

The AQUARIST AND PONDKEEPER

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The Editor accepts no responsibility for views expressed by contributors.



Photo:

Laurence E. Perkins

The Florida flag fish (*Jordanella floridae*) is this month's subject for the tropical fishkeepers' "refresher course" on page 157

VOL. XVIII No. 8

1953

Editorial

IN the most recent undertaking of the Aquatic Traders' Association the original claim of the organisation to be one holding advantages for both traders and their customers promises to become fully justified. It is too early to forecast the future of the A.T.A. scheme for aquarium goods to be submitted for approval to a panel of independent examiners, who can award a "Gold Seal" to mark satisfaction with the articles, but we believe it deserving of every support from readers so that it is given all opportunity for its worth to be tried.

In this country we have been fortunate in the outlook of our traders and manufacturers, who have in by far the greatest majority produced goods of sound design and durable construction. This has been proved by the ready acceptance of British aquarium apparatus in other countries, and the demand for goods "Made in England" continues. The reputation must be jealously guarded however; one shoddy product can undo goodwill created by ten first-class items. The Gold Seal scheme will not eliminate bad goods, but the sight of the emblem should come to be associated with quality, and it should mean to a buyer that if he is not satisfied with his purchase then a means of redress is available to him. Other motives for a scheme originated by a traders' organisation will undoubtedly be voiced by the over-suspicious, and doubters will only be silenced by the sight of the scheme in successful operation.

Traders therefore owe it to their Association to ensure that goods are worthy of the Gold Seal and, what is just as important, to seek its award. This does represent an additional expense to the manufacturer, for the seals, once won, have to be purchased; but support from all traders is essential, even if their goods are already so well tried by the public that further recommendation is thought dispensable. The panel of examiners is in a most unenviable position, open to criticism from trader and customer, though standards highly and fairly set cannot be other than respected. *The Aquarist* welcomes the scheme and wishes it good progress.

November, 1953

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The Talking Catfish (*Acanthodoras spinosissimus*)

by JACK HEMS

ACANTHODORAS *spinosissimus*, to give the species its scientific name, is a member of the Doradidae, a family of heavy-bodied, armoured catfishes native to the Amazon basin. It is commonly called the talking catfish on account of the grunting noises it can make in and out of the water. It is enabled to make these sounds by a special mechanism of the air-bladder and the processes of the vertebrae above it. When lifted out of the water, it accompanies its quite audible grunts or rusty croaks by violent movements of the bony pectoral fins, and spasmodic twitching of the body.

The general body colour of *A. spinosissimus* is dark stone or chocolate-brown broken here and there by biscuit or creamy-white patches and streaky markings. The fins are coloured like the body; that is, brownish with paler markings. A well-defined row of sharp-pointed spines extends along the lateral line; similar spines are distributed over other parts of the body. The backward-curved pectoral fins, which are held outstretched like wings, have spines on the inner margins so that when they are pressed against the spines on the body they form a horrible toothed trap from which there is no escape for any small living creature caught between their points. If the fish is handled in a net, it is quite likely that a finger will be caught between the two rows of spines, and held fast.

If this does happen, it is wiser to prise the finger away by inserting the sharpened end of a pencil or some similar instrument between the fin and the body of the fish rather than attempt to pull it free; for if the aquarist adopts the latter course, the result may be most painful. At least it will teach him to be more careful in the future.

In the aquarium, the talking catfish seldom grows to anything like the size it attains in the wild—a full eight inches; or so we are told by reliable authorities. The rather

tall, anteriorly spined dorsal fin is held stiffly erect; an adipose fin is situated close to the tail but, unlike the dorsal fin, it is not supported by a spine; the mouth is wide slit-like, and adorned by six needle-fine barbels which are annulated with brown and creamy white.

When the fish faces you it resembles a puff-cheeked tabby cat. And, like a cat, it is much given to nocturnal prowling. When the light is dim, or when there is little or no light at all, it shuffles over the floor of the aquarium, or up the side of the aquarium, in search of food. It will eat almost anything and everything, small enough to be swallowed, living or dead, but prefers small red worms or pieces of meat rather than anything out of a packet.

In the daytime, *A. spinosissimus* is not very active. It will take up a position in a corner, or by rockwork or a clump of plants, and there stay put for what seems like hours on end; and even if it is gently pushed or prodded with the aid of a piece of stick it will not always alter its position. In fact its usual reaction to such treatment is to shake itself as if to say: "Bother you! Leave me alone." But if the fish does decide to make a move, then it will do so when you least expect it, and leave you amazed at its turn of speed. A flick of the tail, a puff of fine sediment or sand, and hey presto! there it will be—just like that—at the other end of the aquarium.

A temperature of about 80° F. suits this fish very well, but it is hardy enough to endure a variation of 10 degrees either way without suffering any harm. A protracted low temperature, however, will retard its growth and put it off its appetite.

So far as can be ascertained, the fish has not been bred in captivity. But it is said that the species is a nest-builder, and both sexes tend the eggs. Although *A. spinosissimus* is one of the rarer catfishes, and not always on the market, it has been known to keen collectors of tropical fishes for several decades. Articles about it appeared in German publications about the time of World War I.

Although it is not a quarrelsome, or all-out cannibal fish, it is not suited to life in an aquarium containing bottom-haunting, rather sluggish fishes, which are likely to fall foul of the spines. But in a tank containing species such as tiger barbs, zebra fish and the like it should not cause any trouble, but prove a good scavenger of left-over tit-bits.

Brighton Aquarium

DECISIVE steps are at last being taken to save the famous Brighton Aquarium (which with Naples was once one of the only two marine research stations in the world) from ultimate disaster. At present, out of 30 remaining tanks—there used to be 42—only six are used for marine animals and these are badly stocked. A meeting is to be held at the London Zoo where Dr. Harrison Matthews (London Zoo Director), Dr. H. R. Heweer (Imperial College of Science), Dr. C. G. Hentschel (Chelsea Polytechnic) and Miss Joan Heriot (Department of Biology, Brighton Technical College) will draw up a scheme for presentation to the Sussex Educational Council. The complete rehabilitation of the aquarium and formation of a marine research laboratory, a scheme for the instruction of school children (as at Millport) and the formation of a coastal fauna museum are amongst many long-felt wants it is hoped to bring about. Aquarists and naturalists everywhere are likely to wish this long-delayed campaign all success.

L. R. B.

Food for Fry

"Liquifry" Fry Food. Supplied in tubes, 2s. 6d. each. Manufactured by The Liquifry Company, 7, High Street, Dorking, Surrey.

Sample tubes of Liquifry No. 1 supplied by the makers have been used for raising fry of fancy goldfish, and it is found to be quite effective for the purpose. It was used from the time the fry were free swimming until they were a fortnight old and able to take larger foods. The food is in a minute form which floats in the water until eaten and the fry were seen to eat it readily. The condition of the water in the tank did not appear to be disturbed in any way and the results compared favourably with those obtained by using ordinary Infusoria. The fluid food is expelled into the water by squeezing the tube, which is provided with a small hole at the top. It was found that this hole became stopped up at times and so made the distribution of certain amounts rather unpredictable.

Liquifry No. 2 has particles of larger size than is required for egg-layer fry feeding and is supplied for rearing young livebearers.

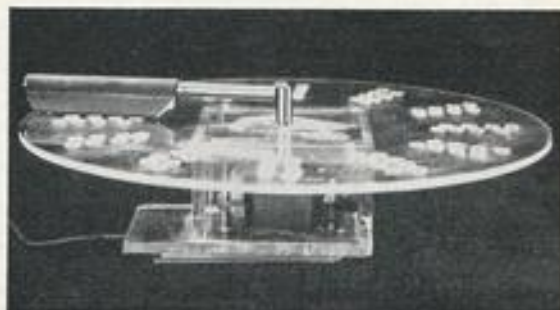
An Automatic Fish Food Dispenser

by Dr. F. N. GHADIALLY

IT is well known that under natural conditions fish hunt and feed on a very mixed diet all through the day, but such an ideal state is almost impossible to attain in the confines of an aquarium. The few fortunate aquarists who can obtain unlimited supplies of *Daphnia*, *Cyclops* and mosquito larvae can approach this ideal fairly closely, as a reasonable number of such organisms can be left in the tank for the fish to feed on all through the day without seriously increasing the carbon dioxide content of the water or causing pollution. But if a surplus of dry foods or fresh foods such as chopped worms, maggots, etc., is placed in the water it soon putrefies and pollutes the water.

Short of sitting by the tank all day the continuous feeding of adequate amounts of dry food can only be tackled by a mechanised feeder which introduces predetermined quantities of food at small intervals of time, the quantity at each introduction being such that it is consumed by the fish within a very short period. No doubt dry food is, qualitatively speaking, inferior to live food, but it is not as useless as it is made out to be. The main snag is not the inferior quality but the failure to feed adequate amounts by the usual two feeds a day regime. With the cheap, easily constructed gadget described in this article it has been found that approximately eight times the normal quantity of dry food can be fed without polluting the water than by the usual method of feeding fish twice a day. This sort of feeding, when combined with adequate space, temperature and an occasional feed of live or fresh food, can make fish grow very quickly indeed.

This is by no means a new or novel idea. Numerous mechanical feeders have been used in the past but none that I know of can claim to be simpler or more fool-proof than the one here described. Though an electric clock motor



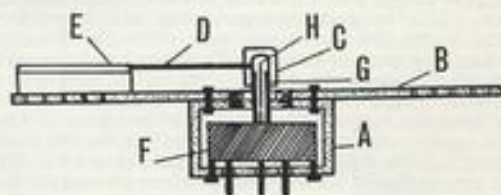
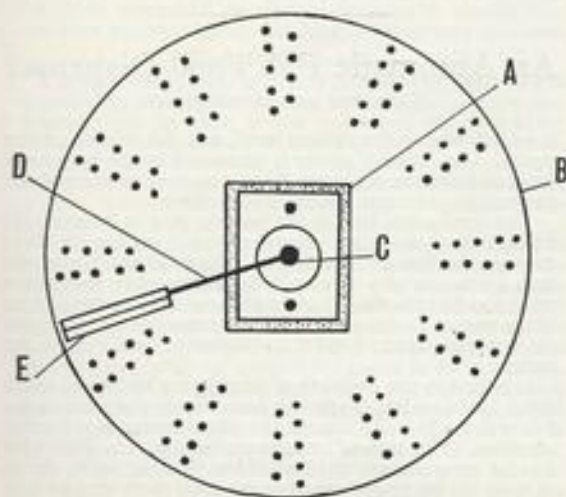
has been used to operate the feeder described in this article, one can easily construct a similar piece of apparatus from an ordinary alarm clock at a cost well under £2.

The main parts were made from perspex—a transparent plastic which can be sawn and drilled with ordinary tools. Very strong joints can be made with a cement which can be made by dissolving small pieces of perspex in chloroform, or it can be purchased ready made. To make a joint, apply the cement to both joint surfaces, wait a few moments until some of the solvent has evaporated leaving behind a tacky surface, apply another thin layer of cement and bring the two surfaces together and maintain them in this position for a few minutes until the solvent has evaporated, leaving the two pieces firmly united. As the solvent in the cement dissolves some of the perspex from the joint surfaces a welding rather than gluing effect is obtained, giving a very strong joint.

Components of the Feeder

The apparatus consists of a small perspex box (A) made to house the electric clock motor and a disc (B) bored with holes as shown in the illustration. The shaft carrying the hour hand is prolonged by means of a snug-fitting tube (C) carrying a transverse arm (D) to which is attached a piece of rubber draught excluder. As the arm goes round it acts like a windscreen wiper, wiping the surface of disc A. The only part that needs to be carefully made is tube C, for a really tight joint must be obtained between it and the hour hand drive so that no slipping occurs at this joint. It is not advisable to use grub screws at this point as these might distort the hollow hour hand shaft, through which passes

(Continued at foot of next page)



A, perspex box housing motor; B, perspex disc with holes; C, collar joining wiper arm (D) to hour hand drive (G); E, rubber draught excluder; F, clock motor; H, minute hand drive

IN THE Water Garden—by Dr. W. E. SHEWELL-COOPER

LAST March we dealt with a number of baby bulbs that could be grown very successfully in pockets around the pool and as this caused a great deal of interest I thought it would be a good thing to deal with a number of other types of bulbs which can be planted during the month of November. Bulbs on the whole are a good investment. If the plants are looked after they go on blooming over a number of years. People seem to forget, however, that there are two factors which must be borne in mind, (1) that it is after flowering that the plants need feeding so that they can build up a good "bulb" or corm for the next year, and (2) that you shouldn't allow any seedling to take place because this robs the plants of too much elaborated sap.

Irises are always worth considering. I am not referring to the bearded kinds or to the baby rock garden varieties, but to the bulbous types, i.e., the true English irises, Spanish irises, or Dutch irises. The English types on the whole prefer the heavier soils, but the Spanish and Dutch kinds do better in the light, sandy soils. If your soil is heavy don't put the bulbs in deeper than three inches, but if it's light then it will be better to bury them four inches deep. You can plant the bulbs so that they almost touch one another, and in this way they make a wonderful display. It's better on the whole to have them six inches apart. Make the hole with a blunt-ended dibber to the right depth and drop one bulb in the bottom of each hole. If there's any sign of dampness, then it pays to put a little sand in the bottom of each hole so that the base of the bulb is resting on this. The English irises don't much mind a moist position, though, of course, they must never be confused with the true water irises. Among the English types I like Montblanc—a white; Othello—a purple; and Blue Celeste—a beautiful blue.

The Dutch irises flower about the first week in June. They are very accommodating and they like most soils. Womenfolk find them very useful as cut flowers and, of course, they could be grown in borders especially for this purpose. Bronze Queen is a good variety and the six centimetre corms can be bought as cheaply as 15s. a 100. In the case of the best dark blue iris, Triumphator, the six to seven centimetre corms are as cheap as 16s. a 100; while with Imperator, which has bright navy blue standards and azure blue falls, the seven centimetre bulbs are only 14s. a 100. Other varieties you may like to include are White Excelsior, Yellow Queen, Wedgewood and Van Vliet—a bright blue with a small orange blob. In the Spanish irises try W. T. Ware, a primrose, Thunderbolt, a bronze, and Royal Blue, my favourite variety.

It is not sufficiently well understood that there are four main types of bulbous anemones: the Dutch, the French, the St. Brigid, and the Fulgens. I make these divisions arbitrarily. The Fulgens Multipetala produce flowers with a double row of dazzling scarlet petals with a glorious black base. This makes them outstanding and very effective both in the bed and in the vase. The St. Brigid's are perhaps the great favourites. They produce flowers of all colours and are grown by the thousand in Cornwall and Devon. The De Caen differ from the St. Brigid's in that the latter are semi-double and perhaps not quite so robust. You can get quite good sized "bulbs" of the De Caen at about 12s. 6d. a 100 and of St. Brigid 15s. a 100. There are always the St. Bavo's which produce star-shaped bulbs in many different colours, but these cost as much as 22s. 6d. a 100, and they bloom from March to April. All these anemones do best in soil which contains plenty of organic matter. For this reason I always fork in sedge peat at a bucketful to the square yard. This particular

type of peat is better than any other for the purpose. The anemones won't object to slight shade, but prefer a warm, sheltered spot.

Get the planting done early in November, and you can be sure of having beautiful flowers in March and early April. Keep some of the buds back if you wish to plant in early March and then you'll get a second blooming from the end of August onwards. Never plant deeper than about two inches in the case of the larger corms, and no deeper than one inch in the case of the cheaper and smaller sized corms, which actually are the ones I recommend. Always see that the soil is sufficiently moist at planting time. You can have the corms as close as two inches apart if you wish or as far apart as nine inches. Northerners should give some protection to the soil in the winter by putting bracken or pea sticks over the top of the spot where the corms are to be planted. This helps to break the cold wind in the early spring and gives the anemones a better start.

It's a pity really that lilies are not more frequently grown. It is true that there are some varieties which are delicate, but there are many garden types which give a good deal of pleasure with the minimum of work. The plants on the whole like shelter and most of them prefer partial shade. Never plant them, however, too close to shrubs or the roots take away all the moisture. Fork plenty of sedge peat into the ground where the "bulbs" are to be planted, and then dig out a hole 18 inches deep and of a similar width and length. Put a few stones or old brick-bats in the bottom and fill up this hole with a mixture consisting of one part soil, one part sedge peat, and one part silver sand, plus one thirty-second of a part of bone meal. This seems tremendous preparation but if any bulbs are going to be down for a number of years, then it's worth while making this special preparation. Plant as soon as you receive the bulbs in November. The general guide is to put them in about three times as deep as their greatest diameter.

The only thing that is wrong about lilies, if I may say so, is the price of the bulbs. I see that Madonnas at the present time are being sold at 21s. a dozen. Try also Martagon, the deep purple; the leopard lily, which has orange trumpets and maroon spots; the tiger lily; Regale; and Henryi, because of its rich orange-yellow flowers.

An Automatic Fish Food Dispenser

(Continued from preceding page)

the shaft driving the minute hand, and this might jam the motor. Considerable power is developed by the hour hand drive of a clock motor hence there is no need to worry about the weight or friction caused by the wiper.

The dry food is laid on the perspex disc in between the holes and as the wiper travels round it pushes the food through the holes. The feeder is fixed on the top of the tank by means of a wooden arm or any other convenient means so that the food that drops down falls on the surface of the water. It should be fixed at a reasonable height from the water surface to prevent condensation from ruining the motor.

It is best to use a variety of proprietary and home-made dried foods, and to charge the feeder every morning so the fish will be fed all through the day without any further attention. This type of continuous feeding, combined with one (or more if available) feed of live food per week, seems to make the fish grow faster than the usual method of feeding available to the average aquarist to-day.

The Flag Fish (*Jordanella floridae*)

ORDER:—Cyprinodontes—from Greek *kyprinos*—a kind of carp, and *odontos*—tooth.

FAMILY:—Cyprinodontidae, sub-family Cyprinodontinae.
SPECIES:—*Jordanella floridae*, after David Jordan and Florida.

THE flag fish is a native of the state of Florida, U.S.A., and seldom exceeds two inches in length. It is a sturdy, chubby looking fish with many admirers. Unfortunately, at the time of writing, it appears to have largely disappeared from the tanks of most aquarists. And yet, shortly after the last war, I remember that the majority of them possessed at least one pair. Such is often the way with fishes. For a short period everyone breeds them, and then they become unfashionable and are temporarily forgotten—only to be “discovered” again some time later. Perhaps this article will revive interest in a beautiful and interesting species.

It is difficult to give an adequate description of the appearance of a male *Jordanella* when glowing with breeding colours. Its ground colour could be said to be bluish-green, overlaid or enmeshed in a coarse net of intense reddish orange. Anal, dorsal, and caudal fins are liberally sprinkled with red dots arranged more or less in rows. A dark mark is apparent on the body midway between dorsal and anal fins. As light strikes the fish's body it is reflected back as a green lustre.

The female is not so colourful, being a delicate shade of green, with darker markings faintly discernible on her sides. Her general body outline, except when filled with roe, is almost identical with that of her mate.

Both fish are equipped with small, quite efficient teeth, which are three-pointed, unlike most of our aquarium cyprinodonts. The presence of teeth usually implies a marked preference for live food, or at least flesh foods, but the flag fish is omnivorous. If it cannot get sufficient green food it does not flourish or breed well. Duckweed is one of the finest vegetables to give it, bringing it rapidly into condition and causing the brightest development of colour.

Flag Fish Breeding

The spawning proper is usually preceded by some playful skirmishing, the fishes darting towards each other and stopping side by side, bodies quivering, fins trembling. Then away the female will dash, her spouse in close pursuit. Eventually both will pause in or just above a depression in the sand of the aquarium, and the female will shed a number of eggs. Occasionally she will cease egg laying after a few hours, but it is more usual for the spawning to be spread over several days, with resting periods between the laying of separate batches of eggs. It has been known for eggs to be scattered over the leaves of plants, and sometimes even among surface plants, but in such cases I believe that the eggs were expelled accidentally by the vigour of the female's movements as the male chased her. Other pairs of fishes lay the eggs among the roots of the plants in the aquarium.

Spawning completed, the male ceases to court the female, and becomes a wife-beater, so that it is wise to remove her from his vicinity, and leave him to his self-imposed task of guarding and fanning the eggs. These hatch in about five days, providing the temperature of the water is between 74° and 78° F. Lower temperatures will delay the hatching for two to three days.



Water thick with floating algae is the finest of first foods for the fry. It gives them just the right ingredients to encourage a flying start and vigorous growth. Small Infusoria will provide the meaty portion of their diet. Follow these up with rotifers, if available, or failing these, a supply of tiny water fleas (*Chydorus ovals*) is excellent. New hatched *Cyclops* nauplii, brine shrimp, etc., all help to give a varied and nourishing diet. As the fry grow substitute a little lettuce or boiled spinach for the green algae-water.

Father will continue to look after the fry for some days after they are free-swimming, herding them into a shoal and leading them about the tank for all the world as though he is showing them around his estate. If well fed he is not likely to eat them, but discretion being the better part of valour, it is safer to remove him after witnessing his early parental solicitude for their welfare.

Jordanella is hardy, active, and with interesting habits, but his temper is extremely uncertain when kept with other species. He may go about his business peaceably, disturbing no one, or he may turn and rend his inoffensive companions without seeming provocation. This applies equally to the female, who has been known to henpeck her husband unmercifully.



A.T.A. Approved
Product Scheme

THE Aquatic Traders' Association has instituted an "Approved Product Scheme" for all apparatus produced for aquarium use. Three academically qualified and experienced aquarists have been appointed to examine and test apparatus submitted by manufacturers and distributors. As a mark of approval, satisfactory appliances will be allowed to carry the Association's "Gold Seal," reproduced above. Before submission of electrical apparatus for approval, manufacturers are required to have their product examined by authorities of the Electricity Board. In providing information about their goods when these are sent for examination by the panel of approvers, manufacturers have been assured of confidential consideration, so that "trade secrets" are protected, and the examiners will act entirely independently of the council of the A.T.A. Reasons for refusal of approval to any goods will be supplied to manufacturers by the panel. It is expected that manufacturers of apparatus awarded the Gold Seal will also offer retailers and buyers a reasonable guarantee of service. Members of the panel will examine apparatus independently and will meet at intervals of not less than three months. (See Editorial comment on page 153.)

Spawning the Glow-light Tetra

by JOHNSON H. HOOD

ALMOST everyone possessing a community tank has kept this inoffensive and graceful characin. Together with the neon tetra it is usually regarded as a "must" in a mixed collection of small fishes. Many an amateur aquarist must have had a desire to breed this attractive species, and I hope readers of the following record will be heartened to make the effort, for the glowlight (*Hyphessobrycon gracilis*) is quite easy to breed.

When kept in community tanks my experience has been that the glowlight rarely makes any attempt to spawn even though the female may become quite distended. Indeed, any chasing done is usually performed by the female. Sexing is simple. The male is very slim, the belly being "knife-edged," while the female, even without being distended with spawn, has the well-known female ridges of the characins showing on the lower part of the belly. These, in appearance, are rather similar to the complementary keels of a rowing boat. There are no visible colour differences in the sexes even when in breeding condition, but in adult fish the female is usually greater in length and girth. Incidentally, when a female is carrying her maximum number of eggs the ridges previously mentioned are completely "pressed out," but that does not say she would not spawn before this occurs of course.

Water Requirements

It has usually been understood that to spawn glowlights successfully the water must be very soft, down to a hardness of 2° or even under; also that light was fatal to the eggs and fry. This I find is not strictly true, although, I must confess, I took these precautions with the first one or two spawnings I managed to engineer. However, after the first glow of success passes one achieves a nonchalance which permits liberties to be taken but, even so, when I had the water tested after the last spawning for the purpose of this article, I was astonished to find how far I had deviated from the water composition I had used originally for the first spawning. Have the fishes a wider tolerance than was first imagined, or are our aquarium fishes building up a resistance to conditions similarly to insects which have built up a resistance to D.D.T. insecticide that was deadly to their great-great-grandfathers? This, I feel, could be a subject profitably discussed by our more learned aquarists.

Before I become involved let me hasten on to relate the details of the latest spawning which took place in July this year.

Tank: 36 ins. by 10 ins. by 10 ins., base heated.

Water: pH 6.9. Layer of peat on the bottom. No sand used. Depth 6 ins. Hardness 5.9°. Calcium oxide 4.44 per 100,000 parts. These figures were obtained from a sample taken immediately after the fish had spawned, and the analysis was performed by a practising analyst.

Plants: Indian fern floating covering two-thirds of surface area. A few clumps of sea-moss at each end of the tank.

Fish: One pair, nine months old. Female bulging, male

very slim. Conditioned on earthworm, *Daphnia* and *Cyclops*.

Spawning

Prior to spawning, male chased female vigorously. Female retaliated for a time. Eventually the female retaliated no longer but nosed up into the roots of the plants and the male seized his opportunity, and exerting greater pressure against the female rolled almost completely over while the eggs were sprayed on the plants. This was repeated at intervals for one and a half hours, then the fish were removed. The female was not spawned out but visibly smaller. No attempt was made to eat the eggs.

7th July. Fish placed in tank. Temperature 75° F.

8th July. Temperature had accidentally risen to 82° F. Fish appeared listless.

9th July. Temperature down to 78° F. Fish still listless.

10th July. Fish livelier. Some nudging noticed in the morning. At 3.30 p.m. fish began to spawn. Temperature 76° F. Fish removed at 5 p.m. and sample of water taken. More plants added to cover surface but light still penetrating to the bottom in places. No further cover added. Two eggs visible, being quite small and clear.

Hatching

11th July. Eggs still visible in the morning but by next inspection at 5.30 p.m. eggs had vanished. Fry presumed hatched. Temperature 77° F.

12th July. Three fry noticed attached to the back glass.

14th July. Nine fry noticed in odd positions and presumed to be free-swimming. A mixture of very small cultured Infusoria and pond Infusoria added. Estimated size of fry about three thirty-seconds of an inch.

20th July. Many fry noticed darting out of sight when the tank was approached. Pond Infusoria the only food used now, sieved to slightly larger sizes than at first.

25th July. Fry much bolder now, often approaching front glass. Temperature 78° F. Dark markings appearing in the body. "Glow" visible in eyes and faintly in the body. Tank full of Infusoria but fry now picking off half-grown *Cyclops*. Infusoria feeding discontinued.

30th July. Miniature glowlights now. Eating quite big *Cyclops*. Offered "Grindal" worms and these were taken quite easily. Total length five-twelfths of an inch, all appear about the same size; no small ones. A quick count revealed 153 fry but there is likely to be over 200. The count was made in electric light after they had settled on the bottom for the night.

On removal to a larger tank later on the final count showed 213 fry.

Rapid Growth

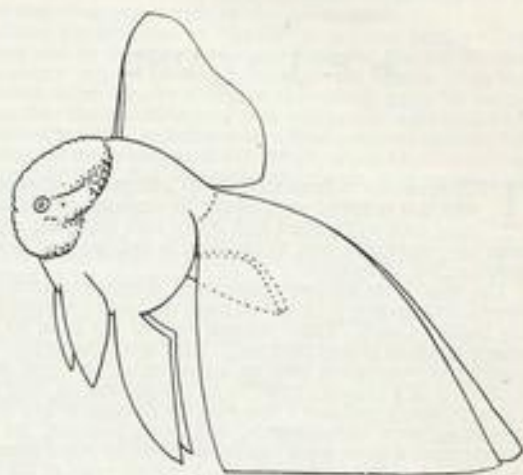
A previous spawning achieved a total length of three-quarters to seven-eighths inch at 10 weeks, so they grow rapidly. Regarding the water I find the easiest method is to take a test of the available water then dilute with distilled water until the desired hardness is obtained and acidify with peat. For example your water may have 10° of hardness. Add an equal bulk of distilled and this would make 5° of hardness. Add an equal bulk of distilled again and you would have 2½°-3° of hardness. Add a small amount of sea-salt, about half a teaspoonful to five to six gallons, and that should do the trick. It would be advisable to protect the eggs from strong light. The greatest difficulty, of course, is to supply sufficient quantity of the right food for the first week after free-swimming, after that micro-worms help out.

Aquarium and Pond Goldfish Varieties

10. Oranda Goldfish

THE oranda goldfish are highly specialised fancy fish and more suitable for a good sized tank than for the open pond. Not that they are delicate, but having flowing fins they are inclined to be damaged easily in a pond and may suffer from fin congestion and also fungus during a severe winter. The scaled and calico types are both recognised by the Federation. The general shape of the oranda is as for the veiltail with the addition of a large protuberance over the whole head and operculum or gill plate. This protuberance is the distinguishing feature of this fish and unless it is well developed the fish does not stand much chance of winning in good company. This wart-like growth is said by some to be a form of cancerous growth and is no doubt caused by malformation of certain cells. It is sometimes referred to as the hood, and has resemblance to the head of a bison. Both male and female fish should carry the hood and a good form is one that covers the head and gills well and finishes off sharply at the junction of the body with the head.

I saw a very good oranda at the British Aquarists' Festival last year, which had a very well developed hood together with a nice short body. The colour of the oranda is as for the common goldfish (for the scaled type) and as for the veiltail (calico) for the calico type. It has been noticeable at most of the shows since the war that many of the orandas exhibited have not been self-coloured but have had silver together with the orange or red. I have not seen a good calico oranda at the shows of recent years. Although the all-red fish is to be preferred to the scaled fish, one with silver markings can win if other points are good. The body of this type should be as for the veiltail, that is, almost spherical. The same faults may be noticed here as are found in the veiltails—a flat back or a humpy one. The dorsal fin should be high and well carried, three-quarters the depth of the body with the front edge vertical. The



Oranda goldfish outline from "Show Standards for Cultivated Fishes" (F.B.A.S., 2s. 6d.)

rear or outer edge should be full and slightly outcurved from half way down. The tail or caudal fin is completely divided and the length greater than that of the body. The base should be as straight as possible without showing any fork as in the fantail.

The oranda is quite a sturdy fish and takes most food relished by the ordinary goldfish. I suggest plenty of starchy foods from the age of a month to assist to build up the tubby body. I recommend that no oranda should be used for breeding until it is mature. This may be from two to three years. It is found that the hood does not always develop until the fish is of this age and some fish from a good strain may never grow the hood. It is not a good plan to breed from those fishes which are late in developing the hood for the reason that they might never do so, and so the strain may be weakened. The time taken to form the correct hood will also depend on the rate of growth and so a younger fish may develop the hood providing it has been reared under ideal conditions with plenty of room. As fish of about three months of age, orandas have a general appearance resembling the young of scaled veiltails, and I have sometimes been asked to pick out good ones from such a batch. This is not possible as I do not think that anyone could say definitely which fish would form the hood and which would not at this early age.

The points to look for in a good type of oranda either for breeding or showing are as follows:—the hood should be well formed and fairly thick, not just a slight excrescence. As 20 points out of a possible 100 are given for this feature it can be realised how important the hood is. For the body the scaled type can get 20 points and the calico 18. The dorsal fin of the scaled gets 8 and that of the calico 7. For the pectorals, pelvics and anals both types get 2, 2, and 4 respectively. Colour receives 10 in the scaled type and 15 in the calico. Each can earn 4 for condition and 10 for deportment.

A well-shaped oranda is always a good attraction at a show but not all aquarists and visitors take very kindly to this type, as it may savour of abnormality to them. I personally consider that it is a good type to breed and exhibit.



"It's no use getting impatient sir—I can only serve one customer at a time!"

Making a Large Aquarium at Small Cost

by F. J. SWAINE

THE aquarium to be described holds 80 gallons of water, which is renewed periodically by draining off via the plug cock and refilled with a half-inch bore hose pipe from any convenient tap. It has been in use, exposed to all weathers, for 15 months.

The tank is an ordinary galvanised domestic coldwater cistern, such as may be found in a second-hand condition in any builder's yard. These cisterns vary in size from 20 to several hundred gallons capacity. The most suitable for the purpose of conversion into an aquarium of the type described, is of a capacity from 60 to 100 gallons. A visit to a local builder's yard and a chat with the foreman or builder, explaining your requirements, will often produce, for a modest sum, a quite good cistern, that has for some reason been removed from a dwelling, and having years of life in it is suitable for constructing an aquarium.

On occasion, such cisterns are occupying valuable space in the yard and usually finish their existence by being removed to the nearest dump. Such discarded coldwater cisterns will have several holes drilled in the lower sides and base, and one hole just below the top edge, where the overflow pipe emerged. Some cisterns have a hole similarly placed near the top, through which the ball valve was coupled to the main inlet pipe. These holes, previously used for service pipe connections, will vary in size from $\frac{1}{2}$ in. to 2 ins. in diameter. Any such hole that is from 3 ins. to 6 ins. up from the base of the cistern will be suitable for the drain cock, or this may be fitted in a hole in the base. If the latter course is followed it will be necessary, when draining to renew the water, to remember to close the drain cock when the level is within several inches of the base, or the fish will be left high and dry. The overflow hole will be used as such for the aquarium, but the other holes, except the one for the drain cock, will be sealed off.

A plate-glass panel fitted to one end gives an excellent view of the fish, whose antics can also be seen from above through the water, which should be kept crystal clear. In the aquarium described, the small rocks and large stones laid on a bed of compost, with goldfish, perch and tench swimming gracefully among the gently waving milfoil and *Vallisneria*, produce a very pretty effect and an aquarium of this size has ample space for an appreciable number of fish. It also has the advantage of being relatively shady, since only the top and one end are illuminated. The complete list of materials follows, with a brief comment on such where it may be helpful.

One plate-glass, second-hand mirror (bevelled edges, or plain cut). This is cheaper than new plate-glass. The size of the mirror should be 2 ins. less all round than the size of the end of the cistern; i.e., if the cistern end is 2 ft. 6 ins. by 2 ft. 3 ins., the mirror will need to be 2 ft. 2 ins. by 1 ft. 11 ins.

The condition of the back of the mirror is unimportant but try to get a piece of glass without flaws or scratches. A suitable piece of glass may be obtained very cheaply at almost any second-hand shop, and if it is too large our builder friend will cut it to your requirements for a few pence, or he may charge you nothing. Ordinary window glass is not thick enough to withstand the pressure of the

water. The glass should be at least $\frac{1}{4}$ in. in thickness. All the quicksilver backing should be removed with a razor blade of the single-edged type. A word here, of caution. The mirror backing will chip off easily enough but it flies in all directions. It is advisable to wear a pair of goggles or an old A.R.P. anti-gas eyeshield to protect the eyes.

Seven pounds of "Saniseal." This is a putty-like compound much in demand by plumbers for sanitary joints. It stands up well to the action of water and is therefore ideal for bedding the glass panel into the cistern end.

One 60 to 100-gallon galvanised, second-hand coldwater storage cistern. One of $\frac{1}{2}$ in. plate is best for the purpose, and choose one with a shape providing maximum top surface area rather than depth.

Four ordinary house bricks (9 ins. by 4 $\frac{1}{2}$ ins. by 3 ins.). A number of $\frac{1}{2}$ in. thickness iron plates, 3 ins. by 3 ins., drilled $\frac{1}{2}$ in. hole in the centre of each. Two of these will be required to seal off the unwanted holes in the cistern. There is no need to buy these plates, as will be explained later on.

Sufficient 1 in. by $\frac{1}{2}$ in. galvanised mushroom head gutter bolts and nuts to allow one bolt and nut for each pair of sealing-off plates.

One $\frac{1}{2}$ in. brass boiler screw, for the overflow. Most builders, and all builders' merchants, carry a stock of these fittings.

One 4s. 6d. tin of "Japlac" emerald green enamel lacquer paint.

One $\frac{1}{2}$ in. or $\frac{3}{4}$ in. second-hand brass plug cock, or a similar size old brass bib tap. Preference is for a $\frac{1}{2}$ in. plug cock, as these do not require re-washing. Try to get one with a hose connection (for draining down, when renewing the water).

One $\frac{1}{2}$ in. or $\frac{3}{4}$ in. brass backnut to suit the threaded end of the plug cock or bib tap.

One small tin of aluminium paint (half pint).

Two 1 in. paint brushes; one for "Japlac" emerald green and one for the aluminium paint. It is not advisable to use the one brush for the two entirely different paints but if the outside of the cistern is to be painted a darker green, the "Japlac" brush will be suitable, provided it is well washed out in "turps substitute." To keep the brush soft, when not in use, always place it in a jam-jar containing about an inch of water.

Having obtained the cistern, a section is to be cut out from one end, where the glass panel will later be fitted. Most garages and engineering firms possess an oxy-acetylene cutter and if the section to be removed is marked out clearly, any such firm will collect the cistern and at very little cost cut the end out neatly to your requirements. To save the trouble of transporting the cistern to the owner's residence, it could, of course, be marked out in the builder's yard after the glass has been cut to size. Having cut the section out, the garage would probably not charge much to deliver the cistern to its destination.

To mark out correctly the piece of iron end plate to be removed, up-end the cistern, lay the glass panel on the top and mark the outline of the edges of the glass on to the cistern end with a pencil, for your own guidance only. Remove the panel and mark with white chalk the perimeter of the actual piece of plate to be cut out. The chalked lines will be 1 in. less all round than the pencil line, thus allowing a firm surround for the glass panel. Erase the pencil lines, or when cutting the iron plate section out the pencil line may, in error, be taken as the cutting line.

The 3 ins. by 3 ins. by $\frac{1}{2}$ in. iron plates previously referred to for sealing off the unwanted holes in the cistern can be cut from the piece of iron plate removed from the end and

the garage will also cut as many of these as are required with the oxy-acetylene apparatus, and drill a $\frac{1}{4}$ in. hole through the centre of each plate.

These square plates will be bolted on with the 1 in. by $\frac{1}{4}$ in. mushroom head gutter bolts and nuts, one plate on each side of the hole which is to be sealed off, as described in more detail further on, but there is an alternative method of sealing such holes that will save you the trouble of doing it, if the garage will undertake the job. This is simply to weld one plate over the hole on the outside of the cistern. Either method—bolting the plates one each side of the hole, or welding one plate on the outside—will ensure a perfectly water-tight joint. With a coarse file, remove the burr from the edges of the panel section, particularly where the glass will be bedded on to the inside face, a reasonably smooth surface being essential.

We now have the cistern to prepare, before fitting the glass panel. Scrape off all rust, inside and out, and sand-paper down to the iron. Or, better still, if you can borrow a painter's wire brush, this will effectively remove all trace of dirt and rust, ready for painting with aluminium after dusting out. Before painting, seal off the unwanted holes in the cistern, unless plates have been welded on. To do this, lightly paint all round the hole, inside and out. Paint each iron plate on one side only, otherwise they are messy to handle. Spread a $\frac{1}{4}$ in. layer of "Saniseal" on the painted side of each plate. Place one plate over the hole on the inside of the cistern and one outside, so that the $\frac{1}{4}$ in. hole in the centre of each plate coincides with the opposite plate hole and is in the middle of the hole to be sealed.

Paint the underside of the bolt head and put a little "Saniseal" on it. Push the bolt through, with the mushroom head of the bolt on the inside of the cistern. This may appear less decorative than the reverse but the fish prefer not to have the hazard of bolts sticking out of the sides of the aquarium added to their other worries. Tighten the nut, holding the head of the bolt from turning with a screwdriver; keep tightening until the "Saniseal" is squeezed well out and no more appears at the plate edges. Repeat with each unwanted hole in the cistern. Cut off the surplus bolt threads and file the ends down flush with the nuts.

Wipe the cistern out thoroughly with a damp cloth,

allow to dry and paint all over the inside with aluminium. Give the base a coat, externally. The aluminium paint will dry in four hours or so, and an even coat of "Japlac" can then be applied. The outer sides of the cistern may be done at the same time, or left until the aquarium is filled and in use and when you decide on the colour scheme.

Until the first coat of "Japlac" is dry and hard nothing more can be done to the cistern itself but the site for the aquarium can be chosen, preferably not farther from the nearest water tap, for filling, or the nearest gully for draining, than the available hose pipe will reach. Choose a firm piece of ground, or better still, a level concrete surface, for siting the aquarium, as it will weigh, when filled, anything from 650 lbs. A full 100-gallon cistern will weigh over 1,000 lbs.

If the aquarium is to be placed outside the house and a concrete surface is not available, level off the ground and put the four bricks in position so that each brick is under a corner of the aquarium and set in, about 2 ins. from each edge. The bricks should be placed on edge; i.e., the $4\frac{1}{2}$ ins. side being vertical, to maintain the aquarium well above the ground. If you do not possess a spirit level, it is advisable to borrow one, in order to ensure that a straight batten laid across the four bricks, each way, shows a true level foundation for the cistern, otherwise it will rock. This may occur, even when the bricks are properly levelled off, due to a slight unevenness in the base of the cistern itself. To overcome any possibility of rocking, place a small dab of "Saniseal" on each brick before mounting the cistern, which will then bed down evenly, with the weight distributed on all four corners.

When the first coat of "Japlac" is thoroughly dry and hard, fit the overflow and the drain cock. If these are too small to fit snugly the existing holes, cut out circular sheet lead washers (3 ins. in diameter and $\frac{1}{4}$ in. in thickness) to fit over each threaded end; use two such lead washers for each fitting. Paint one side of each washer, cover this side with a thin layer of "Saniseal," slip one washer on to the threaded end of each fitting in turn, with the "Saniseal" side next to the cistern, push the fitting through the hole, add a similar washer inside and tighten each backnut up against the washer. Paint all round with "Japlac."

The "Japlac" emerald green paint being dry and hard on the inside of the cistern, the glass panel may now be fitted. This is not bolted or fastened to the cut-out section of the end in any way but is merely bedded on with "Saniseal," the pressure of the water on the surface of the glass keeping it very securely in position, in addition to the adhesion of the glass with the "Saniseal" and the compound with the iron. Although the pressure of the water on the panel tends to keep it water-tight, no trouble has been experienced with the panel when the aquarium has been drained for cleaning.

(Continued overpage)



Tropical aquarium exhibited with 24 others in a publicity display arranged by Enfield and District A.S.

Photo: L. F. Patten



To fit the glass panel, paint with "Japlac" to a width of 2 ins. or so, all round the inside edge of the section cut out of the cistern end. Paint the glass on face and edges—about 1 in. around the face will do—on the surface that will be in contact with the cistern. Paint round the outside face of the panel a 2 ins. wide border with aluminium on the cistern end. Spread a $\frac{1}{2}$ in. layer of very soft "Saniseal" on to the 2 ins. wide inside painted border of the section cut out. On this the glass will be bedded and to ensure perfect contact, and consequently a water-tight joint all round, the glass panel should be pressed very firmly into position by running both hands round the outer face from inside the cistern, exerting a steady pressure, until the glass is separated from the iron by only a very thin layer of compound. Paint a 1 in. border all round the inside face of the glass panel.

Finish off this operation by covering the painted edge of the glass with a good fillet of "Saniseal." Trim off with a knife blade any surplus compound from the outside edges of the glass panel and, if any spaces are left between the edge of the iron and the glass outside the cistern, fill in with "Saniseal" and trim off. Give the "Saniseal" a coat of green "Japlac" on the inside and outside and bring the paint forward beyond the edge of the compound, on to the face of the glass $\frac{1}{2}$ in. all round on both sides. Paint the external base of the cistern, which may now be carefully lifted on to the bricks on the prepared site.

It is important to allow the "Japlac" round the glass

panel to dry and harden, as this has had no application of aluminium and only the one coat of green, but this has been found quite satisfactory in practice. When this is hard, the inside may be given the second coat, again bringing the green paint on to the glass. This is important, as it prevents the water getting between the glass and the fillet of "Saniseal." The outside of the cistern should be "primed" with aluminium paint, allowed to dry thoroughly and then given, in turn, two coats of "Japlac" emerald green; or, if preferred, as in the case of the aquarium being described, a darker green, which harmonises nicely with the surrounding foliage or grass.

Pond compost should be well washed and spread to a depth of 2 ins. over the bottom of the aquarium, sloping or grading it to a slight fall in any one direction, in order to facilitate the removal of any sediment that may, in time, collect. Rocks etc. may now be added and, the drain cock being closed, a $\frac{1}{2}$ in. bore hose pipe may be slipped over the end of the nearest tap and the aquarium allowed to fill slowly to within an inch of the overflow.

Properly constructed, this aquarium is suitable for indoor use and, if elaboration is desired in such a position, the outside could be covered with one of the thin hardboards now so widely used in general building work, leaving the glass panel visible; some form of lighting could, with a little ingenuity, be devised to display the aquarium and its inhabitants to the best advantage.

Show Business

by W. L. MANDEVILLE

THERE was nothing sensational in the Society's News Letter, merely an announcement that the next meeting of the Society would consist of a table show and general discussion, the general discussion obviously intended to occupy the time necessary for the judges to arrive at their decisions. At the meeting, several subjects were dealt with in a calm and desultory manner, until we came to the main subject—the 1954 Birmingham Show. Discussion on this was proceeding placidly, until the chairman of the show committee announced that since the last show the tanks had been in storage and, some had been broken, many of them leaked, all of them required cleaning and painting, and unless something was done about it there would be no show.

The ominous silence that followed this bombshell was broken by the chairman asking for suggestions; several were put forward, the best one being that members able to do so, should state how many tanks they were prepared to do in their spare time at their own homes and the society would arrange to deliver them and collect them when completed. This was amended by the astute chairman announcing that the 150 tanks needing attention would be divided among the number of volunteers.

An interesting competition could have been arranged—"spotting the non-volunteers"; were they the very busy chaps? Some of them, maybe, but the "regulars" were among them—the vocal ones that always know how a show should be organised, arranged and judged, those that are quick to notice that tanks are too high or too low, too small or too large, the chaps that can always assess the merits of a fish or point out the faults in a furnished aquarium after the awards have been made by someone else, but who are as unobtrusive as the clear water in a tropical tank when effort is called for.

The 30 tanks which were to be my responsibility were duly delivered by a very cheerful member of the society, and my grumbles at "work thrust upon me" were soon stifled as I realised the amount of work already done. The van had been loaded, paint, brush, emery paper and glazing

compound purchased and provided, together with typed instructions for carrying out the work. The writer of those instructions has nothing to learn about psychology.

"Before commencing the work" he wrote, "test all tanks for water-tightness"—no suggestion mark you, that they might leak, although that possibility comes to one's mind when looking at a tank that has had the bottom staved in—just a suggestion to "test for water-tightness." Tanks were then to be cleaned, "and all labels removed." A little more of my temper vanished as I removed those labels—"class" labels, put on at previous shows by stewards; "award" labels affixed by judges. My mind moved to the unknown aquarist that had placed his fish hopefully into that tank and then gone about his daily business, with an occasional thought throughout the day, "would the judges notice his fish?" I could imagine him returning to the show later in the day, trying to look unconcerned, but bee-lining towards his beloved entry and seeing that label which I was to remove—and that label had made everything worth while for him.

The ruthless instructions for tank attention then directed me to remove all rust and paint the frame, "allowing the second coat of paint to overlap the putty"—a second coat of paint had not entered into it until that psychologist got to work. He even forestalled my wife's suggestion that we keep the lovely little brush to paint round the door mouldings—"Any surplus paint and the cleaned brush to be returned when the tanks are collected"—that fellow thinks of everything. But the psychology came in useful, for being interested in the brush, her ladyship was soon putting on the first coat and even congratulated me on the results I obtained with the second coat. I hope no-one ever tells her that second coats are easy or I shall lose the finest first-coater in Britain.

Now the tanks are done and the show is on. We can be forgiven the slightly proprietorial air with which we walk around the show, for some of those clean and re-furbished tanks were our small contribution to a lot of other effort required to make any show possible.

AQUARIST'S Notebook



by
RAYMOND YATES

NOW that cheap but efficient electric pumps are generally available the majority of aquarists use some form of aeration in their tanks. This is not an unmixed blessing. Where fish are crowded it is true that aeration is the only answer, but it should be remembered that fish that are used to heavy aeration will usually fail if moved to quarters where no aeration is provided. The tiger barb is very susceptible to a change of this nature, and the barbs generally seem to be those most affected.

Angels, mollies and swordtails are the fishes which are often adversely affected by a change. Characins do not appear to be influenced so much by aeration but they appreciate a change of water, say the removal of one-fifth of their water once a week replaced with fresh water. Aeration can be a nuisance when it constantly distributes sediment about the tank and deposits it on the leaves of the plants. This can be overcome to some extent by screening off the diffuser either with high rockery or by placing it inside a tall glass jar so that the current of water is directed straight to the surface. The jars are almost invisible in the water but can be covered by rockwork to make them even less noticeable.

The bubbles from a diffuser cause considerable spray at the surface and care should be taken to see that an electric lamp bulb is not immediately over them or the light will not last long. Swirling sediment is also caused by large or easily frightened fish or over-industrious *Corydoras*, and this can be prevented to some extent by putting rockery in the tank at an angle of 45 degrees with the front glass, together with heavy planting.

During the colder months of the year the problem of carrying fish is often a source of worry to the aquarist. Generally speaking the main danger is long journeys and possible delays and the risk of falling temperatures. Where the thermos type of jar is used there is little to worry about but in other cases attention must be paid to conserving the heat. Kilner jars and the like should be surrounded with felt or thick wool (many years ago I used to use a naval sea boot stocking for this purpose) and even thick newspaper or corrugated card packing will do in an emergency. Once inside the compartment of a railway carriage there is little to worry about as regards loss of heat. With the windows shut and the heat regulator on, the average carriage is just the right temperature. The inside of buses is also very warm indeed, particularly at the front and well away from the platform. The coldest vehicle of all is usually the motor car; the colder the weather the more obvious this is.

In the street with a container of fish it is wise to avoid waiting in an exposed place and cans must be protected from the biting winds we experience in mid-winter. A few minutes of these can cause much trouble. Of course, in really bad weather it is much safer not to transport fish at all, as the risks of chill are more pronounced. A good thing to do is always to take the temperature of the water when you arrive at your destination—in winter water can often feel much warmer than it is. There is no need for guesswork with a thermometer. Fish which have been chilled in transit often fall victims of white spot or "shimmies" and nothing is lost by keeping them at a higher temperature than normal for a week or more after transit.

Another trouble is that of the carrying capacity of the jar. It is impossible to give figures of number and size of fish per jar per hour but care must be taken not to crowd too many fish into the container. You must make allowances for unavoidable delays and leave a margin for safety. It is better to carry too few fish rather than too many. The more

expensive fish usually are least able to stand crowding. Large and small fish should never be crowded together. Fish are also liable to a rough passage if crowded in a small container, and injury can result. Some air space must be left at the mouth of the jar and this is most important when carrying anabantids such as fighters, gouramies and paradise fish. Remember, the larger the jar or carrying can the less likelihood of trouble for your fish.

Whilst on holiday in the south of England recently, I found myself in Portsmouth and, having spent a considerable time in this city during the war, I decided to look up the local club and see how the hobby fared in this area. I found the Portsmouth Aquarist Society a very go-ahead club with fortnightly meetings and upwards of 150 members. They issue a really excellent magazine which runs to 24 pages and is brilliantly edited. Apart from the usual news items and details of past and forthcoming events they include an editorial, a club personality corner, list of "happy events" (breeding successes) of members, a cartoon, puzzle corner and crossword puzzle, fish from A to Z, and members' classified advertisements. From the very first page this magazine lives. In Gosport I looked in on Mr. H. Howell, the manufacturer of the well known "Suregrow" fish foods. Mr. Howell was an aquarist by heart and in the electrical business by trade. At the rear of his shop he kept a large and well stocked fish house and his customers used to beg to see "the fish." Nowadays Mr. Howell is not only an electrical contractor but also an aquarist dealer, an unusual way of a hobby being brought into a business.

I also called in at the Southsea Aquarium and was shown over by the curator, Mr. H. Sinclair, who was previously at the Paignton Zoo. This aquarium is on a big scale and contains 11 marine tanks, 38 tropical tanks and nine cold-water tanks. In addition there is a 2,000 gallon storage tank which receives sea water direct from the sea, the water being pumped some 500 feet from the sea front. The large sea-water display tank holds 3,000 gallons and two other tanks each hold half this quantity of water. The tropical tanks had a good variety of fish on view and there were some excellent cold water specimens. This aquarium has been constructed on similar lines to those at Regent's Park and Blackpool and is well worth a visit.

One thing which I noticed whilst south of London was the fact that the prices of fish were very much cheaper than those asked in the north. I commented on this many times and in each instance received the same reply to the effect that money was "tight" and that there was "much more money in the north." On reflection, I think there is a great deal of truth in this observation from a fish-keeping standpoint.

Some time ago I watched for 10 minutes or so the pathetic attempts of a large specimen of *Anostomus anostomus* endeavouring to pick up an earwig from the bottom of its tank. It was rather ludicrous to see the efforts of such a large fish trying in vain to dispose of such a small insect. Few aquarists keep *Anostomus* but many keep their much smaller relatives, the *Nannostomus*, better known perhaps as pencil fish. All the *Nannostomus* are attractive fish and make excellent inmates of a community tank. They reach approximately two inches in length and show the most

brilliant colours. They are not troubled much by disease and last a long time in the aquarium. It should be remembered, however, that they have very tiny mouths indeed for their size and they are hard put to it in disposing of one single *Tubifex* or white worm.

Live food, apart from brine shrimp, is best crushed or shredded, otherwise they have to make do with dried food or such vegetable food as comes their way. These fish have two colour patterns, the normal one for daylight and electric light and another beautiful blotched effect after dark. When a light is suddenly switched on this delightful second coloration is seen but it soon fades to the normal but still bright hues. I find that *Namostomus* are, like rudd, very heavy sleepers, and it takes them a long time to wake up after a long time in the dark.

Most aquarists are somewhat doubtful of the paradise fish, which is rather a pity when one considers the brilliant coloration and the interesting habits this fish possesses. It is true they can be troublemakers on occasion and they should never be kept with fish much smaller than themselves. Paradise fish are always on the move, even after dark, and they are then most dangerous to small fish resting at the surface. At any time a sick or ailing fish is liable to be attacked and it is uncanny the way they seem to recognise a disability in blind cave fish, following them as if uncertain of what action to take, although this fish is actually very rarely attacked.

Like most bullies the paradise fish keeps out of the way of larger and stronger fish such as most cichlids, but dwarf cichlids are chased whenever they appear, with the single exception of *Nannacara naenia*. In my experience this small cichlid is afraid of no other member of a community tank and does not hesitate to chase away any intruder which ventures too near to the portion of the tank in which it has made its home. Most Siamese fighters are more than a match for paradise fish although now and again it is the fighter which runs away. In such cases the fighter must be removed or the paradise fish will kill him. Small cichlids, such as the zebra cichlid, are too much for paradise fish, even when only a few weeks old, but these small specimens of this rather pugnacious fish will scare most of the inhabitants of a community tank. Their habit of making sudden short sharp dashes about the tank create panic, even for large angels, and they should be kept by themselves.

I once introduced a one-inch zebra cichlid into a tank which contained a single lonely dwarf cichlid (*Apistogramma pertense*) and awaited results. The *pertense* was delighted

and followed the young zebra cichlid everywhere it went for three whole days until, at last, the latter tired of these attentions and turned on its neighbour with fatal results. Paradise fish which have not been fed for several days become really dangerous to the other occupants of their tank and losses may occur. Where these fish are troublesome it is worth remembering that they can be kept indefinitely in a small floating jar or bowl until such time as their disposal can be arranged.

The use of sponges as a form of aquarium decoration is advocated in some quarters but when tried the results are disappointing. Even the best and largest sponges look out of place alongside normal tropical water plants and although they are a novelty one cannot escape the fact that they just do not belong to the furnished aquarium. Small sponges to-day are quite expensive and this is a major factor against their experimental use by aquarists generally. The bright yellow colour dulls somewhat when submerged and darkens considerably with time; the sponges soon collect dirt and detritus, so that they need removing and cleaning every seven to 10 days if they are to remain presentable.

As may be expected, the fish are quickly attracted to the new occupant of their tank. Swordtails pull and tear at sponges on first meeting but lose all interest within half-an-hour and never bother with them again. Cichlids seem to ignore them completely and snails leave them severely alone. Sponges have to be anchored in the gravel by using lead weights but this is quite easy to do. A sponge which has been in a tank for a week or two dries hard like a stone when removed, and is never quite the same again.

Rubber sponges have been used for decorative effects but are not advised. These are usually sold in the shape of a brick and have to be torn and wedged between rockwork for the best effects. Although attractive colours of red, green and blue are available the effect remains artificial and cannot be recommended. It should be borne in mind that the dye used for coloration may have toxic possibilities and this form of commercial product cannot be boiled or even exposed to fairly hot water for any length of time with safety.

A rather unusual aquarium has been set up at a school near Manchester. This is composed of the plastic gun turret of a bomber and the effect is quite remarkable. Outside the entrance to the river caves at the pleasure beach at Southport there is an octagonal aquarium with sides about 18 inches square. This holds a considerable amount of water and attracts attention, filled as it is with goldfish.

FRIENDS & FOES No. 19

Plea

PHYLUM:—Arthropoda, from Greek *arthron*—joint, and *podos*—foot.

CLASS:—Hexapoda, from Greek *hex*—six, and *podos*—foot.

LAST month I referred to "back-swimmers," describing the powerful *Notonecta*. The *Plea* is the sole British representative of the other genus of the family Notonectidae, and merits special mention because of its size, which seldom exceeds one-eighth of an inch. It delights, particularly in southern England, in frequenting vegetation in quiet, still waters, where there is usually an ample supply of its favourite food—*Cyclops* and *Daphnia*.



PLEA

Once again we have an enemy which can be introduced quite innocently into a tropical fish aquarium, and one which owing to its small size may escape notice for some considerable period. In a tank of goldfishes, angels, acaras, or Demp-

Water Boatmen

sees, it will probably disappear with the *Daphnia*, but in tanks of the smaller characins—flames, head and tail lights, neons, etc., it could do irreparable harm by destroying the tiny fry.

A pair will mate in an aquarium and lay tiny oval eggs on the plants. These might be eaten by the fishes, but I have no evidence that they are. Prevention being at all times better than cure, it is wisest to examine all catches of live food. The tiny creature's habit of swimming on its back and its different method of locomotion should draw attention to its presence.

C. E. C. Cole

THE AQUARIST



*A page for
the beginner
contributed
by*

A. BOARDER

AS we come to the beginning of the winter it is essential that the pond should be cleaned out at the first opportunity. A fine day should be chosen if possible, as this job can be anything but pleasant in bad weather. A pair of wellingtons and an old suit will mean that you can really enjoy yourself. There is, I think, a bit of the angler in all aquarists, and the emptying of the pond gives a good chance of seeing what fish are actually in the pond, how they have grown and whether there are any youngsters which have been bred in the pond unknown to you.

Once most of the leaves have fallen from nearby trees or shrubs the task should be commenced. If a soak-away hole has been provided when the pond was first made, it is fairly simple to empty the pond. If no provision was made then the pond must be emptied by other means, which can be hard work, according to the position of the pond. If the pond is a raised one or on rising ground much of the water may be siphoned out with a hose, but if this is not possible an electric pump can be used. Start the pump working early in the morning, before breakfast, so that as much water as possible can be run out in time to give plenty of daylight for finishing the job.

Do not be in a hurry to try to catch the fish but wait until most of the water is out. If you are impatient and swish about with a net too soon you will only stir up the mud and give yourself more trouble. See that you have a good-sized container beside the pond for the fish and provide a cover to prevent them from jumping out. At the deepest part of the pond will be found a quantity of black mud or muck. This will probably smell very strongly and should be shovelled out. Of course, this only applies to those ponds which were constructed of concrete. If the pond is a natural one there is no chance of being able to thoroughly empty and clean it but it can be partly cleared of fallen leaves by raking with a long-handled rake. Once concrete ponds have been cleared it is easy to swill them with a hose and brush well around with a stiff broom. If the water plants were planted in special weighted pots when first introduced into the pond they can be slid up the side of the pond when it is nearly empty.

Once the pond has been cleaned and refilled with tap water, the fish can be replaced. For a few days it will probably be necessary to net up any more leaves which may fall or be blown into the pond. Too many of these can tend to foul the water and in any case can cause the water to turn acid.

Starting with Tropicals

At this time of the year the cold water fish-keeper may find that with breeding operations ended there is not so much interest. This is the time to make a start with a few tropicals. Even if only one tank is set up in a living room, very much enjoyment can be obtained. Many beginners are scared at the outset by the prices they expect to pay for the set-up. It is quite possible to start with tropicals at small expense as long as you have some patience and do not aim too high in the first place. Many aquarists make a bad start and get discouraged when a little timely advice might

have saved them many heartburns. There is one aspect where I do not think that it is of much use to economise and that is the size of the tank. I suggest that no tank of less than 24 ins. by 12 ins. by 12 ins. should be used. Small tanks may be cheap but they will be dearer in the long run. The smaller the tank then the harder will it be to keep in good order.

Having acquired the tank some form of heating must be fitted. The general temperature required for tropicals is in the region of 73° F. This does not mean that the water must never vary a degree or two from this. I am sure that many tropicals do better when there is a slight variation in the warmth of the water. After all, fish in nature have to put up with many changes of temperature according to the weather and the time of day. There are several methods of heating a tank but for most people the electric method is the best. If no electricity is available paraffin oil can be used. As long as the actual flame does not touch the base of the tank when it is too cold all will be well. The electric heater should be strong enough to keep the warmth up without undue strain. A 100 or 120 watt heater should be sufficient in a living room, but it must always be remembered that the amount of heat required to heat the water up to a certain temperature will depend a great deal on the temperature of the room where the tank is kept. Also the position of the tank in relation to a window may make a great deal of difference. Much heat can be saved by suitable packing or screening. Only the front of the tank should be clear for viewing and so the back and ends can have some form of cardboard protection which can reduce the loss of heat.

Position of the Heater

If a small wattage heater is used it will almost always be on and may soon wear out. The best place for the heater is at the bottom of the tank so that the warmer water gradually rises towards the surface when it will assist in circulating the water and helping it to get rid of foul gases and to take up more oxygen. A thermostat is essential. Without one it is very difficult for beginners to be able to regulate the correct temperature. I know some experienced aquarists who switch the heater on and off and do without a thermostat, but this method can only be learnt with considerable practice.

It will be found that the upper regions of the water will be much warmer than the lower. There is no need to worry over this as it will not inconvenience the fish. The thermostat can be placed near the top of the water; most instruments cannot be entirely immersed but must have the upper part clear of the water. Some aquarists heat their tanks with ordinary electric lamps, which have the bulb partly immersed in the water. If this system is used it is a good idea to rub some vaseline around the metal cap of the lamp to protect it from too much moisture. The disadvantage of this system is that the light may have to be on all night and I do think that fish need some rest from strong light at night.

(Continued at foot of next page)

A Marine Aquarium in the Tropics

by Dr. F. R. HOLLINS

SINCE I came to Fiji as a medical officer in 1946, my favourite recreation has been the study of life on the coral reefs. Some years ago I decided to build a small aquarium, but unfortunately this was not possible during my first tour. Last year I returned to England on leave and learned that a marine tank was regarded by some aquarists to whom I spoke as impracticable for the amateur. Nevertheless, I obtained a good deal of valuable information and, on returning to Fiji, designed and built the aquarium that is described in this article. It has been a most interesting experiment, works perfectly and is no more difficult to operate than its fresh water counterpart.

Design was based on the following principles:

1. To reproduce a natural rock pool as closely as possible.
2. To use materials suitable for an amateur.
3. The water to be purified by a sand filter.

On these criteria it was decided to make the whole thing of wood with a glass front, to build up a rockery at the back and ends using rock and cement, and to have a small wooden tank filled with sand and gravel standing against one end to act as a filter.

Construction Details

Fish tank: Dimensions 30 ins. long, 15 ins. wide, 18 ins. deep. Bottom, back and both ends in 1 in. timber joined with marine glue and securely screwed. The screws were placed 2 ins. apart, the heads being countersunk and later covered to give a smooth finish. For the benefit of those who have had no previous experience with marine glue I may say that it is difficult to use as it hardens so rapidly. The glass was rebated back about $\frac{1}{4}$ in. from the edge and held in place by pieces of wood screwed to the base and sides to form a frame. Thin pieces of wood or moulding were then fixed around the top, projecting upwards for $\frac{1}{2}$ in. to hold the cover in place. This moulding was omitted over the central 10 in. of one end to allow the filter to fit flush—two vertical pieces being fixed to act as positioning guides.

Cover: Back 4 ins. high by 30 ins. long. Sides 4 ins. high, for the back 6 ins. then tapering to $\frac{1}{2}$ in. in front. Top.—Made in two parts, a horizontal piece 6 ins. wide at the rear, to which the front sloping portion was hinged thus allowing easy access for feeding and cleaning. A slot was cut near each end of the back of the cover to fit over the tubes to the diffuser blocks, and two more at the end where the filter was to go for the inlet and outlet pipes, thus enabling the cover to be removed without disturbing the mechanism.

Filter: Sides 9 ins. by 18 ins. by 1 in. Ends 8 ins. by 18 ins. by 1 in. Bottom 8 $\frac{1}{2}$ ins. by 7 $\frac{1}{2}$ ins. by 1 in. The bottom was let in to the ends and sides to a depth of $\frac{1}{2}$ in. at a distance of 11 $\frac{1}{2}$ ins. from the top, the whole being glued and screwed as already described. These measurements ensured that the top of the filter was flush with the top of the tank, while 11 $\frac{1}{2}$ ins. allowed clearance for the outlet at the top of the airlift, so that this distance must be measured on the airlift before construction is commenced. The space underneath the bottom was used to house the air-pump, a suitable opening being cut at the back to allow it to be

slipped in and out easily. A flat-topped cover 2 ins. high was fitted in a similar manner to that on the tank, the moulding being omitted on the end that rested against the latter. Three slots were cut—two coinciding with those on the end of the tank cover, and one at the back to fit over the rubber connection between airlift and pump.

Apparatus: Air pump, large airlift, plastic siphon tube, two diffuser blocks, two three-way connections, three regulating clamps, glass and rubber tubing. The outlet of the airlift was found to be much too short so a suitable length of plastic tube was fixed on with Durofix.

Finishing

The interior of both tanks was given a good coating of bitumastic paint, the corners rounded with Bostik sealing compound, allowed to dry and then tested for leaks. When completely watertight the tanks were filled with fresh water and allowed to soak for a week—the water being changed frequently. The interior of the fish tank was then decorated to simulate a rock pool, the result being most attractive and very realistic. Pieces of rock, stone and bleached coral washed in fresh water were built up with a cement mixture consisting of one part of cement and two of washed sand. When dry the tank was filled with fresh water and allowed to soak for a further period of three weeks. The interior of the cover was painted with liquid lino and two electric light bulbs fixed to the back. The whole exterior was finished with light green high gloss paint. A stand, just large enough to accommodate the tank and filter was made, its design and construction being as for a kitchen table.

Before filling with sea water the tank was tested with fresh-water creatures to ensure that all effects of the cement had been removed. Two lengths of $\frac{1}{4}$ in. diameter glass tubing were taken and a diffuser block fitted to one end of each using a piece of rubber tubing thickly covered with Bostik. Each tube was then bent at right angles at the correct height, the free end coming out through the slot in the back of the cover and connected to the air pump. The bottom was then filled to a depth of two inches with well-washed coral sand, the level of the sand being flush with the top of the bottom frame, and a few pieces of rock clumps of coral and shells strewn about to complete the effect. The airlift was placed in the centre of the filter, which was filled to a depth of several inches with gravel, and then fairly coarse sand to allow about $\frac{1}{2}$ in. of water on top.

Nineteen gallons of seawater were required to fill tank and filter. The siphon was started, air pump switched on, water flow and aerators adjusted to a nice steady rate and the apparatus was ready for use.

Stepping Stones

(Continued from the preceding page)

When first filling the tank use warm water so that the heater will not have to be overworked to raise the temperature from about 50° to 73° F. Test with a thermometer to see that the required level is reached. If a small thermometer is kept in the tank it will readily indicate if all is well. No aerator is necessary as long as you do not try to keep too many fish in the tank. As a rule tropicals can be crowded more than cold water fish and it must be remembered that the action of the heater tends to aerate the water by causing a good circulation. Next month I will deal with the tropical set-up in more detail, touching on plants and fish for beginners.

AQUARIST AT HOME:

Mr. C. W. Williamson

Interviewed by JAS. STOTT

A CONSIDERABLE number of tropical fishkeepers are finding the increased cost of electricity a serious matter in the pursuit of their hobby and are reducing the number of tanks in use accordingly. Quite a number of aquarists are experimenting with various ideas for conserving the heat in an attempt to avoid cutting their set-up.

With this kind of approach in mind, Mr. C. W. Williamson, now chairman of the Norfolk and Norwich Aquarist Society, began experiments early in the year and when I visited him in July he had completed the building of an entirely new installation which he humorously calls his "economy hot-box." Describing it one might say that in principle it is rather like a fish house inside a fish house.

Actually it consists of a large cabinet-like structure ten feet long by three feet wide and six feet high at the back, falling to four feet six inches in height at the front. This is fitted inside the fish house, which is a lean-to conservatory ten feet long by nine feet wide. The height is 16 feet sloping to eight feet at the front. This conservatory can be entered through the rear door of Mr. Williamson's house and there is a door from the conservatory which opens into a small garden where it was proposed to lay down a fish pond during the autumn, an ideal time for pond building.

Wood is the material used for the frame-work of the cabinet and angle-iron makes up the staging to take the tanks inside. The lower front panels are insulating board, each panel fitting closely into the framework; they are, however, removable. Glass is fitted into the front upper panels and they are hinged to open outwards. The sloping top panels are also glazed and the two centre panels are also hinged permitting them to be raised when extra ventilation is needed. A baseboard fixed to the back wall of the cabinet carries several sockets into which the leads may be plugged for electrical supply to thermostatically controlled immersion heaters.

At the time of my visit, Mr. Williamson was in the



Photo:

J. Scott

A view of the glass-cased cabinet within the conservatory fish-house

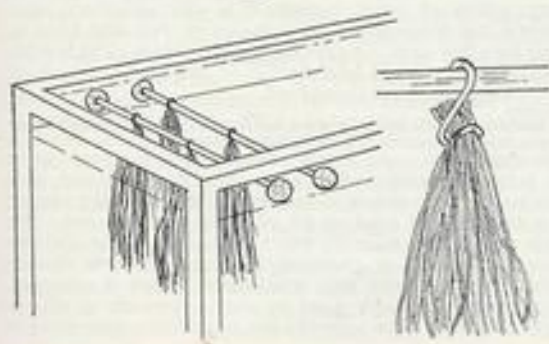
process of cleaning the tanks ready for setting up in their new position inside this cabinet. One tank was completed and in its place, well back in the centre of the cabinet: it may be clearly seen in the photograph illustrating this article. The tank had been in action for several days and Mr. Williamson told me he was very pleased with the results so far although the real test would come during the winter months. He has strong hopes, however, that the installation will come up to expectations.

Space Heating in Winter

During the cold winter months it is proposed to heat the fish house, or conservatory, by means of a small greenhouse type paraffin oil heater, thus surrounding the cabinet, as it were, with a volume of warm air and, of course, within the cabinet the actual tank heating will be by the usual immersion heaters. A maximum-minimum thermometer is fixed inside the cabinet to record the air temperature within and all ventilators are under complete control.

Before leaving I arranged with Mr. Williamson for him to let me know how the installation worked during the coming winter, after which I hope to be able to make further comments through this feature article next year. When all the tanks are installed in this cabinet and ready for stocking, Mr. Williamson now feels he would like to specialise in labyrinth fishes but he is determined to start with only good-quality stock.

Providing Cover for Fry *by* VICTOR HILLMAN



FINDING difficulty in growing floating plants, and finding them a nuisance during tank-cleaning operations when I could get them to grow, I invented a method of providing aquarium fry cover which may interest other aquarists.

Stick two or four rubber suckers (I use four) at the ends of the tank, back and front, and attach between them a glass rod. From this suspend three or four bunches of sea moss by means of hooks made from lead wire and—*hey presto!*—there are your floating plants, and they can be detached at will.

Alternatively, in place of sea moss ordinary white raffia used by gardeners can be hung in bunches after boiling, to act as fry cover. Raffia is also useful for making a thick mat on the tank bottom for spawning egg-layers, if the strands in bunches are kept down by cross strips of lead wire.

OUR EXPERTS' ANSWERS TO READERS' QUERIES

I should like to keep tropical marine fish, and wonder whether ordinary sea salt added to boiled tap-water would suit them?

We are afraid there is no substitute for sea water to suit marine fish. You need a few gallons of pure sea water even if you cannot get enough to fill an aquarium. The rest can be made up by adding a briny solution of evaporated sea salt and some other ingredients. We advise you to read some literature on the subject. You will find a chapter dealing with the marine aquarium in Hervey and Hems' *Freshwater Tropical Aquarium Fishes*, which may be seen in many public libraries.

Some time ago I installed a tropical aquarium in our local hospital. The water is very cloudy, and filled with white particles. I have been led to believe this cloudiness has been brought about by blanket dust. I intend to install a filtering plant, and cover the aquarium with a sheet of glass. Can you suggest any other measures I might take to prevent the cloudiness?

All aquariums should be kept covered with a sheet of glass or specially designed hood. The fact that your aquarium has been left uncovered may explain why it has become so cloudy. Another thing, an uncovered aquarium is a great temptation for people to drop tit-bits into the water for the fish. Too much uneaten food would soon bring about fouling of the water. You must place a cover on the aquarium as soon as possible, and leave instructions for the fish to be fed only at specified times, say once or twice a day. A filter will certainly help to clear the water and generally tone it up.

The appearance of my aquarium has been spoilt by a soft green algae which has spread over the rockwork, among the plant life, and on the compost. Can you suggest any method by which I could eradicate it or keep it in check?

The soft green or slimy algae you describe often makes its appearance in aquariums containing heavy feeders such as cichlids, in aquariums containing rockwork having a chalky content, and in aquariums having the bottoms fouled with uneaten starchy food. It is possible that the pH of the water is on the alkaline side. Alkaline conditions encourage the growth of algae. Try straining the water through scalded peat, repeating the procedure every now and again. In a little while the water should take on an acid nature. In the meantime, wipe the algae off fixed objects with a clean piece of rag, and cut away badly coated leaves and stems of the plants. Given such treatment, you should soon have the unsightly growth under control.

I have recently become interested in tropical fishkeeping, but cannot understand why the experts seem to differ in their views about how much artificial light an aquarium should have to keep it in a healthy condition. Can you give me some information on the subject?

It is not easy to lay down rules about how many hours of electric light an aquarium should receive to keep the fish and plants in perfect condition. You see, it all depends on the amount and strength of natural light available; whether the aquarium is situated close to a window or not; whether the window faces north, south, east, or west; and which locality, or even part of the world the aquarist is residing in. For instance, we should say that a bright day in December would be considerably brighter in Bournemouth than in, say, Stoke-on-Trent or Manchester. If an aquarium is right away from natural light, it needs about eight hours electric light every day. A 60-watt lamp is usually sufficient for a tank about 18 ins. by 12 ins. by 12 ins. The exact amount of light an aquarium needs is best worked out by experiment with lamps of different wattage. As a rough guide, you may take it that if the plants turn yellow and die down, then the light is not bright enough, or it is not being left on for long enough. On the other hand, if the plants become covered with algae, and shoot to the top of the water in a very short time, then you may consider that the light is too bright, or you are giving the aquarium too much of it.

Many queries from readers of "The Aquarist" are answered by post each month, all aspects of fish-keeping 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.

Recently I tested the pH value of my aquarium water. I found the pH value to be 6.7. I am a beginner in tropical fish-keeping, and wonder whether this is all right for my fish?

The pH value of your aquarium is about right for most species. Do not be tempted to alter it by the addition of salts or chemicals. If the fishes seem to be enjoying good health, and are eating well, leave well alone.

Some friends have told me that as white spot is prevalent in the rivers and lakes of this country, it is just asking for trouble to feed *Tubifex* worms to one's fish. Is this true?

It cannot be said that white spot disease is common among native fish. The most common disease among river fish appears to be *Saprolegnia*, or fungus disease, especially at the end of the spawning season. So long as *Tubifex* is rinsed several times in fresh tap-water we do not think much danger exists in feeding it to aquarium fishes. Of course, it would not be sensible to scoop up *Tubifex* worms from sewage-polluted mud and drop it straight into an aquarium; but, to recapitulate, cleansed *Tubifex* is another kettle of worms altogether.

Please can you tell me why bubbles break through the compost in my aquarium and rise to the top of the water?

Bubbles rising from the compost may be caused by pollution of the growing medium brought about by excessive feeding, by oxygen rising from algae carpeting the compost, or by oxygen liberated by the roots of the plants. If pollution is the cause, you will soon know about it because the fish will gasp at the surface, and if you disturb the surface of the compost with a stick, the grit or sand below the surface will be blue-black, and if a spoonful is lifted out of the aquarium it will have a nasty, gassy smell. If a small area only of the compost is polluted, it can be spooned out and replaced with fresh. If the pollution is all over, then the best thing you can do is to set up the aquarium afresh.

In a newly set-up aquarium my fish seem to spend a lot of time rubbing their gills and sides against the leaves of the plants. Do you think they are suffering from gill-flukes?

Fish often act in the way you describe, especially in a newly set-up aquarium, and it does not necessarily follow that they are diseased. Affections of the gills usually result in more positive signs of illness such as the fish going off their food, gasping at the surface, showing redness round the gills and badly sunken eyes. If you feel certain something is wrong, try the following treatment: add four drops of a two-and-a-half per cent. solution of methylene blue to every gallon of water contained in the aquarium, and increase the temperature by a degree or two and keep it there for a few days. In the meantime, siphon all sediment from the bottom, and feed the fish on live food or pieces of lean meat rather than dried food.

I have been told by an expert aquarium-keeper never to put stones in an aquarium. Is his advice right?

In some ways, yes. Small stones or pebbles spread over the bottom provide pockets into which food can sink and turn bad. Large stones or rockwork of a soft, chalky nature soon dissolve and send up the pH value of the water. In other words, they make the water too hard. If you want to place large stones or rockwork in your aquarium, choose smooth flints, granite, tufa, well-soaked lumps of coal (not coke), lumps of block glass or slate. Smooth all sharp edges away with a few rubs of a file, or carborundum stone.

A few months ago I bought a pair of green swordtails. Soon after I placed them in an aquarium the female gave birth to some babies. After a little while she fattened up again, and I felt sure she was going to have another brood of young. Then one day I noticed that the lower rays of her caudal fin were lengthening, and her anal fin was changing its shape: in other words she was changing her sex. Is this a common occurrence among swordtails?

Swordtails and several other species of livebearers often appear to change their sex. A female which has "changed into a male" has, in reality, only developed certain secondary sexual characteristics usually only seen in males. In such fish the sex organs have often become useless and they are incapable of parenthood. Swordtails and mollies seem to "change their sex" more readily than other livebearers.

One of my mollies has developed an ulcer on the eye. Can you suggest a treatment, please?

Touch the ulcerated spot with a camel-hair brush dipped

in iodine, or better still, in a solution of tincture of aconite and iodine mixed in equal proportions. You may have to repeat the treatment several times before you notice any improvement in the fish's condition. Even then, some forms of ulceration resist treatment, and then it is better to put a badly diseased fish out of its misery.

I am planning to set up two 30 ins. by 15 ins. by 15 ins. tropical tanks in a warm living room. Can you tell me the wattage needed to heat the tanks by electricity?

As you say the tanks will be kept in a warm living-room we think that one 75 watt heater in each tank will prove sufficient to maintain a temperature above 70° F. all the year round. Place each heater in a horizontal position, close to the floor of the aquarium, and, if possible, wire them up to a thermostat so that whatever the temperature of the room, the water in the aquariums will remain at an even heat.

COLDWATER FISHKEEPING QUERIES *answered by* A. BOARDER

What can I do with a cracked glass? It is a 36 ins. by 15 ins. by 12 ins. tank and the bottom glass is cracked. Can I seal it, re-glaze the bottom only, or must the whole lot be done?

It may be possible to seal the crack with little trouble. I have had a cracked glass in a tank for years with little or no sign of a leak. When the tank is empty and fairly dry try to force some mastic material into the crack with the aid of an india-rubber. If there is any space at all this will be filled up and you may have no further trouble. Another way is to get some mastic material and place a little on a strip of grease-proof paper. Place this along the whole crack inside and do the same with another strip underneath. Gently press with the fingers until the mastic is spread out over both pieces of paper and a good seal should be made. You could not re-glaze the bottom by itself as this is the first piece of glass to be put into position and so must come out last.

I have just started an aquarium and have been told that I can do without an aerator. Is this correct, please?

You can do without an aerator as long as you do not try to overcrowd the fishes. I consider that to use an aerator in an ordinary set-up tank is a sign of failure. Providing the setting-up has been correctly done and the plants are growing well, there should be no need for an aerator. If the condition of the water becomes foul through excess of foul gases or lack of oxygen, it is a sign that the management has been at fault, either by over-feeding or over-crowding the fish. An aerator may be used to good purpose by a breeder when he has a large number of fry in a tank, but generally speaking it can be dispensed with.

I am having trouble with a pair of Bristol shubunkins. After they have fed on garden worms their dorsal fins fold up and they sink to the bottom. I have never had this happen before and would like to know the reason.

It must be realised that goldfish are unable to take any large portions of food easily. They have no large stomach and so are unable to swallow a big piece of food such as could be done by a fish like a perch or pike. If you watch goldfish eating you will see that as soon as they have picked up a small portion of food they go into a corner and quietly chew this over for some time before they are able to swallow it and take in more. Many fishes lower the dorsal fin whilst doing this and if your fish normally swim about with the fin raised I should not worry much over their behaviour. You say you have not had the fish long. They may have come from an outside pond and the water conditions may be very different where you have them now. Try a partial hunger cure. Withhold all foods for a week and then, when feeding, a few crystals of Epsom salts may be dropped in. This treatment should put them right.

I am in the process of making an outdoor fish house. What is the best type of window lighting? Is it advisable to pad the walls and do I want a separate plug for each heater?

Provide sufficient windows so that you can get the maximum light. If too much you can always shade some out, but you cannot give more light and air when it is required if the windows have not been fitted in the first place. You can use horticultural glass for glazing, it is quite good and cheaper than window glass. If you can pad the walls you will be able to keep the house warmer in cold weather and also keep it cooler in hot weather. You could use sawdust or glass wool. Have separate plugs for each tank heater and see that you have a good fuse box and switch inside the fish house. A tiny pilot lamp is also useful to show that the electricity is functioning all right.

I am a newcomer to fishkeeping and would like to know what types of fancy goldfish can be kept together in one tank; also how long must I feed baby fantails on fine food? I think mine are five weeks old.

All kinds of fancy goldfish can be kept together. As a rule they are most docile and never appear to quarrel even over their food. The only point to remember is that all types of fancy goldfish have been bred from the original goldfish and so they will breed together. This may not worry you much in your tank as it is very unlikely that any fry would be hatched and reared under mixed tank conditions. The size of foods for your fry will depend entirely on their progress. Only food which is small enough for them to eat should be given, but as the fish grow, so large foods can be added. Goldfish are greedy feeders and always go for the large pieces first, and smaller foods are likely to be left if given mixed.

I gave two of my shubunkins a salt bath to cure them of fin congestion. One recovered but the other one swims about head down. Can you advise me what can be done?

You may have given the fish a chill when giving it the treatment. It is easily done if you do not test the temperature of the bath before placing the fish in it. I think that fin congestion is cured more safely with a Dettol bath: a quarter teaspoonful to a gallon of water, and leave the fish in for 15 minutes. I think that much of the red streakings on the fins of fish are caused by flukes, too small to be seen without a magnifying glass, and the Dettol can kill these. The fish may recover all right but at present has swim-bladder trouble. Place the fish in shallow water and warm it up to about 65° or 70° F. for a week. This should effect a cure, when the water can be gradually cooled to ordinary temperatures.

I have some *Macropodus opercularis*, often called paradise fish, and I cannot find a reproduction couple, for it is extremely difficult. Can you please advise me on this matter?

It is not at all difficult to sex paradise fish, for when

about three-quarters grown the male develops a very long anal fin. This can reach to the end of the tail. The male also gets better coloured, especially when in breeding condition, and also he continually blows bubble nests on the water's surface. The female is quieter coloured and, in fact, when actually breeding she turns very pale. As you live in Portugal you should be able to breed these fish quite easily; I do so in cold water.

I have in my garden two small ponds in a rockery, one about 18 inches higher up than the other. Two medium-sized goldfish live in the upper pond. One night they were there as usual and the following morning one was swimming around in the lower pool. The ponds are about two feet apart. Do you think that the fish jumped out and landed in the lower pool by accident or was it design?

The fish may have been spawning in the early morning and the one jumped out in the excitement. I have had this happen in my pond and have found a fish over four feet from the pond on a lawn. Once they jump from a pond they do not seem to have much idea of direction and I feel that my own fish would never have found the pond by itself. Once your fish had jumped from the pond, by flapping about it would naturally drop into the lower pond. I would think it far more unusual if it had jumped from the lower into the upper one. On the other hand I remember a paradise fish jumping from one tank to another under such circumstances as to prove to me that the fish did actually know where it was going and changed tanks deliberately.

I rear large numbers of goldfish and use large ponds used for rice-growing at certain times of the year. I use tanks 20 feet by 15 feet by 7 feet, and put about 2,000 fry in each. After a month, although they had grown well, I could only find just over 100 fish. I found some water boatmen in the tanks. Do you think they can kill the goldfish, as Innes says they are "not guilty"?

I feel sure that some of your losses were caused by water boatmen and I must disagree with Innes about them being harmless to young fish. I have actually caught a water boatman with a live fantail in its clutches and I had previously found one eating a dead one. Whether this fish had been dead before the boatman found it I was not sure, but now I have no doubts whatever. As these pests can fly strongly they can enter your tanks by night and by day. A screen would have to be fitted to keep them out altogether. Meanwhile they have to come to the surface at frequent intervals to get air and so they may be netted. Also if you visit the tanks at night a torch will soon show you the boatmen on the surface. It is then quite easy to catch and kill them. Of course, some fry may be eaten when tiny by *Hydra* and later on by the larvae of water beetles and dragon flies. Large fry can also eat smaller ones and so it is difficult to pin the murders on the water boatmen alone. It seems that even in Rangoon you have pests to contend with very much the same as we have here.

I have a pond of about one-third of an acre in area in which I have some hi-goi and roach. There is plenty of water weed and there appears to be enough food, yet the roach do not seem to grow. They are only about four inches in length and yet the hi-goi have grown very well indeed. Why do the roach not grow?

Your pond seems quite large enough for the roach and there does not appear to be any particular reason why they do not grow. They are mostly a slow-running river fish although many do grow to large sizes in ponds or lakes. They eat very similar foods to hi-goi and are especially fond of water snails and small forms of Infusoria. There is apparently something which they prefer, lacking in your pond. No doubt if you could find the food which they lack the rate of growth would be increased. Generally the reason for lack of growth is because the fish are overcrowded and food is scarce. You can try feeding them with the following foods and see if they have a preference for any kind:—chopped worms, gentles, brown bread, rolled oats, shredded horse liver, Bemax, boiled hemp, cheese, boiled wheat and chopped spinach. As roach can be caught with many of these baits it is likely that at least some of them will be taken readily by the fish.

I have a 24 ins. by 12 ins. by 15 ins. tank containing an eel six inches long, two small goldfish and a stickleback. What weed is suitable for the eel, what food should be given and what other fish can the tank hold?

You certainly have a queer mixture in your tank already and I fear to recommend any other kinds as suitable for companions. I see no reason why you should not try a small tench, small rudd and a small bleak. They can be all kept together but the stickleback can injure the others and the eel might have a go at the tails at least of the other fishes. Eels do not worry much about water plants but are more at home in mud. The eel is mostly carnivorous and would need live foods such as worms, but would take liver and dead fish. When available tadpoles or frogs could be given. You must keep the tank covered or the eel might climb out one night.

I have had two metallic veiltails since they were four months old. They are now over two and show no signs of turning red. They are quite healthy. What are their chances of changing from this colour to red now?

I could more easily answer your question if I knew from what type of fish they were bred. You see there is a great deal in whether they have been bred right. If they came from a quick-colouring strain, then one of them at least would have changed colour by now. As they are two years and have not done so they might never change at all. It is when such fishes are used for breeding that the youngsters change colour but rarely. You could try to give them as much strong light as possible, sun for preference, and warm the water up a bit, otherwise there is little you can do.

I have a 24 ins. by 12 ins. by 12 ins. tank containing two moors. Will they grow all right in the tank; how big should they be at three months and will watercress make them grow?

The tank is large enough for the moors and they should grow well in it. If they have been well treated they could be two inches in length over-all by now but it depends on the feeding; they might not be more than an inch if they have had insufficient food. Watercress alone would not be a very good food for moors. Give them chopped earth-worms, Bemax, dried shrimp, boiled oatmeal and some shredded liver; they will grow on this, especially as they have plenty of space, the most important point.

I have found some goldfish fry in an outdoor tank where I had placed some spare plants from my goldfish tank. What can I feed them on; so far they have had nothing?

The fry will eat Infusoria and algae when small and as they grow you can add egg powder or yolk of hard-boiled egg, micro worm, shredded worm or white worm, finely-ground Bemax and later some dried shrimp, ground finely and sifted.

I have some shubunkin fry and wondered if I could transfer them from an outdoor pond to a tub and winter them in my greenhouse which I can heat with a paraffin lamp. Is it any use keeping fry which have not changed colour at four months of age?

You can winter the fry in the greenhouse and they may grow slightly in the winter as long as the temperature is between 50° and 60° F., but they may need plenty of light. Those which have not coloured by now are not worth keeping.

Post-Mortem Examination of Fishes:

W. Harold Cotton, F.R.M.S., F.Z.S., 39, Brook Lane, King's Heath, Birmingham, 14. (Phone: Highbury 1693)

Specimens should be sent direct to Mr. Cotton with full particulars of circumstances, and a fee of 3s.

It is important that the following method of packing fish be adopted:—Wrap fish, very wet, and loosely in grease proof paper and then in wet cloth. Re-wrap in grease proof or wax paper and pack around with cotton wool in tin box. Despatch as soon as possible after death, with brief history of aquarium or pond conditions.

OUR READERS

Write—

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.



Fish Capacity

THE usual way of estimating the surface area required by a fish is to allow a certain number of square inches of surface for each inch length of fish, this number depending upon whether the fish is large or small. The amount of air a fish needs, however, depends presumably upon its volume rather than its length. If we assume what is roughly true, that fishes of different lengths have much the same proportions, then this implies that the surface area needed by a fish is proportional to the cube of its length.

If we accept this, the only question remaining is how many square inches of surface to allow per inch cube of fish. A reasonable value seems to be $1\frac{1}{2}$. On this basis a 2 inch fish would require 2 by 2 by 2 by $1\frac{1}{2}$ square inches, i.e., 12 square inches; a 3-inch fish would require 3 by 3 by 3 by $1\frac{1}{2}$, i.e., 40½ square inches, and so on. I should be interested to know whether other readers agree with this idea.

A. H. LUCAS,
Hammersmith, W.6.

Fluorescent Lighting

AS a comparatively new reader of your excellent journal I am surprised that little mention is made of fluorescent lamps for aquarium lighting. These have many good points which outweigh the old enemy—initial cost.

For my aquarium (30 ins. by 12 ins. by 15 ins.) I use two 2 feet 20-watt fluorescent tubes, which have a light output of about one 60-watt lamp each but a life some three times longer. The colour rendering properties of fluorescent tubes are well known, and together with their even light distribution this makes them ideal. They also work at a relatively low temperature and so in warm weather are a big help in maintaining an even aquarium temperature.

The cost of my installation was in the region of £4 10s. However, on large tanks and on the tops of staging, longer tubes may be used (e.g., five feet, 80 watt) with a light output greater than five 60 watt bulbs. Saving on electricity on a large installation will recover the capital cost and show a saving during its lifetime.

R. S. BANNISTER,
Leeds, 12.

Zebbras and Minnows

SOME years ago a rumour was started by a lecturer from abroad, who was interested in hormone fish foods, that zebra fish and white cloud mountain minnows would not thrive when kept together. While we do not hear much about the foods to-day the rumour lingers on.

I have long been expecting some aquarist to prove or disprove the idea but have so far been disappointed. I have spawned both species, which I always keep together as they

have similar requirements, and have grown them on to maturity. These fish have been regularly seen by many visitors to my fish house, growing side by side. The matured pairs of the young fish have now spawned and are fully fertile.

The fact that *Vallisneria* and *Sagittaria* rarely grow well together, as mentioned in Innes's book, does not necessarily imply any innate antagonism but merely emphasises that as conditions of light intensity, mineral content of the water, temperature, etc., in any one tank can only be ideal for a particular variety, that variety will make faster growth and will eventually deprive the other of light, with the inevitable result that the latter will starve.

I appeal to aquarists who are unable to carry out properly controlled experiments not to jump to conclusions as a result of any one success (or failure). I hope the above will kill the first-mentioned rumour once and for all—but I doubt it!

J. J. BRADY, M.P.S.,
(Judge, M.A.A.S.).

Unusual Catch

LAST month I made a *Daphnia* collecting expedition with a friend and it turned out to be very interesting in a most unexpected fashion. The pond chosen was a small pool about three-quarters of a mile from the River Severn, near Arlingham. A ditch about three feet wide runs into the pool and a similar ditch passes close to it. The pool has proved a very fruitful source of *Daphnia* in the past but this time we could not find a single one.

However, in the ditch I noticed a creature swimming near the surface which looked something like a very small fish, which I netted. It turned out to be a tiny transparent shrimp, large numbers of which were found in the ditch together with a few larger ones up to three inches in length. While netting some of these near the surface a larger creature swam into the net, and it proved to be a flounder.

The explanation appears to be that a very large Severn bore a few days previously had overflowed the river banks, and that all this marine life had wandered through nearly a mile of ditches to its present position.

T. N. ARTUS,
Stroud, Glos.

Coral Fish Keeping

FROM time to time you have published articles on the keeping of sea fish, so here are some notes on the keeping of yellow-bellied coral fish, made over a course of about three years' experiments in Antigua, B.W.I.

About 20 of the fish, from one-third to an inch in length, were taken from a very large pool having an outlet to the sea.

Mr. Strachan Kerr

IT is doubtful if any other aquarist in Great Britain would have left such a gap in the ranks of aquarium lovers, as has Strachan Kerr by his sad death last month. Loved and respected by all who knew him, employees, friends and fellows in the fraternity, he had yet left a greater mark on the aquatic world than on the ordinary world around him. An ultra-generous host to all who were privileged to enjoy his hospitality, a keen business man, but whose first thoughts always seemed to be for his beloved fancy, he nevertheless refused to take the hobby, or himself, too seriously, taking his many losses—due often to his careless generosity—always with a semi-facetious philosophy that masked his sincere love for the aquarium world.

The Scottish Aquarium Society rose to the great heights it did mainly due to the expenditure on his part of money, hard work, careful thought and far-seeing scheming. No set-back shook his buoyant optimism, no obstacle appeared too great to deter him. The death of his only son, Robin, torpedoed off the Belgian coast during the war, gave him great grief, as it did to the boy's adoring mother. This was a terrible shaking-up for both, but Strachan, knowing how keen was his son, thought it only right to "keep right on to the end of the road" with the same cheerful grin, although now somewhat grim.

It is only latterly that he had determined to give up the helm of the S.A.S. and give the youngsters a chance to prove themselves as good as he. A difficult task this! May they succeed. Strachan Kerr had been a time-serving naval man, and looked it, with his wide shoulders, bulldog jaw, yet genial good-tempered disposition. A widely-travelled, good-natured, lovable natural gentleman; a devoted husband and father, generous and helpful to all, and a great aquarist. R.I.P.

A.D.

Our Readers Write (Continued)

One fish was placed in each of 20 glass jars 9 ins. by 6 ins. by 15 ins. high, filled to within an inch of the top with sea water.

The jars were kept in shade—no direct sunshine or glare reached them. A little rusty-brown coloured algae was allowed to grow on the sides of the jars; no aeration, heating or filter was used.

Variation in temperature was normally between 70° and 85° F., occasionally between as much as 60° and 90° F. The jars were "topped up" with fresh tap water once a week; dirt was siphoned out once every two weeks and the water replaced by clean sea water.

Fish were fed twice a week, when each was given as much as it could eat—mainly chopped earthworms, but sand-hoppers and a dry tropical fish food were sometimes given. A little of the algae appeared to be eaten occasionally. If the water became cloudy (it seldom did) it was changed.

Observation of the fish in the pool showed that each fish made its home in a crack or under a rock and that it considered the surrounding area as its own territory. Fish of the same or of different types staying long in its area were attacked. When two or three half-inch fish were placed in the same jar they showed no signs of lack of oxygen but attacked each other so vigorously that only one remained alive.

Each fish was returned to the pool when it reached a length of two inches, as they then began to show signs of

lack of oxygen in the jars. Fish in the pool lost the vivid brightness of blue in the upper part of the body as they grew older and older fish caught in the sea also showed this characteristic. The fish in the jars showed very little loss of colour over two years, however, and compared very well with their brethren of equal size in the sea.

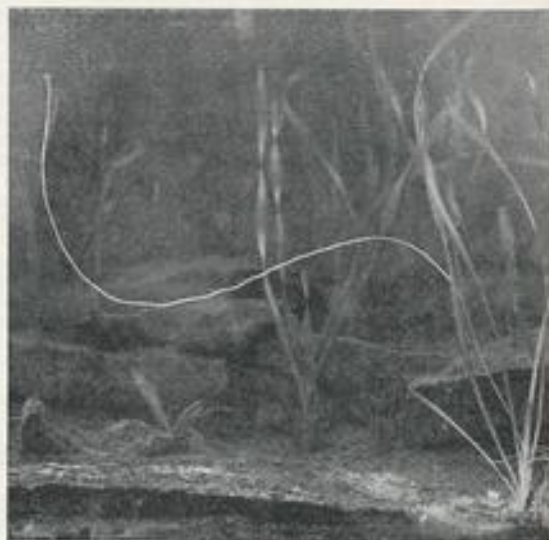
I am returning to Antigua next month and hope to construct a 60-gallon aquarium in order to see if these fish can be kept together then, and I will try to breed them if they will agree in larger quarters.

J. F. FOOTE,
Instow, N. Devon.

Vallisneria Flowers

FOR the past several weeks I have been experimenting with *Vallisneria spiralis*, hoping to encourage its flowering. My photograph (this page) was taken before the plant threw up its second bloom, and two more of the plants are also forming flowers.

E. G. VENTON,
Haslemere, Surrey.



Flower of *Vallisneria* making its way to the water surface

ALTHOUGH my *Vallisneria spiralis* came from a tropical tank as a young specimen, it lived and grew in my cold-water tank. After nearly a year I changed to a tropical aquarium and the plant grew tremendously and I noticed a shoot almost eight inches long growing from the crown. Three buds appeared on it after a day, and two days later one of them flowered. The two other buds then grew away from the main stem and each formed another group of buds. Hardly a day passes but there is a flower. The tank is 24 ins. by 12 ins. with water about 10 ins. deep, and the compost is river sand and gravel.

J. FERGUSSON, Dumfries.

Reader's Home Aquarium

THE accompanying picture shows a tropical aquarium outfit designed and built by myself. The tubular stand is one-inch conduit pipe that any electrician can bend, with tubular cross-members.

To carry the large tank (30 ins. by 15 ins. by 12 ins.) there are two one-inch angle-iron pieces welded across with a half-inch clearance, i.e., a quarter of an inch each end to allow



Mr. A. E. Cooper's home-designed tubular stand to take two aquaria and with built-in apparatus cupboard

the tank to slip in easily. Fastened to these angle bars is a sheet of 20-gauge sheet metal, bent up to form a casing for the cupboard between the tanks (20 ins. across, 6 ins. deep), with 1½ in. by ½ in. rivets. A wood back is made for the cupboard and a wood front is hinged so as to drop down to allow access to pump and multiple plug board distributing power to pump, heater and lights.

On each side of the cupboard in the picture can be seen small neon lamps in series with the thermostats to indicate heater functioning. The bottom tank—20 ins. by 15 ins. by 12 ins.—rests on a piece of asbestos board placed on the cross members. On either side pieces of plate glass are fitted to take flower vases. The tank covers are made of wood lined with reflectors and carry two 60-watt lamps over the top tank and two 25 watt lamps over the bottom one. Glass covers are also used. Tanks are painted cream enamel and the stand pale green enamel. I can say with pride that the outfit is an asset to a living room as a beautiful piece of furniture.

A. E. COOPER,
Barrow-in-Furness, Lancs.

“Old George”

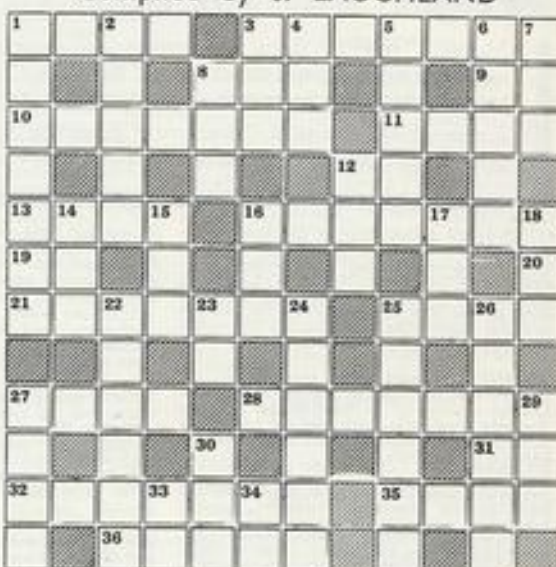
OLD George, London Zoo's oldest alligator, a resident of the reptile house since 1912, died last month. He was believed to be 60 years old, and was 11 feet in length. Autopsy revealed that a story concerning the existence of a stock of sovereigns within him, supposed to be the result of eating a purse provided by a visitor, was untrue. A few copper coins were found in the stomach but these were not the cause of death.

CORRECTION

It is regretted that in the announcement describing Mr. Cedric Chater's picture “Veiltail Goldfish” on page 139 of last month's issue the information was incorrectly given that the picture was obtainable from The Medici Society Ltd. The picture can be purchased only through art dealers.

The AQUARIST Crossword

Compiled by J. LAUGHLAND



CLUES ACROSS

- | | |
|--|---|
| 1 Rough indication of pH value (4) | 25 A sweet beer, but in bladder this means root (4) |
| 3 Variety of <i>Betta</i> (7) | 27 Common British fish, alias red-eye (4) |
| 8 Organ of balance in fish (3) | 28 These tropical favourites are certainly not white fish (7) |
| 9 Is in this clue (2) | 31 Look at the start for the answer (2) |
| 10 A tan rat (anagram) (7) | 32 No aquarist will hesitate to call this a weed on the bed of tank or pond (7) |
| 11 Fishes that can cross land (4) | 35 Due (4) |
| 12 Alternative of orle (2) | 36 Port near Edinburgh (5) |
| 13 Famous anglers' river is a decided trial (4) | |
| 16 Batrachian family (7) | |
| 19 It treads the corn (2) | |
| 21 Our-footed; as the water boatman, for example (7) | |

CLUES DOWN

- | | |
|--|--|
| 1 Mechanical device for oxygenating aquaria (7) | 15 Prefix common in aquatic terminology; means three (3) |
| 2 Book sometimes called the aquarists' bible. The writer of same (5) | 16 Fish eggs (3) |
| 3 Bank of sand at mouth of a river (3) | 17 A song in two parts (3) |
| 4 Age of the Ranidae (3) | 18 Nest (3) |
| 5 Species of gourami (5) | 22 Average (6) |
| 6 Hair-like lashes of cells (5) | 23 Parent of <i>Paramecium</i> (2) |
| 7 Last loses a pound, silly creature (3) | 24 Dearth of water (6) |
| 8 And so on (3) | 25 Roll in mud (6) |
| 12 A unit (3) | 26 Angler, dancer, or just drunk (6) |
| 14 River in the Doone country (3) | 27 Red stone (4) |
| | 29 Turf (3) |
| | 30 Snow shoe of fish skin (3) |
| | 33 Direction of 36 (1, 1) |
| | 34 “— ra, <i>Brass</i> ?” (2) |

PICK YOUR ANSWER

- The orange-tail mollie was developed from: (a) *Mollinia latipinna*. (b) *Mollinia latipunctata*. (c) *Mollinia sphaerops*. (d) *Mollinia velifera*.
- Which is the smallest of the following species: (a) *Cichlasoma aurorum*. (b) *Cichlasoma bimaculatum*. (c) *Cichlasoma ceteri*. (d) *Cichlasoma sphenothalmus*.
- Characidium racheoi* is native to: (a) North-east Brazil and the Guianas. (b) North-west Brazil and Colombia. (c) South-east Brazil and Paraguay. (d) South-west Brazil and Bolivia.
- Cynolebias adloffi* attains a length of about: (a) 1 in. (b) 2 ins. (c) 3 ins. (d) 4 ins.
- The *Blatter für Aquarier und Terrarierkunde* was founded in: (a) 1880. (b) 1890. (c) 1900. (d) 1910.
- Life and Love in the Aquarium* was written by: (a) Norbert Lederer. (b) Alfred Morgan. (c) C. H. Peters. (d) Carl E. Thompson. G. F. H.

(Solutions on page 175)

News

from AQUARISTS' SOCIETIES

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

A copy of *The Aquarist's Directory of Aquarium Societies* will be sent free to any reader on receipt of a stamped, self-addressed envelope.

THIS year's annual show of the **Accrington and District Aquarist Society** (their fourth) drew smaller crowds than last year despite the excellence of the show. Messrs. J. Legge and A. Williams judged the entries, all furnished aquaria, and Mrs. Dorothy Loder of Burnley won the Cocker Challenge Cup for the show's best exhibit.

BEXHILL, Borough water engineer Mr. A. Bristow was the visiting lecturer at the first October meeting of the **Bexhill and District Aquatic Society**. With him he had a pH meter and took readings on water samples brought by members.

ANNUAL general meeting of the **Chingford and District Amateur Aquarist Society** took place in October. Mr. G. Wrenn was elected president, Mr. L. Roberts elected chairman, Mrs. B. Bell treasurer and Mr. R. Macfadzean (46, Nevin Drive, London, E4) continues as secretary.

OVER 1,000 people passed through a marquee containing 20 furnished aquaria and 40 single entries in the display arranged by the **Crawley and District Aquarist Society** in conjunction with a show of all pets. Fish entries were judged by Mr. A. Lambert.

THE first competitive show for furnished aquaria to be staged in Dublin was arranged by the **Dublin Society of Aquarists** in conjunction with the Royal Horticultural Society of Ireland. Awards were:—Tropical—1, Mr. R. Russell; 2, Mr. J. Tyrrell; 3, Mr. A. Webb. Coldwater—1, Mrs. E. Spurling Jewell; 2, Mr. A. Spurling Jewell; 3, Mrs. D. Quinn.

THIS year's annual show of the **East London Aquarists' and Pondkeepers' Association** attracted 341 entries, over 500 fishes. The

Mayor and Mayoress of Barking presented the prizes, including the Coronation Trophy won by Bethnal Green Aquatic Society for the best club furnished aquarium.

FIRST and second places at the table show for livebearers held recently by the **Friends' Aquarist Society** were taken by the exhibits from Mr. D. A. Gregor.

EIGHT guppy breeders' societies took part in the annual cup competition of the **Federation of Guppy Breeders' Societies** held in London. It was the "biggest ever" guppy exhibition, with nearly 500 guppies on show to the public. Best fish in the show was judged to be a double-sword male guppy belonging to Mr. W. G. Layzell.

AN alligator, terrapins and tortoises, skinks, pythons and a six feet boa constrictor accompanied their owner, Mr. B. E. M. Smith, when he gave a lecture on reptiles to the **Hampstead Aquatic Society**.

THE annual outing of the **Kettering and District Aquarists' Society** this year was made to the fish houses of Messrs. Whitwell and Smykala of Colchester, where many members gained useful tips on breeding problems.

LAST month's film show organised by the **Leicester Aquarist Society** for an evening meeting attracted a large attendance of members. At the meeting before this Mr. W. R. Burwell delivered a talk on aquarium pioneers which was illustrated by lantern slides.

MEMBERS of the **Mid-Somerset Aquarists' Society** were taken on an imaginary tour of Bristol Zoo aquarium, when they were given a talk by Mr. L. Jones, its curator. He described



Exhibit staged at a local trade fair by members of Huntingdon and District A.S. to publicise the hobby and obtain new members. Nearly 10,000 visitors saw the display

for them his charges, tank by tank, and answered many questions from his listeners.

ANNUAL show of the **North Birmingham Pond and Aquarium Society** was held last month, when entries were judged by members of the Midland Association A.S. panel of judges.

RECENT meetings of the **Oldham and District Aquarist Society** have included a talk on thermostat construction by chairman Mr. F. C. Howell and a talk on the *Abbyssinica* species given by Mr. J. R. Shaw. Last month Dr. F. N. Ghadially spoke to the society on breeding tropical fish.

FIRSTS in all the open classes of the Oldham aquaria show were taken by members of the **Rochdale and District Aquarist Society** and the club furnished tropical aquarium also took first in the inter-society class.

OVER 20 tanks of tropical and coldwater fish, including British specimens, were on display in a marquee show given by the **Slieford and District Aquarist Society**. The show was held in conjunction with an exhibition by a local gardening organisation.

A "FAIRYLAND" was how the Mayor of Southampton described the fourth annual show of the **Southampton and District Aquarists' Society** in his opening ceremony speech. There were 247 entries and over 3,000 people saw the show during its three days opening.

Best aquarium at the third annual show of **Oldham and District A.S.** was entered by Mrs. J. Dodsworth of Rochdale



An unusual species claimed best fish in the show award—a specimen of *Gophaugus fransiliensis* owned by Mr. P. L. Burden.

AN aquarium of tropical fishes displayed by the Southern Amateur Aquarists at the Brighton Horticultural Society's autumn show last month attracted interest and brought enquiries about both the society and the hobby.

CHAIRMAN Mr. F. Bassett-Jones reported a very successful year for the Swansea and District Aquarists' Society at their annual general meeting, and he reviewed the exhibitions and shows in which the society had played a part. Membership of the society stands at 62 and it is in a sound financial position.

MONTHLY issue of a free bulletin to members is the latest venture of the Walworth Aquarist Club. The club meets on alternate Wednesdays at 8 p.m. in Loerrimere Hall, Olney Road, London, S.E.17, where recent evening meetings have included lectures on water plants, show standards and live food collection, table shows for livebearers and a quiz.

Blackpool Show



THIRD annual show of the Blackpool and Fylde Aquatic Society attracted 224 entries, from as far afield as Surrey in the south and from Carlisle in the north. Judges were Messrs. J. H. Gloyne and H. Snape, seen assessing a specimen of *Astronotus ocellatus* in the picture above. A trophy was presented for award for the best individual tropical furnished aquarium by the Blackpool Corporation, and this is shown in the hands of the society's chairman, Mr. Norman Hadley, and show secretary, Mr. W. Robinson, in the picture below. A black widow belonging to Mr. J. R. Shaw (Oldham) was judged best fish in the show and the Corporation Trophy was awarded to Mr. A. Wardle of Bury. The show lasted six days and was opened by Blackpool's clown, Mr. Charlie Cairoli.



Photos: "Lancashire Daily Post"

Cinema Display

THE Metro-Goldwyn-Mayer film "Scandal at Scourie," which includes the adventures of a small orphan girl whose only worldly possession is a goldfish, is now generally released. By arrangement with Messrs. Spratt's Patent Ltd. it is proposed to organise 1000 aquarium displays at certain cinemas showing the film, and aquarists' societies in the localities might wish to take advantage of the publicity thus offered by loaning and installing an aquarium; cinema managers may be asked about the possibility of this venture by the secretaries of societies. Places, playing dates and periods of showing are:—Cardiff Olympia Cinema, 15th November, 7 days; Manchester New Oxford Cinema, 22nd November, 7 days; Sunderland Ritz Cinema, 23rd November, 6 days; Hartlepool Forum Cinema, 30th November, 6 days; Darlington Regal Cinema, 7th December, 6 days; Middlesbrough Elite Cinema, 21st December, 5 days; South Shields Savoy Cinema, 21st December, 5 days.

F.B.A.S. Assembly

AT the September Assembly of the Federation of British Aquatic Societies it was announced that member societies now total 115. Thirty-seven delegates attended, and at the opening of the meeting the chairman, Mr. T. E. Burt, welcomed Mr. A. Fraser-Brunner, recently returned from absence overseas. The treasurer's report disclosed a balance of over £250. It is announced that the address of the F.B.A.S. Services Secretary is now (Mr. S. T. Jelly) 34, Fairfield Avenue, Rushlip, Middlesex.

New Societies

Lebistes Study Group. Secretary: Mr. J. E. Edwards, 42, Berrylands Road, Surbiton, Surrey. Meetings: Last Friday each month at the above address. (This society has been formed in place of the North Surrey section of the Federation of Guppy Breeders' Societies, which has ceased to exist.)

St. Anne's Society of Aquarists. Secretary: Mr. A. McCurdy, 88, Donegall Avenue,

Belfast, N.I. Meetings: First Thursday of each month.

Todmorden and District Aquarist Society. Secretary: Mr. J. R. Horsfall, 74, Industrial Street, Todmorden.

Secretary Changes

CHANGES of secretaries and addresses have been reported from the following societies:

Bury and District Aquarist Society (Mr. H. Hammond, 45, Cedar Street, Bury, Lancs.); **Crewe and District Aquarist Society** (Mr. H. J. Eden, 48, Cherry Tree Road, Crewe); **Dalton and District Aquarist Society** (Mr. A. P. Foxon, 3, Thirlmere Close, Dalton-in-Furness, Lancs.); **Forest Hill and District Aquaria Society** (Mr. H. J. Vosper, 23, St. Asaph Road, Brockley, London, S.E.4.); **Leigh and District Aquarist Society** (Mr. J. Clare, 31, Mayfield Street, Atherton, Lancs.); **Plymouth Aquarist Society** (Mrs. V. Coslett, 180, Bodmin Road, Whitleigh, Devon); **Weymouth and District Aquarist Society** (Mrs. J. P. Pugh, 71, Mill Road, West Drayton, Middlesex).

Aquarist's Calendar

11th-13th November: **Mid-Somerset Aquarists' Society** annual show of tropical and coldwater fishes at Blake Hall, Bridgewater, Somerset.

12th-14th November: **Gloucester and Cheltenham Aquarists' Society** second annual show at Empire Hall, Cheltenham.

14th November: **Lancashire Aquatic Breeders' Society** first annual open show in the Spinners' Hall, Bolton. Show schedules available from Mr. J. Duckworth, 534, Plodder Lane, Bolton, Lancs.

4th December: **British Herpetological Society** London Group annual general meeting, 7 p.m., at Linnaean Society's rooms, Burlington House, Piccadilly, London, W.1.

5th December: **Peterborough and District Aquarists' Society** annual show with open classes. Schedules and full details from Mr. R. Whitehead, 32, Low Cross, Whittlesey, nr. Peterborough, Northants.

12th December: **Federation of British Aquatic Societies** general assembly, 2.30 p.m. at Friends House, Euston Road, London, N.W.1.

21st-28th December: **Plymouth Aquarist Society** display of aquaria at Plymouth School-boys' Exhibition, Hyde Park School, Plymouth.



The Aquarist's Badge

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

To obtain your badge send a postal order for 1s. 9d. together with the **Aquarist's Badge Token** cut from page xvi, to Aquarist's Badge, *The Aquarist*, The Butts, Half Acre, Brentford, Middlesex, and please specify which type of fitting you require.

Crossword Solution

A	C	I	D	B	E	L	L	I	C	A
E	N	E	A	R	E	E	I	S		
R	A	N	A	T	R	A	E	E	L	S
A	E	C	O	R	I					
T	E	S	T	R	A	N	I	D	A	E
O	X	R	O	E	U	F				
R	E	M	I	P	E	D	W	O	R	T
E	A	R	A	E						
R	U	D	D	M	O	L	L	I	E	S
U	I	S	U	L	L	O				
B	L	A	N	K	E	T	O	W	E	D
Y	L	E	I	T	H	W	R			

PICK YOUR ANSWER (Solutions)

1 (c). 2 (c). 3 (c). 4 (b). 5 (b). 6 (c)



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