young Male Amboina

It is easier to make them happy indoors, and they do not necessarily need a very high temperature—that of a constantly warmed living-room or kitchen is quite adequate, but under such conditions, of course, they eat considerably less than when kept at about 80 deg. F., as their metabolic requirements are correspondingly reduced. Such a slackening in appetite need give no cause for alarm. A baking-tin makes a good bath for them, and the rest of the floor of their case should be liberally covered with damp peat moss. Most of their time is spent in the pan of water waiting for food, but

if the water is too cool, they will leave it and bury themselves in the peat. They show themselves off much better if they are given an electric light bulb, but this is not indispensable.

At the temperature at which mine are kept (80° to 70°) the males exhibit considerable sexual behaviour, but the processes incidental to reproduction are not preceded by any of the often pretty and elaborate or odd courtship ceremonies which are practised by so many other terrapins. So far I have not had any eggs.

Any information about the feeding habits of readers' examples will be very welcome.

The Jet-black Molly

By J. A. OAKES

IT is the ambition of most aquarists at one time or another to own a Jet-black Molly. I have been successful in breeding and rearing these velvety-black beauties of the aquarium, and as I have received many requests from aquarists for help over their various difficulties, I wish to pass on the knowledge I have obtained.

Very often I am asked, "How can I stop my Mollies eating their young? " The inquirers are amazed when I say, " Feed the parents." This reply may seem too brief to be helpful, but I firmly believe that all Mollienisia are really vegetarians, as they have long guts, and if they are sufficiently well fed they will not touch their young. One or two meals a day are not enough. I experimented with Bemax feeding every half-hour for twenty-four hours, and not a particle was left over to foul the water. Not one of my Mollies will eat flesh foods other than insects, and then only when there is no floating dried food about. I had a tank containing four Perma Black Mollies, and raised 167 young in two months, not one being eaten, and the parents absolutely ignoring them.

Another question I am often asked is, " At what temperature should I keep Mollienisia? " I have tried every degree from 65 to 95. At 65 deg. the fish were lethargic, had poor appetites, soon caught chills, and had drooping fins and hanging tails. At 82 deg. they moved swiftly about the tank, with fins erect and outspread, and had an appetite for all the food one cared to give them. They appeared happy, comfortable, well fed, and were surrounded by sturdy black fry, which were unafraid of their larger kin.

Another question I am often asked is, " Does it kill Mollies if one transfers them to another tank at the time of delivery? " In my opinion, which I have formed after extensive tests, no harm is done other than that which can be done to any fish which is the victim of rough and careless handling. I transfer them at any stage if convenience demands it. If one is overdue in delivering her young I put her in a lowered temperature (not more than ten degrees), and more often than not she delivers her young within twelve hours. If not, however, I put her back in the original tank at 85 deg., which often succeeds.

" Do Mollies need more room than other fish of their kind? " The following experience will answer this question. In a tank, 24 x 12 x 12-in., I had six adult Mollies and forty-two babies; the latter grew to one inch in length in five weeks, and I only removed them because the adults were ready to deliver more young, which would have caused unnecessary congestion. I am convinced that the cause of this success was continued feeding with vegetable foods. Space did not matter, not did the lack of algæ which resulted from their numbers: as long as their supply of artificial foods was continuous they continued to thrive.

" What kind of water do you find best for Mollies? " Water on the alkaline side is best. This, with a handful of Tidman's sea salt to every twelve gallons, provides a solution which is identical with that of their native waters. I found that the salt caused them to be unusually prolific and to present larger broods than those kept in tanks without it.

Good Perma Black Mollies will breed true only if mated with their own kind. Do not spoil the strain by crossing with poorer strains. The young, too, should be vigorously culled, and no speckled adults used in breeding.

* * *

EAST LONDON FOSSIL FISH

No fish story since Jonah has been more surprising than the recent catch, near East London, South Africa, of a living specimen of the Coelacanth fish, which had been believed to be extinct for 50,000,000 years. One might as well have expected to see a mastodon walking down the Strand. The creature was five feet long, and has been skinned and mounted by a local taxidermist. Unfortunately the flesh has been thrown away, thus denying to any enterprising gourmet the opportunity of a meal of which he might have boasted to the end of his life.—*Observator.*

. . . . . .

DRAGONFLIES AS FOOD

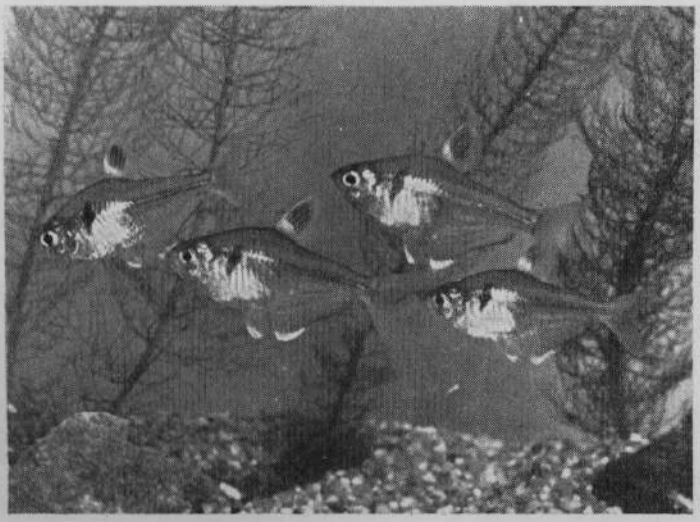
Do they still eat dragonflies in Malaya? Possibly, though the custom may have died out. At all events, fried dragonflies were at one time deemed very tasty morsels by the natives, and the boys had their own way—and a very effective way—of catching them. On the island of Lombok, according to one writer, " every day boys were to be seen walking along the roads and by the hedges and ditches, catching dragonflies with birdlime. They carry a slender stick, with a few twigs at the end well anointed, so that the least touch captures the insect, whose wings are pulled off before it is consigned to a small basket. The dragonflies are so abundant at the time of the rice-flowering that thousands are soon caught in this way. The bodies are fried in oil with onions and preserved shrimps, or sometimes alone, and are considered a great delicacy."—P. M.

Hyphessobrycon Serpae

By NORMAN BAKER

WHEN *Hyphessobrycon serpæ* was first introduced to aquarists, it was described as "the jewel of the Characin family," with the proviso "at least until a finer one is discovered." That was nearly six years ago, and although certainly "a finer one" in the shape of the Neon Tetra (*H. innesi*) has been discovered, *serpæ* remains one of the most pleasing of the more common, hardy, and less expensive Characins.

A brief description of the coloration can best be given by reference to the accompanying illustration, from which an impression of the general lines and form of the fish can also be gained. The body and fins are suffused with a lovely rosy hue. There is a well-marked, elongated black spot on the shoulder, a black patch on the dorsal, and the anal fin bears a narrow but well-defined black edge. The shoulder spot is edged behind



by an almost light area, but in the fins the white markings, which tip the pelvics and the anterior corner of the anal and adjoin the lower edge of the black patch in the dorsal, are so intense as to have the appearance of enamel paint.

Fully grown fish are nearly 1¾-in. in length, and at this size their coloration is permanent. Young, immature specimens lack the red suffusion of the body, or at any rate it is only present as a very pale pink apology. Adult fish are seldom on the market, and usually quite small specimens are offered. Nevertheless, these are hardy and grow quite rapidly, and one has the great pleasure of seeing them gradually come into the full bloom of maturity. This is a long-lived species.

Serpæ is an entirely peaceful species, and from this point of view is eminently suited to the happy-family aquarium, but quite definitely it should only be associated with other small fishes, for in a large aquarium housing more robust—or perhaps "tough" would be the better word—species, *serpæ* is inclined to hide away where, not only does it remain unappreciated, but also it may not get its fair share of food. Do not get the idea that this is a delicate species; on the contrary, it definitely is not; but it is rather shy, retiring, and very skittish when a net appears. To be seen to the greatest advantage this species needs a well-planted aquarium, situated where it receives a good front light.

The species does not seem especially sensitive to the quality of the aquarium water, but it definitely prefers it bright and clear, not too old and not too alkaline. Breeding experiences such as are recorded would indicate a preference for soft, well-aerated water when spawning. *Serpæ* does not like low temperatures, however, and is happiest over a range of 77—80-deg. F., with a slightly higher average for stimulating spawning. Feeding is quite straightforward. Any dried food and all the usual live foods are eaten, but not greedily or in large portions. In all things *serpæ* is very reserved. One point that should be borne in mind is that this fish has quite a small mouth, and food should be small.

Breeding *H. serpæ* is not by any means readily brought about, but many would-be breeders do not succeed because they try to spawn immature or inadequately prepared specimens. Some idea of the aquarium conditions favoured has already been given, and the planting should consist in part of thickets of *Myriophyllum* and other plants suitable for the reception of spawn. Intended spawners should be specimens of good size, and, with less easy species like this, it is a good plan to separate the sexes for a week or so previous to the attempt at breeding.

The sexes are not easy to differentiate. The males are smaller, more colourful, and of a more active and perky disposition. The black in the dorsal fin is dense and more clearly marked, and the white markings are more intense. In old males the free edge of the tail is in some specimens said to be marked with small black lines alternating with white. The females appear, when conditioned, definitely deeper and rounder in outline.

After introducing to the spawning tank, and having been given time to settle down, the pair should be subjected to a gradually rising temperature, say from 77 to 85-deg. F. overnight. This will usually precipitate spawning. The pair, all their colours intensified, particularly the male, dart in and out among the plants. Here and there they stop side by side, and with bodies slightly inclined and the male's tail curved and arched over the female, a group of eggs is extruded and fertilized. The eggs adhere to the plant leaves, and about 100 or so will be laid in the space of a couple of hours by an average female. The adults are best removed, though, in the writer's experience, they have never eaten any appreciable amount of spawn.

At 82—84-deg. F. the eggs hatch out in a little over two days, and the very small, transparent fry begin a life of their own. They require very small food and lots of it. Unless this is available the mortality is very high in the first week or so. After about a fortnight they can take very finely graded *Daphnia* and quite readily learn to eat fine dried food, which is a great advantage. At the age of three months they should be a good inch long in the body.

The Perfect Water Garden

By CHARLES W. HEWITT

I IMAGINE that there are many people to whom the formal water garden, with its pond-like aspect, is not acceptable. There are those who look upon rock and water gardening as necessary adjuncts to each other, and seek to combine the beauties of both. Thus they produce alpine meadows with streamlet effects or a series of small pools connected by narrow waterways. Sometimes the higher flights of ambition lead to waterfalls and cascades. It should be realized that gardens of this nature entail a great deal more work than the less ambitious projects, and one should be more than ordinarily careful over the making, so that they do not leak.

Our plan shows a very simple embodiment of this idea. There are merely two pools (of different sizes) connected by a narrow waterway. Rockwork, woodland, grass, or herbaceous plants can be used as a framework, according to the whim of the designer or the position of the water garden, and will materially assist in setting off the charm of its unusual contours. As in all concrete work, the most convenient way to set about construction is to mark out the outline first, so as to form some idea of the finished effect, and then make the deeper portions, that is, the square and rectangle in the plans. Have them about two feet deep, and prove them watertight before attempting to make the shallower parts. The latter can be anything between six and twelve inches deep; an uneven surface will not matter, as it enables one to grow plants with varying requirements as to depths of water.

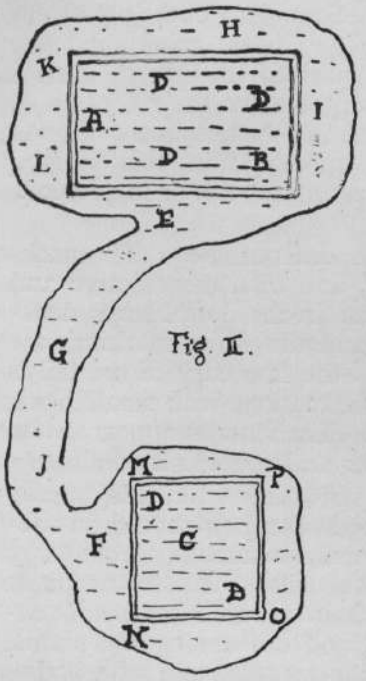


Fig. II.

For the purposes of estimating the number of plants required for each plan, we will assume that the square pool is six feet on all sides, and the rectangular one six feet by nine feet. The tops of each should be three inches below the level of the outer wall of the shallow margins, so that water may flow freely from one part to another, and disguise the central tanks. It is assumed that all the gardens are in sunshine.

FIG. 1.

A.—*Nymphæa Laydekeri purpurata,* a prolific water lily with purplish-rose flowers and green leaves.

B.—*N. Odorata alba,* A sweet-scented lily with pure white, cup-shaped blooms. The flowers are small, but quite free.

C.—*N. Paul Hariot.* A variable *Nymphæa,* the blooms open a delicate apricot colour, and change from orange-red to flame on succeeding days. The foliage is attractively blotched with purple and bronze markings.

D.—Twenty submerged aquatics planted at intervals in the deeper portions of the pool. *Elodea crispa* and *densa, Hottonia palustris, Tillæa recurva, Myriophyllum* species, and *Callitriche verna* are all suitable.

E.—*Aponogeton Krauseanum.* A comparatively new *Aponogeton* to British gardens, but one of outstanding merit and quite hardy out of doors. The flowers stand several inches out of the water, are a uniform shade of sulphur-yellow, and very fragrant. The leaves, as in *Distachyum,* are strap-shaped.

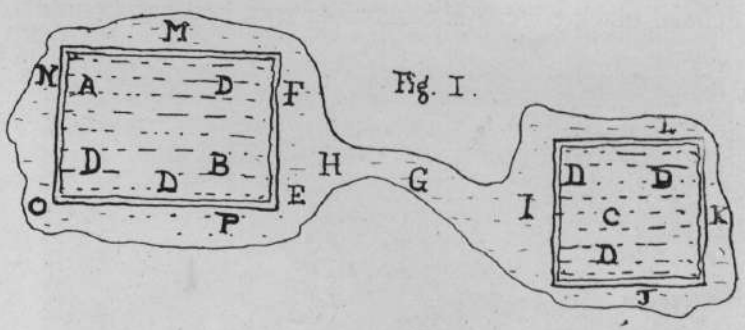


Fig. I.

F.—Three *Caltha palustris plena.* The double form of the well-known Marsh Marigold is a welcome addition to the water garden in early spring.

G.—Six *Myosotis palustris.*—The charming little Water Forget-me-not soon becomes established in such situations as this, and will become a blue sheet of blossom as the summer progresses.

H.—Three *Calla palustris.* This North American Aroid has small, glossy leaves and tiny, white, arum-like flowers. It scrambles across the water surface, but is easily kept under control.

I.—Two *Butomus umbellatus.* The Flowering Rush, with umbels of rose-pink flowers and rigid, sword-shaped leaves. Height 2-ft.

J.—*Typha angustifolia.* A tall-growing plant (5-ft.), with narrow, grassy leaves and brown "bulrush" heads of inflorescence.

K.—Two *Sagittaria japonica.* Arrow-shaped foliage and spikes of three-petalled, white flowers. Height 2-ft.

L.—*Ranunculus lingua grandiflora.* Resembles a giant Buttercup with shining petals and lanceolate leaves. Height 3-ft.

M.—Two *Cyperus vegetus.* An Umbrella Grass with greenish inflorescence in the young stage, and brownish glumes towards the end of the season.

N.—Two *Pontederia cordata.* A handsome plant with cordate leaves and spikes of soft-blue flowers. Height 2-ft.

O.—Two *Sagittaria japonica plena*. Resembles K, except that the flowers are double. It does not reproduce quickly.
P.—Two *Butomus umbellatus*. A further supply of this lovely perennial will not look amiss.

Fig. 2.

A.—*Nymphæa Carisbrooki*. A beautiful water lily with delightfully fragrant flowers standing several inches above the water level. They are a uniform shade of deep rose-pink.
B.—*Aponogeton distachyum*, the Water Hawthorn, has strap-shaped foliage and pure white, forked flowers having jet-black anthers. It is very fragrant, especially towards evening.
C.—*N. Moorei*. The foliage of this water lily is freely spotted with bronze markings which gives it character, even when out of flower. The blossoms are a uniform shade of soft primrose yellow.
D.—Twenty submerged aquatics.
E.—Six *Myosotis palustris*.
F.—Three *Menyanthes trifoliata*. The Bog Bean delights to scramble in and out of the water, and has olive-green bean-like leaves and clusters of fringed, white flowers.
G.—Six *Iris lævigata*. A fine aquatic growing about 2-ft. high, the erect stems carrying rich blue flowers, each of which has a golden spot on the petals.
H.—Two *Saururus Loureirii*, carries spikes of yellowish-white flowers and grows about 12-in. high.
I.—Two *Juncus spiralis*. A curious rush, having the stems twisted in a corkscrew fashion instead of growing straight.
J.—*Menyanthes cristii—galli*. Grows 1-ft. to 2-ft. high, and has fringed white flowers and rounded leaves.
K.—*Peltandra alba*. A stout plant with glossy, arrow-shaped leaves and large, arum-like flowers. These are succeeded in autumn by clusters of red berries.
L.—Three *Typha minima*.—The miniature Reedmace only grows about a foot high, but is very prolific when established.
M.—*Orontium aquaticum*. The Golden Club has large, velvety leaves and spikes of small, golden-yellow blossoms. It needs plenty of soil, as the roots penetrate a long way.
N.—*Typha Laxmanni*. A graceful form, growing only 18-in. high; unfortunately the true plant is scarce, but it is unrivalled for grace and slender habit.
O.—*Jussieu repens*. A free-flowering plant with bright golden blooms. It grows floating on the water or else makes a small bush, about 3-ft. high.
P.—Two *Lobelia paludosa*. A useful aquatic with spikes of pale-blue flowers. It grows about 3-ft. high, and is in bloom from May to July.

Fig. 3.

A.—*Nymphæa Laydekeri Lilaceae*. A small-growing but free-flowering water lily with soft-pink flowers and green foliage.
B.—*Aponogeton distachyum*.
C.—*Limnanthemum Nymphoides*. The small, rounded, water lily-like leaves float on the surface, and the fringed, poppy-like flowers, of a bright yellow colour, stand out of the water.
D.—*Nymphæa James Brydon* has large, red, cup-shaped blooms and green foliage.
E.—Twenty submerged aquatics.
F.—Six *Cotula coronopifolia*. The popular little Brass Buttons grows only 6-in. to 12-in. high, but the masses of golden daisy-like flowers give it a very bright appearance at the water's edge. It is an annual, but seeds freely.
G.—Six *Myosotis palustris*.
H.—Three *Echinodorus ranunculoides*. A gay plant with tapering leaves and loose umbels of pinkish flowers.
I.—*Acorus calamus* fol. var. The variegated Bede

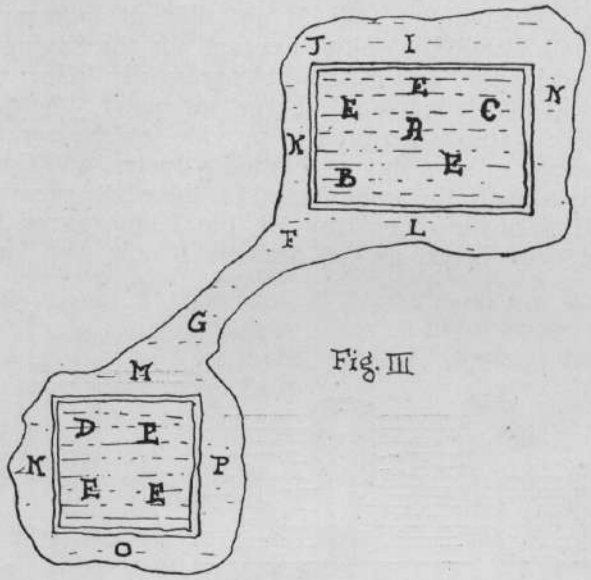


Fig. III.

Sedge, with Iris-shaped foliage and brownish spathes. It has an aromatic scent when crushed. Height 2-ft.
J.—Two *Butomus umbellatus*.
K.—*Decodon verticillatus*. A low-growing shrub with purplish flowers and willow-like leaves. In autumn these assume the most handsome tints, and are red, bronze, and yellow.
L.—Two *Eriophorum latifolium*. A fine form of the Cotton Grass.
M.—Three *Caltha polypetala*. A giant Marsh Marigold growing 2-ft. to 3-ft. high.
N.—Two *Sagittaria japonica*.
O.—*Orontium aquaticum*.
P.—*Pontederia cordata* var. *lancifolia*. A giant form of the North American Pickerel Weed. Height 4-ft. to 5-ft.

* * *

LIZARD'S COLOUR CHANGES

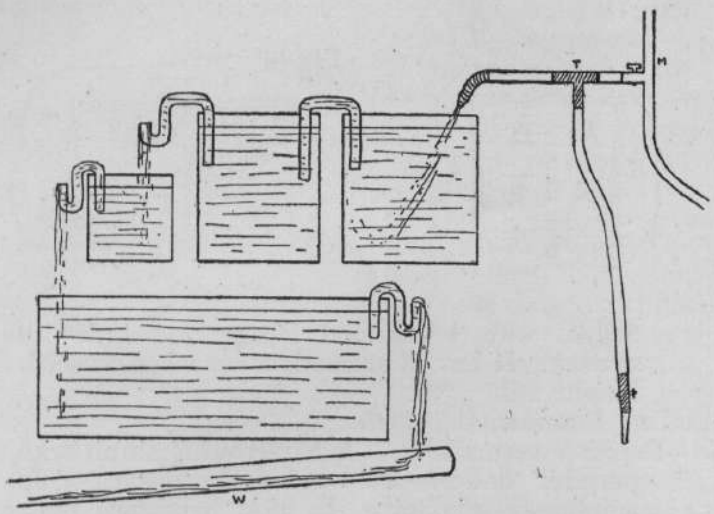
An addition to the Reptile House at the London Zoo is a Londok Lizard, or Sumpah-sumpah of Malaya. This Lizard, which is of a uniform green with a short body and a very long tail, is characterized by its extraordinarily rapid colour change. This it accomplishes even more readily than the better-known Chameleon. The Londok is particularly welcome, since these interesting reptiles are not often exhibited in the menagerie. —*Observer*.

The Aeration of Coldwater Aquariums

By E. M. ATKINS

AERATION of coldwater aquariums for an hour or so a day is definitely beneficial, and in the case of creatures such as Trout, Miller's Thumbs, and Crayfish, which require a good deal of oxygen, it is almost a necessity.

Aeration by means of running tap water proves satisfactory, and if the aquariums are in the greenhouse or other out-building this is not difficult to arrange. It is well worth the initial expense for the saving of time and labour, and it does not necessarily follow that there will be an increased charge for water. Actually very little water is required to provide jets for aerating for an hour or so a day. I fitted a meter, and I now pay according to the amount used for the whole premises. The fitting of the meter cost £4, but I have saved this several times over, as the amount I now pay for is



considerably less than that due for my house at the fixed charge, and I use running water for the garden ponds as well as the aquariums. This, of course, is due to the fact that I use comparatively little for household purposes.

Running water is also useful when tanks are emptied or when sediment is siphoned off. I have never found any harm resulting from putting fish straight into tap water, except when they have been in soft water, and the tap water is very hard. It is then necessary to mix some of the soft water with the hard. Fish can live perfectly well in very hard water, but it is the sudden change from soft to hard which is definitely harmful, and I have known it to cause death within a few hours.

Before having a direct supply I tried pumping water from the tanks to a height of about 5-ft., and then running it back again. This worked quite well, but the growth of algæ in the pipes and in the tank used as a reservoir gave a lot of trouble. Probably, however, had all the apparatus been painted to keep it dark, this trouble would not have arisen.

The water should be taken from the main supply by a small tap to which rubber tubing can be fixed to connect it to a jet. This jet is made by drawing a piece of glass tubing to a fine point, and it should be placed about 2-in. above the surface of the water to be aerated. It will carry minute bubbles of air to the bottom of the tank, and will also create a current.

Glass " T " pieces can be inserted in the rubber tubing at any point, and any number of jets can be used; they can be controlled individually by glass taps if required. There is, however, no need to aerate more than one tank in three or four, as the water can be conveyed from tank to tank simply by filling a siphon and putting one arm in each tank, as will be seen from the illustration. The overflows should be turned up at the end, as shown, and they will always keep full when the water ceases to flow, and will not require attention to keep the water at the correct level.

By using this method any tank which is suspected of containing infection can be isolated merely by moving the siphons. Waste water can be run into a pond, but it is better to run it into a bog garden in case there is any infectious disease present. The only troubles in connection with this system are that the rubber tubing wears out in about six months, and that if algæ grows in the glass tubes, bubbles of oxygen will form and cause air locks; this latter can be avoided by painting the tubes.

Glass tubing is cheap, and the necessary bending and drawing are easily done. The necessary material can be obtained from a glass blower, or a maker of scientific apparatus. It is sometimes possible to pick up slightly damaged apparatus which is good enough for the job.

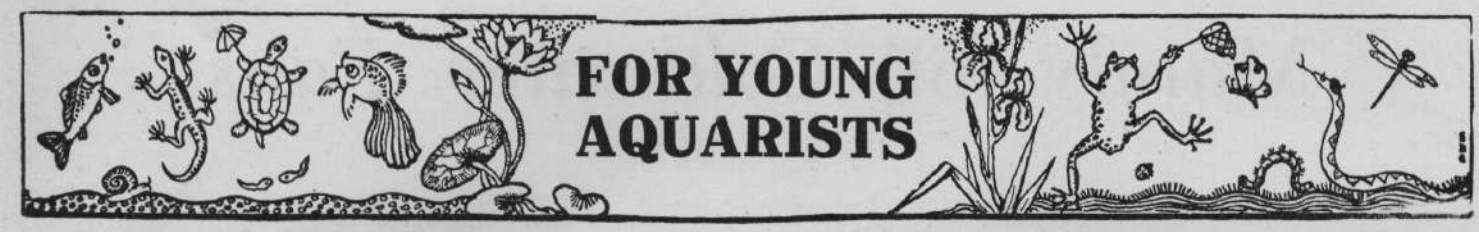
* * *

THIS WEEK'S PLANT

Marsh Marigolds

These beautiful plants bloom freely each spring, and often produce a second crop in autumn. The leaves are dark green, and the large buttercup-like flowers are usually bright yellow. They enjoy a rich, boggy soil on the banks of ponds or streams, and will grow quite happily in several inches of water. Planting may be carried out in March or October, and the plants may easily be increased by division of the roots in March or July.

Caltha leptosepala is a species from North-west America; it grows about twelve inches high, and the yellow flowers are out in May. *C. palustris,* the species native to Britain, flowers in May. There are also varieties with white or double yellow flowers. *C. polypetala* is a taller species with large leaves and large golden-yellow flowers. J. ST. CLAIR WRIGHT.

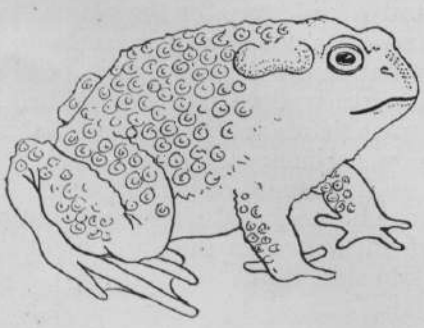


THE COMMON TOAD

By W. G. RUFFLE

OUR Common British Toad is, in my opinion, one of the most interesting of batrachians, and is certainly a very easy one to keep. No doubt most of you know how to distinguish the dry-skinned Toad from his slimy and more active relative, the Frog.

The Toad leads a particularly sluggish existence, hiding in holes and only emerging at dusk or on rainy days in search of insects. He accepts anything that is capable of movement and is small enough as food—indeed, the animal has been known to snap at a piece of paper dropped in front of it! It seems probable, therefore, that the senses of sight and smell are not at



all good. The little animal's appetite is enormous, and it is one of the farmer's best friends, and should never be destroyed.

Toads are capable, by means of some little glands just above the shoulder, of excreting a fluid, and this has led to the creature being regarded as dangerous, but it is absolutely harmless, although the unpleasant nature of the fluid seems to prevent most creatures from eating it.

The adults settle down to breeding immediately after hibernation, and on rainy evenings dozens of them may be seen making their way towards the ponds. The eggs are laid joined together in long bands. The tadpoles are larger and lighter in colour than the frog ones, and take about two months to develop into lung-breathing Toads.

Toads thrive under the simplest vivarium conditions, shade and moisture being the essentials. Just enough water for bathing should be provided. Damp moss is sufficient as floor-covering, and the Toads will use this as a retreat. The appetite is large, and should be satisfied as far as possible. It is unnecessary to compel Toads to hibernate if you have a supply of mealworms.

STICKLEBACKS

The nest-building activities of the male Stickleback, and his gorgeous spring coloration, make him one of the most interesting of all aquarium fishes, even including tropicals. If the Stickleback had to be imported from the Amazon, he would probably be looked upon as being almost as wonderful as the Neon Tetra, and he would fetch a high price. As it is, he is to be found in any odd brook or pond, and consequently has no interest for the average fishkeeper.

Sticklebacks will spawn in quite small aquariums—about five gallons will do—and now is a good time to catch them with a view to spawning them later. The female is quite full of roe at this time of year, as you will see by her round shape. When you go to catch them, bring home several females, but choose only one male if you are going to give them only one aquarium. In a small tank several males will only fight and injure one another as the breeding season approaches, and it is cruel to subject the fish to unnecessary suffering.

Fish caught at this time of year should not be put straight into an aquarium in a heated living room, as it would be too warm for them. Acclimatize them to their new conditions in an unheated room for a week or two. Plant the tank with thickets of fine-leaved plants, feed the fish well with succulent foods, and then just wait, and your patience will be rewarded.

SNAKES BY THE YARD

Snakes are sold by the yard in Paris. Regulation prices per yard observed by most Paris dealers are: Senegalese Python, 30/-; Indian Python, 47/-; Boa Constrictors, 14/-. Prices for other animals (says B.U.P.) are: Tigers, about 4 guineas; antelopes, about 10 guineas; and dromedaries, about 27 guineas.—*The Evening News.*

THE DIARY OF A YOUNG AQUARIST

By PETER LIVINGSTONE

Last week I went pond-hunting. I suppose it is early, for I did not get very much. The only real catch I had was a Whirligig Beetle. There were several in the pond, going round and round. I got one and put it in a jar, putting the lid on quick to stop it escaping.

When I got home, I put it in an old Goldfish bowl with a piece of perforated zinc on top, and it started going round again, all over the place. Feeding was a bit of a problem. It did not seem to like fish food, but it ate some earthworm chopped very small. It has been here a week now, and it still seems quite lively.

Since writing the above I have caught a Water Boatman. I was watching the pond where I got the Whirligig, and I saw something which kept coming to the surface waiting there for a moment, and then going down again. I saw it coming up and made a dive at it with my net. I missed the first time, but got it the second.

The Whirligig is still in the Goldfish bowl, so the Boatman has to stay in the jam-jar. He keeps coming to the top and lying on his back, presumably getting his breath before diving down again. I put a bit of Milfoil in the jar to make it homely. The Boatman seems to like *Daphnia* to eat.

Mainly for Coldwater Fans

By L. C. BETTS

MANY fanciers who keep their tanks in glass-houses, or have them in other well-lighted positions, find that they are troubled with an unsightly growth of algæ on the sides. Beginners in particular are a little worried to know whether this growth is unhealthy or deleterious to the fish. Except in the case of the blue-green algæ, it is usually a good sign. In tanks where the algæ clings to the glass, one has little trouble with the discoloration of the water. There are many types of algæ, and it seems that where one group flourishes, such as the long, filamentous type, the other free-swimming group cannot get a hold. However, it is essential that one should see the fish, and some of it at least must be removed. The commonest method of doing this is with a razor blade. If held at the correct angle, the blade will clean the glass thoroughly. The razor blade has one drawback, and that is that it has a tendency to scratch the glass, particularly when the steel has started to rust. As everyone knows, a scratch down a pane of glass is not far removed from a crack, and on that account the blades should be carefully watched, and used only for a short while and then replaced. Of course, algæ in its earliest stages can be removed by the flat hand, but this does not prove really successful, as it quickly grows again. It seems that the razor blade cleans back to the glass, and so makes a fresh foothold difficult. It is not necessary to clean all four sides, and I prefer to leave the back.

One of the worst jobs when setting up a tank or pond is the washing of the sand. It is a troublesome sort of job, but it should nevertheless be done thoroughly. Inadequate washing will carry its bad results long after the operation is forgotten. Every time a plant is disturbed or a fish grubs round, the water becomes cloudy. The fine dust whirls round, and will take days to settle again. Until it does so it provides an excellent anchorage for the free-swimming algæ, and very often may be the cause of a permanent discoloration of the water. The best way to wash sand is a little at a time in a bucket, stirring the whole time. As each handful clears itself, it should be removed to another bucket and the operation repeated. In this way two or three additions of water will be found sufficient, but if the bucket is filled with sand for each wash, it does not leave enough space for the water to be thoroughly agitated, so that the grains can fall to the bottom and the dust remain in suspension. Unwashed sand is bad, too, for the plants, for it packs too tightly and does not allow the roots to push out. For an extra halfpenny a pound it is possible to buy sand that has already been partially washed, so that a little cursory wash before setting up is all that is required. On this account ordinary builders' sand is not very satisfactory, as it contains a certain amount of loam. The best is known as washed river sand, but, despite its title, it should still be given a rinse and slight sterilization to be on the safe side.

Club Reports

Owing to the manner in which Club Reports tend to encroach on the limited space available in this paper, only notices of future meetings and club matters of general interest to all our readers will be published in these columns. We greatly welcome reports giving interesting points from lectures, but are not prepared to devote space to club business, as this is only of local interest.

LONDON AQUARIST SOCIETY.—The London Aquarist Society held a very successful show at the Central Hall, Westminster, on Thursday evening, March 9. There were seven classes, all staged at eye level, which were fairly well supported, and these were judged by Mr. A. Fraser-Brunner, assisted by Mr. D. Pope. About 300 people were present. In addition to the competitive exhibits there was a tank containing a shoal of Neon Tetras, one with a pair of adult and a shoal of young *Barbus tetrazona,* and another with a pair of Blue Orandas and two Calico Fantails, in addition to a large tank containing Mr. Atherden's 3-ft. alligator, which was named "Snappy" for the evening! While the judging was in progress, Mr. Dowsett, of the Dowler Electrical Engineering Co., gave a most interesting and instructive lecture on aquarium heating. He pointed out among other things the importance of the position of the heater in an aquarium to ensure comparative uniformity of temperature, the manner in which heaters should be employed where an aquarium was to be divided, when and how an electric heater should be earthed, and the inadvisability of using a heater without a thermostat, etc. At the conclusion of his lecture he answered numerous questions on the subject. Mr. Boughton then deputized for Mr. Bartmann, who was away, in answering general questions on pond and aquarium management—time is being devoted to these questions at every meeting of the Society—and this was followed by a brief survey of the results of the competition by Mr. Fraser-Brunner. The results were as follows: *Class* 1. Live-bearers. 1, Mr. R. Mealand; 2, Mr. R. Mealand; 3, Mr. G. Pengelly; 4, Mr. G. Pengelly. Mr. Fraser-Brunner chose as the first prize-winner a pair of Red Swordtails which, he said, corresponded closely to the features of the true *Xiphophorus hellerii,* a point which is not too common with colour varieties of Swordtails. *Class* 2. Labyrinths. 1, Mr. A. E. Atherden (with a really splendid Veiltail Fighter); 2, Mr. Henzell; 3, Mr. G. Pengelly; 4, Mr. C. Ward. *Class* 3. A.O.V. Tropicals. 1, Mr. A. W. Atherden (large Angel Fish); 2, Mr. George Levy (Archer Fish); 3, Mr. Evans; 4, Mr. C. J. Stiff. *Class* 4. Shubunkins. 1, Mr. G. Waits; 2, Mr. G. Waits; 3, Mr. Parbury; 4, Mr. Parbury. *Class* 5. A.O.V. Fancy Goldfish. 1, Mr. Wheeler; 2, Mr. Affleck; 3, Mr. Wheeler; 4, Mr. C. J. Stiff. *Class* 6.

(*Continued on page* 156)

The Redshank

By F. JEFFERSON

THE Redshank belongs to the wader family, and makes good use of those facilities which thus characterize the species. The comparatively long legs (for its body is only about the size of a blackbird's) permit the bird to pursue a livelihood amongst the shallow pools and watercourses, where, with darting thrusts of the longish bill it captures the aquatic insects which are its quest. Crustaceans and molluscs are the main items in its diet, but the Redshank must also find the worms which are delved from the marshy ground of more value than a passing titbit. During the winter large numbers dwell upon our coasts, finding a happy hunting ground amidst the saltings and mud flats, but the population is considerably increased during March and April by migrant birds which come here to raise their families. Many remain to nest by the coast, but others come inland and settle down quite readily in the lonely marshlands, ings, and damper meadows through which often enough a low-banked stream stretches its winding course.

The Redshank is an early nester, and eggs may be found during the month of April, though clutches may be noted at a much later date when misfortune has befallen an earlier attempt. The eggs are usually four in number, being buff, and overmarked with dark brown, and, though smaller, are much like the pear-shaped eggs of the Plover. The Redshank loves to build a bower to screen her sitting presence from prying eyes, and with her beak weaves over the longer grasses to complete the privacy. Here the mother bird sits confident in her security, only rising from the precious eggs should we threaten to touch her. But she does not always nest in the longer grasses where this additional architecture is possible, and so she sits out in the open, secure only in her protective colouring, which, generally speaking, is light brown, with a fine darker brown marking. In flight the bird appears to be pied, and this perhaps is due to the purity of the white on the lower part of the back, and on the inner and outer primaries, showing up in strong contrast to the other dark-brown areas, when thus exposed to view.

Immature birds have yellow legs, and it is not until the Redshank reaches the adult stage that it becomes furnished with the bright-red colouring of the shanks, from which the species derives the descriptive name. Sometimes the birds nest in small colonies, and in their united strength combine in attacking and driving away such predatory creatures as the Carrion Crow, but the bird illustrating these notes was solitary so far as her own species was concerned, though she had the close company of three Green Plovers, who were similarly occupied. The Plovers rose and harassed even the Rooks which crossed their territory, but the Redshank kept strictly to her incubating, apparently deeming her companions quite capable of dealing with the situation. It was interesting to observe how she crouched low and remained immobile at the first sign of one of the Plovers moving to the attack, and never relaxed until her nesting acquaintances returned, and tranquillity reigned once more.

Should we invade the nesting territory when young ones are about, the Redshank becomes very excited, and flies around us quite boldly uttering plaintive cries, and if we persist in our trespass she also runs along in front of us exhibiting distress, with a closer familiarity than shown at any other time. In some ways the Redshank reminds us of the smaller Sandpiper, particularly in that bobbing motion when the bird jerks its body in a quick, free movement; and also in the courtship of the male, when, besides serenading his mate with both voice and aerial display, he runs before her with wings uplifted in cherubic fashion.

The Redshank is now occupying its nesting territory and happily proceeding with its courtship. The male bird's trilling notes, as we hear them from afar, fall pleasantly upon our ears, and we know by that carefree song that springtime has surely once more come to the marshlands.

* * *

Readers may remember that some weeks ago we mentioned having received a "Slick Klenser" from Bellas Simpson, of Tottenham. This improved form of siphon was made of glass, and, effective as we found it, we mentioned that it was liable to breakage. The " Slick Klenser " has been modified, and is now strongly constructed entirely of transparent celluloid—in our opinion a very great improvement. We would also remind you that it is entirely British made.

(*Continued from page* 154)

A.V. Coldwater Fish. 1, Mr. R. Mealand; 2, Mr. Parbury; 3, Mr. Wheeler; 4, Mr. Wheeler. In this class Mr. Fraser-Brunner complained that the standard was somewhat poor. *Class* 7. Team of Six Tropicals. 1, Mr. R. Mealand, with six very fine Black Platy-Swordtail Hybrids. Mr. Fraser-Brunner considered such a matched team of perfectly coloured fish a real achievement in hybridising; 2, Mr. R. Mealand, with six Red Wiesbaden Swordtails the first to be bred in this country; 3, Mr. A. E. Atherden; 4, Mr. R. Mealand. The President, Mr. J. R. Norman, presented the prizes.

On Thursday, April 13, the Society will hold its first annual general meeting, at the Caxton Hall, Westminster, at 8 p.m., when the work of the past year will be reviewed and a really ambitious programme laid before the members. It is hoped that the Society will receive sufficient support to warrant the holding of a show at the Central Hall, Westminster, to be open to the public from noon until 9 p.m. on a Saturday in June, this being a stepping-stone towards the holding of a two-day show later in the year on a much larger scale. Naturally it depends on what support the Society receives meanwhile. There has been much clamour for such shows since the last one was held in 1936, and it is therefore up to aquarists to join this enterprising and progressive Society and help to make such a show possible. It is not intended that aquarists should leave other clubs in order to support the London Aquarist Society, but there may be many who would consider it worth while to belong to the London Aquarist Society while retaining their membership of their own local society as well. Although at the annual general meeting only members will have voting power, all those who would like to ascertain more of what the Society is and what it intends to do, with a view to joining, will be welcomed. It may be of interest to other clubs to note that the question of deciding who are and who are not eligible to compete in classes which are open to amateurs only, a matter which seems to have provided endless controversy in the past, has been solved by the Show Committee of the London Aquarist Society in the following way: "A professional aquarist shall be deemed one who claims the benefit of trade terms when buying." This allows the breeder who sells his surplus to retain his amateur status, while it protects the amateur against competition by aquarists who are able to acquire show specimens on more favourable terms, which is the only real advantage which a dealer has over an amateur in a competitive show.—C. S. STIFF, Hon. Secretary, 32, Gilkes-crescent, Dulwich Village, S.E.21.

WEST SURREY PONDKEEPERS' AND AQUARISTS' CLUB.—Meeting held on Wednesday, March 8, 1939, at Gt. Bookham. Mr. J. Harvey Prince, F.B.O.A., F.S.M.C., gave an exceptionally interesting lantern lecture on "Vertebrate Optics." Slides were shown of animals, birds, and reptiles, with coloured pictures of the interiors of their eyes. Diagrams were shown of the construction and functioning of the various types of eyes possessed by different vertebrates, their focusing mechanisms and motor systems. Adaptation of the eyes for the survival of the species and for specialized habits were discussed at length. Points mentioned were that some birds could see whether a rabbit or rat were alive or dead from five miles above. The eyes of Zebra were shown to be at such an angle that it was possible for them to keep careful watch, either when feeding with their heads down or when they had their heads erect. Fish or animals requiring to see under water had different focusing mechanism from animals seeing in the air only, owing to difference in light reflection. After refreshments Mr. Prince was good enough to answer many questions.—W. L. DEIGHTON, Hon. Sec.

SOUTH LONDON AQUARISTS.—Thursday, March 16, ended the first year of this club as the South London Aquarists. The Secretary's report showed steady progress in membership. The lectures provided had proved a great success, attendances had been good, and many new members had been enrolled from visitors who enjoyed the pleasant and interesting talks given by experts. The results of the various members' shows were of particular interest, keen competition between tropical and coldwater members ending with only two points difference in favour of the coldwater section. The WATER LIFE cup being won by Mr. H. G. Wheeler with 35 points, and the "Aquarist" medal by Mr. G. Hare (tropical) with 33 points. Mr. Wheeler also won the club medal. The Treasurer's statement disclosed a balance in hand. All the show equipment had been paid for, and this cheering report did much to start suggestions from members for a programme for the coming year. All the officers of the club were re-elected to their old positions—Mr. A. H. Hoare, Chairman; Mr. T. Aldred, Treasurer; Mr. H. G. Rowbotham, Secretary; and Mr. G. Hare, Show Secretary. The next meeting takes place on Thursday, March 30, at the Adult School, Garratt-lane, S.W.17 (a few minutes from Tooting Broadway), at 8 p.m. The subject will be "Get Acquainted with White Spot," and the lecture will be given by Mr. Stanley Harker. We offer all interested aquarists this opportunity of learning the life cycle and pitfalls in treatment, etc., of this disease, and invite them and their friends to attend and help make this meeting a great success. All particulars of club matters from H. G. ROWBOTHAM, Hon. Sec., 57, Idmiston-road, West Norwood, S.E.27.

THE BELLE VUE AQUARIUM AND VIVARIUM SOCIETY.—290 members and friends visited this Society's second annual display of films on Monday, March 20, in the Central Café, Belle Vue Gardens. The programme consisted of ten films, including "Facts about Fish," "Interdependence of Pond Life," and "Development of the Trout." Also included were Mr. J. E. Saunders' "Visits to the London Zoo," the Manchester Film Society's "Belle Vue," "Feeding Time at the Zoo," "Killing the Killer" (Mongoose and Snake), and three magnificent coloured films "White Wings on the Wolfgangsee," "The Private Life of a Swallowtail Butterfly," and "In Our Garden," the first by Dr. R. G. W. Ollerenshaw, and the last two by Mr. J. H. D. Ridley. The films were accompanied by appropriate music, and a commentary by Mr. G. T. Iles. The Society is indebted to several members of the Manchester Film Society and others who so kindly lent their films and assisted with the display, the Directors of Belle Vue, Ltd., for the use of the hall, and to Mr. H. L. Ollier for projection and sound equipment.—J. N. BERNARD, Hon. Sec.

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BOOKS

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